

S2Biom Project Summer School

17-20 May, 2016

SUMMARY

Venue:

National Technical University of Athens (NTUA),

Zografou Campus

Athens, Greece



About S2Biom project

The S2Biom project - Delivery of sustainable supply of non-food biomass to support a “resource-efficient” Bio-economy 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



S2Biom is co-funded by the European Commission in the 7th Framework Programme (Project No. FP7-608622). It is coordinated by FNR (Fachagentur Nachhaltige Rohstoffe e.V.), and the consortium includes 31 partners from EU28, western Balkans, Ukraine and Turkey.

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Introduction

In S2Biom project it was planned to promote cooperation and synergies between S2Biom partners engaged in research activities on sustainable supply of non-food biomass at pan European level, through a limited number of student exchanges. This student exchange programme was planned to include post-doc and post-graduate student exchange visits from S2Biom research partners with the aim to increase research capacity on biomass costs-supply, conversion technologies and bio-based products, logistics and feedstock delivery chains, value chain sustainability, financial and regulatory frameworks, as well as tool and strategy development in EU28, Western Balkan, Moldova, Ukraine and Turkey.

Due to high University fees, which were not taken into account during the S2Biom project proposal, it has been decided to organize a one week summer school instead of the student exchange programme. The summer school has been organised on 17-20 May 2016 in Athens, Greece and hosted by the National Technical University of Athens (NTUA) in Zografou Campus.

Organisers

The summer school has been organised by the National Technical University of Athens / Laboratory of Steam Boilers and Thermal Plants and co-organized by WIP – Renewable Energies (Germany) and CERTH - Centre for Research & Technology Hellas (Greece) with support of other S2Biom project partners.



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS

Announcement of the summer school has been published by CERTH in several online media in Greece which was in addition to the promotion campaign by WIP and S2Biom project partners in social media and through personal networks. In overall the organization efforts resulted in a high interest in Greece and other European countries.

The participation in the summer school was free of charge. However, travel costs to and from the venue, accommodation costs as well as any other costs had to be covered by the summer school participants themselves or from alternative funding sources. For that reason the most of the participants came from Greece and neighbouring countries.

Participants of the S2Biom summer school

The S2Biom summer school was foreseen for Master and PhD level students. Post-doc students and researchers from scientific institutes willing to extend their knowledge about non-food biomass feedstock supply chains, costs and technologies, have also been welcomed to join. Participants were invited to bring their own laptops to be used during the S2Biom Tools workshops.

In total around 50 participants, coming from Greece, Serbia, United Kingdom and Finland, attended the summer school (see Figure 1). The list of participants is provided in the Annex II of this report.



Figure 1: Participants of the S2Biom summer school in Athens, Greece

At the end of the event students, who attended the complete course, received the certificate of attendance (see Figure 2).

Summer school agenda

The agenda of the summer school included 6 sessions which were implemented in 4 days. The following topics have been included:

1. Sustainable supply of non-food biomass to support a “resource-efficient” Bioeconomy in Europe
2. Estimation of biomass availability for lignocellulosic biomass
3. Biomass conversion technologies
4. Matching the biomass to conversion technologies
5. Biomass logistics
6. Policies & case studies

Full agenda of the summer school is provided in Annex I.

Presentations

All presentations given in the summer school are published on the S2Biom project website: <http://www.s2biom.eu/en/10-news-events/29-summer-school.html>



Figure 2: Certificate of the attendance of S2Biom summer school in Athens

Summary of the S2Biom summer school

Day 1: Biomass supply & introduction to the S2Biom toolset

The first day started with the opening of the summer school and welcoming participants. Practical and organisational issues have been explained. Two welcome presentations were given by **Professor Sotirios Karellas** (NTUA, Greece) and **Manolis Karampinis** (CERTH, Greece).



Figure 3: Welcome presentation by Prof. Karellos (NTUA)



Figure 4: Welcome by Manolis Karampinis (CERTH)

1st session included 2 presentations. S2Biom project coordinator **Ludger Wenzelides** (FNR, Germany) explained the idea and objectives of S2Biom project and introduced participants to the work programme and so far achieved results.

The following presentation given by **Ilze Dzene** (WIP-Renewable Energies, Germany) gave an overview about state-of-the-art of sustainable supply of non-food biomass for resource efficient bio-economy in Europe. It was an introduction presentation summarizing lignocellulosic biomass potential assessments in previous studies and providing an overview of European policy framework conditions.



Figure 5: Presentation of Ludger Wenzelides (FNR)



Figure 6: Presentation of Ilze Dzene (WIP)

The Day 1 was continued with the 2nd session. Estimation of biomass availability for lignocellulosic biomass has been discussed in 3 following presentations. **Igor Staritsky** (DLO-Alterra, the Netherlands) demonstrated the biomass mapping tool and cost supply curves, **Jacqueline Ramírez Almeyda** (UniBO, Italy) presented methodology and data behind assessment of the cropping potential and dedicated crops database, and **Raymond**

Schrijver (DLO-Alterra, the Netherlands) presented the methodology of economic assessment implemented in the S2Biom toolset.



Figure 7: Presentation of Igor Staritsky (DLO-Alterra)



Figure 8: Presentation of Jacqueline Ramírez Almeyda (UniBO)



Figure 9: Presentation of Raymond Schrijver (DLO-Alterra)



Figure 10: Discussions after the Day 1

Day 2: Conversion technologies

The 2nd day of the S2Biom summer school started with the Session 3 where biomass conversion technologies for energy and fuels have been presented by **Tijs Lammens** (BTG, the Netherlands). Biomass conversion technologies for bio-based products were summarized by **Ludger Wenzelides** (FNR).

After the coffee break Tijs Lammens presented biomass and technology matching tool and organized the tool testing session. Summer school participants were able to try out how the tool works and were supported by the developers of the tool in case of any questions.

The day was concluded by the visit to NTUA laboratories for the first group of the students.



Figure 11: Presentation of Tijs Lammens (BTG)



Figure 12: Ludger Wenzelides (FNR) presenting conversion technologies for bio-based products

Day 3: Logistics

The Day 3 of the S2Biom summer school was dealing with logistics and the planning of biomass supply chains. Two S2Biom tools have been presented and demonstrated – BeWhere tool and the LocaGIStics tool. The first presentation about the main logistical components and logistic concepts has been provided by **Igor Staritsky** (DLO-Alterra, the Netherlands). The second presentation was given by **Sylvain Leduc** (IIASA, Austria). He presented the methodology behind BeWhere tool and demonstrated the tool on the example of Burgundy case study. The BeWhere allows modelling of optimal technology, location and capacity of bioenergy production plants in a certain region.



Figure 13: Presentation of Sylvain Leduc (IIASA)



Figure 14: Igor Staritsky (DLO-Alterra) presenting LocaGIStics tool and methodology

After the break Igor Startsky explained the LocaGIStics tool and summer school participants were able to test the tools with their computers. Individual user profiles for participants have been set up.



Figure 15: Summer school participants at the tool testing workshop

The day was concluded by the guided laboratory tour to the 2nd group of students.

Day 4: Policy and case studies

The final day of the S2Biom summer school included lectures on policies and case studies implemented in the S2Biom project. The day started with the presentation of benchmark and gap analysis which has been implemented by S2Biom project partner VITO and presented by **Ludger Wenzelides** (FNR).



Figure 16: Ludger Wenzelides (FNR) presenting benchmark and gap analysis



Figure 17: Participants on the last day of the summer school

Afterwards two case studies have been presented. **Kristian Melin** (VTT, Finland) introduced to the case study of Finland and **Madga Borzęcka** (IUNG, Poland) presented the results of case study on biofuel production in North-East Germany and North-West Poland. This case study has been performed in cooperation with S2Biom partner SYNCOM from Germany.



Figure 18: Kristian Melin (VTT) presenting case study from Finland



Figure 19: Magda Borzęcka (IUNG) presenting German-Polish case study

After the last day presentations the participants received their certificates of attendance and filled in the evaluation sheets. Evaluation sheets have been prepared by WIP and aimed to collect feedback from the participants and to evaluate the overall performance of the event.

Evaluation summary of the summer school

All together 31 evaluation questionnaires have been collected from the summer school participants.

Most of the participants (52%) have learned about the summer school in internet, 32% followed the personal or email invitation, 16% got to know about the event from their professor or a friend who studies in NTUA.

The content of the summer school mostly satisfied the expectations of the participants because:

- It was an opportunity to learn much more about lignocellulosic biomass and biomass conversion technologies;
- A chance to get familiar with very helpful tools (e.g. BeWhere) was given;
- It was surprising to find out that biomass has such a big potential and can be exploited in so many ways;
- Interesting presentations, multicultural environment, high-qualified lecturers and the lab-type interactive style of the course;
- Most of the speakers were “easy to follow” and inspired;
- I got information about relevant initiatives in Greece and other countries;
- It provided good overview about the state-of-art in EU;
- Exceptional presentations from Tijs Lammens;
- My knowledge on bioenergy and biomass sector was broaden and I learned a lot useful information and existence of great tools;
- Whole cycle of biomass use has been presented in a coherent way that helped me to gain a deeper understanding in these topics;

- It was very close to my research field;
- Bio2Match, BeWhere, LocaGIStics and Finnish case study are very useful for my future study works;
- It was interesting with a very good content;
- It covered what was promised in the program in an explanatory manner. The presenters were good and willing to solve every question;
- I learned the methods and sources for the production of biomass and useful tools. It will help me with my diploma work;
- I had the chance to broaden my horizons on biomass valorisation aspects; to explore new potential of sustainability issues and to come in touch with other people sharing the same interest for biomass potential;
- I received information about biomass utilisation as well as the S2Biom project which really interesting.

The content of the summer did not satisfy some expectations of the participants because:

- It was not enough interactive during S2Biom tools testing;
- I would like it to focus more on biofuels production from lignocellulosic biomass;
- I would like to have more demonstration time of the developed tools and the interaction with audience (for example live exercises with the tools);
- It was not possible to test the tools presented on the 3rd day, although the extensive description about they use have been provided;
- Low interpretation of Anaerobic Digestion in the tools;
- I expected more details about conversion technologies and higher interest in biotechnology;
- The internet connection was interrupted and registration process did not work smoothly (however, it was reasonably justified);
- Some presentations were not very interesting, but in a general basis the most of them met my expectations.

The most interesting sessions for the participants was Session 3 (29% of all votes) on biomass conversion technologies, Session 4 (26%) with demonstration of Bio2Match tool and the Session 5 (16%) on biomass logistics. Other 3 sessions received equal interest (10% each).

The following topics should have been discussed in more details:

- Developed tools and working with them;
- Specific applications of tools;
- Small and medium sizes of biomass exploitation, that could be distributed through EU;
- Top match technologies (e.g., plasma gasification, fuel cells);
- The ability of biomass plants to stabilize the energy production of all other renewable sources;
- Biomass logistics;
- Biomass conversion technologies;
- Biomass availability assessments and matching tool;

- Anaerobic digestion;
- Biomass – wheat straw instead of wood;
- Conversion technologies, especially the biotechnology based ones;
- Abilities to play with the tools. Maybe instead of “print screens” into slides a “real time” demonstrations would be more helpful;
- Probably more time to explore the tools should be given;
- Maybe a more detailed presentation of the conversion technology basic operation principles should be provided;
- A topic about the waste treatment opportunities may have been presented a bit more detailed.

The interest in tools is proportionally distributed between different S2Biom tools. The most interesting tool for the participants seemed to be ‘Bio2Match’ tool (31% of all positive replies); biomass cost-supply tool (27%), ‘BeWhere’ (25%) and ‘LocaGIStics’ (17%).

There are following suggestions for the improvement of tools:

- In the tools it should be directly noted, when the data was last updated;
- For practicing, interaction and networking, it would be useful to organize a group work after tool testing sessions;
- Internet connection and access on tools using username and password should be more functional;
- It would be good if tools could be used as a part of virtual case study that combines all of them;
- In matching tool it would be better to use methane yield instead of biogas yield;
- Maybe it is possible in the future to make tools ‘mobile’ and ‘tablet’ users friendly;
- The visual part of the tools should be improved – I would like to see the full display of the words and sentences used in each of the tools.

Almost all participants think that the length of the summer school was appropriate. Few would like to have it a bit longer (5 days) or to have more time for testing the tools. Only one person thought the summer school was too long (3 days were suggested).

Most of the participants would recommend the summer school to other persons.

Annex I: Agenda of the summer school

Tuesday		
17th May 2016		
Day 1: Biomass supply & introduction to S2Biom toolset		
10:00 – 10:15	Welcome to the summer school and overview of the agenda	Assoc. Prof. Sotirios Karellas, NTUA Manolis Karampinis, CERTH
10:15 – 11:30	Session 1: Sustainable supply of non-food biomass to support a “resource-efficient” Bioeconomy in Europe	
	Introduction to the S2Biom project	Ludger Wenzelides, FNR
	Sustainable supply of non-food biomass for a resource efficient bio-economy: Review on the state-of-the-art	Ilze Dzene, WIP
11:30 – 11:45	<i>Break</i>	
11:45 – 13:15	Session 2: Estimation of biomass availability for lignocellulosic biomass	
	Mapping of the biomass availability and cost supply curves	Igor Staritsky, DLO - Alterra
	Assessment of the cropping potential and the development of dedicated crops database	Jacqueline Ramírez Almeyda, UniBO
	S2Biom Tool box workshop: biomass availability maps and cost supply curves	Igor Staritsky, Raymond Schrijver, DLO – Alterra
Wednesday		
18th May 2016		
Day 2: Conversion technologies		
10:00 – 12:00	Session 3: Biomass conversion technologies	
	Overview on biomass conversion technologies for energy and fuels	Tijs Lammens, BTG
	Overview on biomass conversion technologies for bio-based products	Ludger Wenzelides, FNR
12:00 – 12:15	<i>Break</i>	
12:15 – 14:15	Session 4: Matching the biomass to conversion technologies	
	Matching the biomass to conversion technologies	Tijs Lammens, BTG
	Biomass & Technology Matching Tool workshop	Tijs Lammens, BTG
14:15 – 14:45	NTUA/LSBTP Lab tour (1 st group of students)	
Thursday		
19th May 2016		
Day 3: Logistics		
10:00 – 13:15	Session 5: Biomass logistics	
	The main logistical components and logistic concepts	Igor Staritsky, DLO – Alterra
	BeWhere Tool workshop: Optimal Technology, Location and Capacity of Bio-energy Production Plants and Evaluation	Sylvain Leduc, IIASA
11:30 – 11:45	<i>Break</i>	
11:45 – 13:15	LocaGIStics Tool workshop: Biomass Chain Design and Evaluation	Igor Staritsky, DLO – Alterra
13:15 – 13:45	NTUA/LSBTP Lab tour (2 nd group of students)	

Friday 20 th May 2016	Day 4: Policy and case studies	
10:00 – 11:30	Session 6: Policies & case studies	
	Benchmark and gap analysis	Ludger Wenzelides, VITO & FNR
	Case study of Finland	Melin Kristian, VTT
11:30 – 11:45	<i>Break</i>	
11:45 – 12:30	Case study on Biofuel production in North-East Germany and North West Poland	Magda Borzęcka, IUNG, Simon Kühner, Klaus Lenz, SYNCOM
12:30	<i>End of the summer school</i>	

Annex II: List of participants

No	First name	Family name	Country	University/Institution
1	Foteini	Barla	Greece	National Technical University of Athens
2	Esmira	Bibaj	Greece	Eastern Macedonia & Thrace Technological Institute
3	Muhammad	Bilal Ali	UK	University of Glasgow
4	Thomas	Christou	Greece	National Technical University of Athens
5	Panagiotis	Danias	Greece	National Technical University of Athens, School of Chemical Engineering
6	Christodoulos	Dimitrelis	Greece	National Technical University of Athens, School of Chemical Engineering
7	Athanasios	Gentimis	Greece	Institute for the Management of Information Systems
8	Chrysoula	Gkantela	Greece	National Technical University of Athens
9	Paraskevi	Kamaterou	Greece	Aristotle University of Thessaloniki
10	Spyridon	Katoumas	Greece	MBA, graduate of the Athens University of Economics & Business
11	Nikolaos	Kekes	Greece	National Technical University of Athens
12	Dimitrios	Konstantopoulos	Greece	National Technical University of Athens, School of Chemical Engineering
13	Michael - Alexander	Kougioumtzis	Greece	Centre for Research & Technology Hellas / Chemical Process & Energy Resources Institute (CERTH/CPERI)
14	Dimitris	Koullas	Greece	National Technical University of Athens, School of Chemical Engineering
15	Gerasimos	Kounadis	Greece	National Technical University of Athens
16	Georgios	Lignos	Greece	National Technical University of Athens, School of Chemical Engineering
17	Athanasios	Limnaios	Greece	National Technical University of Athens
18	Kyriaki	Lysigaki	Greece	Eastern Macedonia and Thrace Institute, Hephaestus Advanced Laboratory
19	Dimitris	Machairas	Greece	National Technical University of Athens
20	Nebojša	Manić	Serbia	Graduate of the University of Belgrade, Faculty of Mechanical Engineering
21	Angeliki	Maragkaki	Greece	Technological Educational Institute of Crete
22	Dimitrios	Mathioudakis	Greece	National Technical University of Athens

No	First name	Family name	Country	University/Institution
23	Panagiota	Megagianni	Greece	National Technical University of Athens
24	Konstantinos	Mpraimakis	Greece	National Technical University of Athens
25	Maria	Nikoy	Greece	National Technical University of Athens
26	Vasiliki	Ntagkonikou	Greece	National Technical University of Athens
27	Manolis	Panagiotis	Greece	National Technical University of Athens
28	Petros	Papadatos	Greece	Physicist, MSc in Energy, graduate of Heriot-Watt University
29	Konstantinos	Papaspyrou	Greece	Graduate of the University of Piraeus
30	Konstantina	Peloriadi	Greece	National Technical University of Athens
31	Christoforos	Perakis	Greece	Centre for Renewable Energy Sources and Saving (CRES)
32	Apostolos	Petropoulos	Greece	National Technical University of Athens
33	Dimitrios	Petsanas	Greece	National Technical University of Athens
34	Marianna	Poulogiannopoulou	Greece	National Technical University of Athens, School of Chemical Engineering
35	Fragkiskos	Proestakis	Greece	Graduate of Technical Educational Institute of Crete - Environmental and Natural Resources Engineering
36	Melina	Psycha	Greece	National Technical University of Athens
37	Konstantinos	Pyrgakis	Greece	School of Chemical Engineering, National Technical University of Athens
38	Anastasia	Rodana	Greece	Eastern Macedonia and Thrace Institute of Technology, School of Engineering, Technology Hephaestus Advanced Research Laboratory
39	Efthymios	Rodias	Greece	Agricultural University of Athens
40	Eleni	Routoula	UK	University of Sheffield
41	Hiseni	Sadik	Greece	National Technical University of Athens
42	Sandra	Sandar	Finland	University of Eastern Finland
43	Evangelos	Syngounas	Greece	National Technical University of Athens
44	Christina	Tsouti	Greece	Diploma in Chemical Engineering
45	Evangelia	Tzoumani	Greece	Eastern Macedonia & Thrace Technological Institute

No	First name	Family name	Country	University/Institution
46	Aristotelis	Vasileiou	Greece	National Technical University of Athens
47	Ioannis	Vergos	Greece	University of Thessaly, Faculty of Medicine
48	Dionysis	Vlassopoulos	Greece	National Technical University of Athens
49	George	Vogiatzakis	Greece	National Technical University of Athens