

BIOPOL



www.biorefinery.nl/biopool

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Project acronym: BIOPOL

Project title:

Assessment of BIOrefinery concepts and the implications for agricultural and forestry POLicy

Instrument: **Specific Support Action**

Thematic Priority: Scientific Support to Policies (SSP)



the international institute for industrial environmental economics
Lund University, Sweden



Deliverables 6.2.2 and 6.6

A final project wide workshop to present the biorefinery assessments and recommendations to European Stakeholders and policy makers

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|---|---|---|
| Dissemination level | | |
| PU | Public | |
| PP | Restricted to other programme participants (including the Commission Services) | |
| RE | Restricted to a group specified by the consortium (including the Commission Services) | X |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

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1. Introduction

In accordance with the Biopol Description of Work the final workshop was planned to present the biorefinery assessments and recommendations to European Stakeholders and policy makers. Correspondingly, the one-day workshop included a lecture program and an interactive panel discussion session.

The workshop was held on 30 March 2009 at the Committee of the Regions, Brussels, and was a joint workshop with the SSA Biorefinery Euroview. The workshop attracted over 100 participants from all partner countries of the two projects.

Whilst the Biopol Description of Work document suggests that 3 workshops should be held during the project. It was decided that an additional workshop between the 1st and final workshops would not provide additional value in dissemination, and could dilute the impact of the final workshop. Since some data gathering activities involved interaction with stakeholders an additional 'parallel' workshop was organised in March 2009 alongside the final workshop and targeted at sustainability issues. In addition, two members of the Biopol team attended a special workshop in June 2008 organised by SSA Biorefinery Euroview to discuss biorefinery concepts with stakeholders.

2. Workshop planning

The planning for the final workshop was begun in 2008. Two planning meetings were held between the project organisers and project coordinators in September 2008 and March 2009. Brussels was chosen for its convenience for most European participants, for the availability of an excellent venue free-of-charge, and the proximity of the European Commission, whose officials constitute part of the target audience for demonstration.

A communication strategy was developed early in the planning process. It included distributing a 'save the date' flyer to the available mailing lists in late 2008, followed by an official invitation to a selected mailing list and wider publicity via online events listings in the biorenewables and research field (e.g. Cordis, Royal Society of Chemistry, Europabio etc.). Key invitees were the European Technology Platforms. They were invited via their website coordinators who were also able to advertise the event on the Technology Platforms' websites.

In addition to presentation of project results, an aim of the workshop was to encourage discussion amongst participants and place the project work in the context of other European and global activities. To achieve this, a panel discussion was planned involving representatives of industry, government, overseas experts and the Technology Platforms. The panel discussion was preceded by interventions from Maria Wellisch of Natural Resources Canada and Alfredo Aguilar of the European Commission.

3. Workshop timetable

| Committee of the Regions, Rue Belliard 99-101, 1040 Brussels | |
|--|--|
| 09.30 | Registration |
| 09.50 | Welcome by the project coordinators of Biopol and Biorefinery Euroview <i>E. Annevelink (Wageningen UR) & C. Luguel (IAR Cluster)</i> |
| 10.00 | Address from the European Commission <i>P. Venturi (European Commission DG Research)</i> |
| 10.15 | Introduction to the two projects and headline conclusions <i>E. Annevelink (Wageningen UR) & C. Luguel (IAR Cluster)</i> |
| 10.45 | Defining biorefineries and different concepts <i>W. Soetaert (Ghent University)</i> |
| 11. 15 Coffee break | |
| 11.45 | Mapping of EU biorefinery activities <i>V. Steinmetz (CARINNA) and H. Reith (ECN)</i> |
| 12.15 | Consumer landscape <i>K. Menrad (Univ. Weihenstephan)</i> |
| 12.45 Lunch | |
| 13.45 | Technological and economic evaluation of lignocellulosic Biorefinery <i>L. Fagernas (VTT)</i> |
| 14.15 | Technical description of green and whole crops Biorefinery <i>B. Kamm (BIOPOS)</i> |
| 14.45 | Propects of furthers demonstration <i>K. Meesters (Wageningen UR)</i> |
| 15.15 Coffee Break | |
| 15.45 | Policy recommendations <i>C. Burel (EuropaBio)</i> |
| 16.15 | A Canadian perspective on Biorefinery <i>M. Wellisch (Natrural resources Canada)</i> |
| | EU intervention <i>A. Aguilar (European Commission)</i> |
| | Panel Discussion <i>A. Bauen (Imperial College), A. Aguilar, M. Wellisch, C. Patermann (North-Rhine Westphalia State), W. Schonewille (Port of Rotterdam), R. van Ree (Biofuels TP), Camille Burel (SusChem TP), K. Meesters.</i> |
| 17.15-17.30 | Concluding remarks from the project coordinators |

Parallel Session: Biorefinery Sustainability issues
M. Rolgulska (IPIEO)

4. Workshop Output

The workshop was very well attended and responses from participants indicate that it was a highly productive experience for all who attended. The publicly available report that was produced immediately after the event is reproduced below. The report may be found on the websites of the Biopol and Biorefinery Euroview projects. Other outputs of the workshop are direct inputs to the ongoing Biopol work packages. The afternoon discussions were extremely helpful in identifying issues and directing work towards areas of concern to the European biorefinery policy and technology community.

i. Report of Proceedings

The workshop began with introductions from the coordinators of the two projects, **Dr. Bert Annevelink** (Wageningen UR, Netherlands) from Biopol, and **Christophe Luguel** (Industries & Agro-Resources Cluster, France). A welcome address was also given by **Dr. Piero Venturi** of the European Commission's DG RTD, the scientific officer for the two projects.

ii. Defining biorefineries and different concepts

Prof. Wim Soetaert (Ghent University, Belgium) followed the welcome speeches with an overview of the definitions and concepts used by both projects. Both projects identified 4 main biorefinery concepts on the basis of either feedstock or technology, giving rise to overlap as well as synergies between the different concepts. He pointed out that biorefineries based on oil, sugar or starch are already existing biorefineries, but that a lot of research still needs to be done concerning the lignocellulosic biorefinery. The interactions between the different concepts were demonstrated, for instance where the outputs of one process can be suitable inputs to a different biorefinery facility. One example is the potential use of residues from the oilseed, green or cereal biorefinery in a lignocellulosic biorefinery for the production of cellulose fibres, chemicals, lignin and/or energy. Prof. Soetaert made clear that although biorefinery concepts are becoming increasingly complicated as new technologies emerge, the four main types presented remain valid and useful to cover all research in this field. Translating the complexity of these classifications into real-world developments is possible, however, and exemplified by the Rodenhuizedock biorefinery in the port of Ghent – the largest integrated bio-energy production complex in Europe.

iii. Mapping EU biorefinery activities & the consumer landscape

The first presentation of project results in the morning session was given by Dr. Vincent Steinmetz (CARINNA, France) and Dr Hans Reith (ECN, Netherlands). They gave a detailed overview of existing biorefinery activities, including industrial plants and research facilities. This is the first time that such information has been compiled from a variety of sources including: a collaborative survey of 110 European industrial actors undertaken by the two projects; interviews; land-use databases, site visits, and input from experts.

The results showed some important trends. Most biorefinery developments are occurring in Western European countries and many are co-located with chemical and biofuels industry developments, as well as agro-industries, pulp & paper and forestry industries. 'Whole crop', 'multiple feed', 'green' and 'lignocellulosic' biorefineries are popular ventures so far, and they

generally take advantage of locations with existing local bio-industry, local R&D facilities, local feedstock supply or local transport hubs. Periodic updating of the mapping overview in order to monitor the evolution of biorefineries in Europe is recommended. Furthermore it is recommended to analyse barriers and potential solutions for the development of biorefineries in Eastern EU countries. Key success factors for the establishment of biorefineries can usefully be identified from the mapping and can assist the design of policies to foster European biorefinery developments.

Prof. Klaus Menrad (FH Weihenstephan, Germany) presented results from a survey of consumers who were asked about their attitudes towards bio-based products. With consumer chemicals representing as much as 10% of EU chemical sales, he stressed that consumers could play a critical role in providing markets for biorefinery products. The results indicate that European consumers are very positive towards the biorefinery concept, but possess a low level of knowledge of policy targets in Europe, such as those for biofuels or bio-based products. Nevertheless, the respondents were generally positive towards the prospect of products such as bio-based shampoos and detergents, and many would be willing to pay a premium, albeit a small one. This work suggests a role for consumer products to be strong sources of revenue for biorefineries, but raises questions about how such products can be reliably labelled in order to enable consumers to make well-informed choices.

iv. Technical Descriptions & Prospects for Further Demonstrations

The first afternoon presentations elaborated on some specific biorefinery concepts. Dr. Leena Fagnäs (VTT, Finland) described how 'lignocellulosic' biorefineries could be used to produce fuels and chemicals via gasification or bioconversion. Her work on the scale and requirements for a gasification plant suggest that such a plant, producing fuels and bulk chemicals, would be viable and present an opportunity for integration with pulp and paper mills. Prof. Birgit Kamm (Biopos, Germany) focused on how 'whole crop' and 'green' biorefineries have the potential to exploit materials whose uses could be expanded to include higher value materials. Straw and grass provide two excellent opportunities, and new processes that offer the ability to lower the costs of on-site enzyme production point to exciting new directions.

Koen Meesters (Wageningen UR, Netherlands) presented his investigation of the establishment potential and costs of pilot and demo scale biorefineries. By synthesising a range of project results presented he outlined some implications regarding the appropriate technologies for different European regions. Western, and to a lesser extent Southern Europe have good establishment factors for all types of biorefineries (productive agricultural land providing raw materials and oil refineries, chemical industry and cattle to sell the side products). In Eastern Europe these were lower, but since agricultural yields are expected to increase then their potential suitability for future biorefineries will improve. Northern Europe is promising for wood-based processes. Lignocellulosic biorefineries are not considered ready for full scale implementation yet, but considerable technological improvement is expected. Syngas biorefineries are more ready, but have very high investment costs. Overall, demonstration and establishment of biorefineries will depend on consumer, industrial and political acceptance, raw material availability and viable side-product markets, as well as technical and economical feasibility.

v. Policy Recommendations and a Discussion of Priorities for Europe

Both projects aim to provide insights that can be incorporated into European policies relating to biorefinery activities. To give an impression of how the qualitative and quantitative results provide the foundations for sound policy advice, Camille Burel (Europabio, Brussels) presented 12 thought-provoking suggestions. These included standardised LCA methodologies for marketing bio-based products, setting appropriate targets for use of bioproducts in specific sectors, such as mulching films, taking a strategic approach to funding infrastructure projects, and addressing public concerns including GMOs. Overall, there is a clear indication that the EU would benefit from a cohesive legislation strategy to develop the fragmented existing markets for bio-based products, such as plastics and vitamins.

The policy recommendations were followed by interventions from invited speakers from Canada and the European Commission. Maria Wellisch (Natural Resources Canada) gave a highly informative talk about activities in Canada in the context of other initiatives in the US, Europe and elsewhere. Canada, she said, has a vast resource to be tapped, but new developments are often attempts to reinvent the forestry industry, rather than arising from sustainability ambitions. Consequently, the drivers in North America are different to those underpinning many of the European efforts, but are nevertheless accelerating innovation in the field. Dr Alfredo Aguilar (European Commission DG RTD) placed the project work in the context of the EU's Knowledge-Based Bio-Economy (KBBE) agenda. He expressed his confidence that the new information presented at the workshop would help guide the large investments being made in research by the EU.

These 4 presenters were then joined for a panel discussion by Wijnand Schonewille (Port of Rotterdam, Netherlands), Dr. Christian Patermann (ex-European Commission and now advisor to North Rhine Westphalia, Germany), Rene van Ree (Co-chair of the European Biofuels Technology Platform) and moderator Dr. Ausilio Bauen (Imperial College London, UK). The lively discussion raised a number of crucial points for biorefinery development: new markets need to be created for bio-based products through policy actions; Europe should initiate dialogues on the subjects of resource-use prioritisation and genetic engineering; the advantages of biorefining need to be clarified and communicated; and opportunities should be sought for linking new processes into existing infrastructure in order to reduce the costs of establishment.

vi. Concluding remarks

The workshop was wrapped up by Dr Annevelink who thanked all participants for their valuable input on behalf of the coordinators. He confirmed that the presentations would be made available on the project websites, to be joined in May 2009 by the project reports. In recognition of the role of this workshop and others like it in building important networks for biorefinery researchers he indicated that we can look forward to BioreFuture 2010, which will hopefully be held early next year by some of the successor projects of Biopol and Biorefinery Euroview.

5. Attendance List

| | Lastname | Firstname | Organisation |
|----|-----------------|---------------------|--|
| 1 | Abbas | Ouissam | Wallon Agricultural Research Centre - CRA-W |
| 2 | Agathokles | Dimitrios | National Technical University of Athens - ICCS |
| 3 | Agathos | Spiros | UCL - Unit of Bioengineering (GRBI) |
| 4 | Aguilar | Alfredo | European Commission |
| 5 | Anderson | Iris | Department of Energy & Climate Change |
| 6 | Annevelink | Bert | Wageningen UR - AFSG |
| 7 | Balogh | Zoltan | Eszak-Alföde Region in Brussels |
| 8 | Bansal | Rahul | Imperial College Business School |
| 9 | Barbier | Marc | INRA Sciences en Société - IFRIS Université Paris-Est Marne La Vallée |
| 10 | Baudoin | Pierre-Marie | Vandeputte Oleochemicals |
| 11 | Bauen | Ausilio | Imperial College London |
| 12 | Bennett | Simon | Imperial College Business School |
| 13 | Berde | Agnes | |
| 14 | Blachnicki | Pawel | |
| 15 | Boels | Gauthier | REALCO |
| 16 | Bogel-Lukasik | Rafal | New University of Lisbon |
| 17 | Bols | Christian- Marie | Wetlands Engineering SPRL |
| 18 | Boureima | Fayçal- Siddikou | Vrije Universiteit Brussel |
| 19 | Bowra | Steve | Phytatec (UK) Ltd |
| 20 | Brose | Isabelle | University of Namur, Louvain School of Management |
| 21 | Burel | Camille | EuropaBio |
| 22 | Capros | Pantelis | National Technical University of Athens - ICCS |
| 23 | Chong | Katie | Aston University (BioEnergy Research Group) |
| 24 | Christian | Delphine | CARINNA - Champagne-Ardenne Research and Innovation agency |
| 25 | Claeys | Caroline | Burson-Marsteller |
| 26 | Cludts | Marc | CELABOR Scrl |
| 27 | Collignon | François | CERTECH |
| 28 | Contin | Andrea | CIRSA - University of Bologna |
| 29 | Czok | Krysztof | Fotka.pl |
| 30 | De Jong | Dirk | Ministry of Agriculture, Nature and Food Quality |
| 31 | De Jong | Wiebren | TU Delft, faculty 3mE, Dep. Process & Energy |
| 32 | De Kimpe | Fabienne | Embassy of Canada |
| 33 | Dele Olumuyiwa | Olaniyan | Bhig Drilling Service |
| 34 | Di Donato | Paola | University of Naples |
| 35 | Diels | Ludo | Flemisch Institute for Technological Research (VITO) |
| 36 | Dietmar | Dr. Peters | Fachagentur Nachwachsende Rohstoffe e.V. (FNR) / Agency for Renewable Resources |
| 37 | Di Sandro | Alessia | University of Bologna |
| 38 | Dobbelaere | Sofie | Ghent University |
| 39 | Dumange | Boris | Pôle IAR |

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|----|----------------------|------------|--|
| 40 | Du Toit | Daan | South African Embassy - Department of Science and Technology |
| 41 | Engelen-Smeets | Edith | SenterNovem |
| 42 | Fagernäs | Leena | VTT Technical Research Centre of Finland |
| 43 | Fava | Fabio | University of Bologna & Italian SusChem |
| 44 | Galatola | Michele | European Commission - DG Research |
| 45 | Ghysel | François | Centre Wallon de Recherche Agronomique |
| 46 | Gillmann | Marc | MAP / DGPAAT |
| 47 | Gofflot | Sébastien | Centre de Recherches Agronomiques de Gembloux |
| 48 | Gouardères | Frédéric | European Commission - DG RTD G2 |
| 49 | Grundberg | Hans | Processum Biorefinery Initiative |
| 50 | Gutierrez | Francisco | Fundacion CARTIF |
| 51 | Hansen | Hans Ove | Danish Technological Institute |
| 52 | Holemans | Didier | MODULO architects |
| 53 | Ilmurzynska | Janina | Institute of Power Engineering |
| 54 | Jevons | Kamla | Koch Membrane Systems |
| 55 | Jolly | Guillaume | IAR Cluster |
| 56 | Johnston | Johnny | National Grid |
| 57 | Jossart | Jean-Marc | AEBIOM |
| 58 | Julien Saint Amand | François | Centre Technique du Papier (CPT) |
| 59 | Kamm | Birgit | Biopos |
| 60 | Karbowski | Adrian | ONT Biopaliwa |
| 61 | Kotarba | Lukasz | |
| 62 | Kurka | Stefan | University of Applied Sciences Weihenstephan |
| 63 | KVANCZ | Jozsef | College of Nyiregyhaza |
| 64 | Labidi | Jalel | University of the Basque Country |
| 65 | Lambert | Gérard | B.E. |
| 66 | Le Henaff | Yvon | ARD |
| 67 | Lepage | André | Agrobiopole Wallon |
| 68 | Lerma | Victoria | European Forest Technology Platform (FTP) |
| 69 | Lewis | Mark | North East Process Industry Cluster |
| 70 | Luguel | Christophe | Pôle IAR |
| 71 | Lukas-Eder | Karin | Bavarian Research Alliance |
| 72 | Madarasz | Laszlo | |
| 73 | Maniatis | Kyriakos | DG TREN |
| 74 | Marazza | Diego | CIRSA - University of Bologna |
| 75 | Mateo-Sagasta Davila | Javier | AMBISAT |
| 76 | Matrai | Melinda | |
| 77 | Meesters | Koen | AFSG |
| 78 | Menrad | Klaus | University of Applied Sciences Weihenstephan |
| 79 | Mercier | Emilie | ALMA Consulting Group |
| 80 | Middleton | Alison | Ministry of Agriculture, Nature and Food Quality |
| 81 | Migdal | Antoni | Industrial Chemistry Research Institute |
| 82 | Mozaffarian | Hamid | ECN - Energy research Centre of the Netherlands |
| 83 | Niemela | Klaus | KCL |
| 84 | Okafor | Chidi | Petronella Nigeria Limited |

| | | | |
|-----|---------------------|---------------|---|
| 85 | Olczyk | Janusz | EMES Mining Service Sp. z o.o. |
| 86 | Parache | Pascal | PSPc |
| 87 | Patermann | Christian | Advisor, German Land North-Rhine-Westphalia |
| 88 | Peck | Philipp | Lund University |
| 89 | Piskolcziné Baracsi | Eniko | INNOVA |
| 90 | Pontoglio | Serena | European Commission - DG Research |
| 91 | Quiles Ruiz | Jordi | ITENE |
| 92 | Ratonyi | Tamas | |
| 93 | Reith | Hans | ECN |
| 94 | Rios del Rio | Manel | Invintia |
| 95 | Rogulska | Magdalena | IPIEO |
| 96 | Roiseux | Olivier | Walagri SA |
| 97 | Round | Andrew | Centre for Process Innovation |
| 98 | Rous | Jean-François | PROLEA |
| 99 | Ruszkabanyai | György | Green Industry Cluster of Kaba |
| 100 | Sanati | Mehri | Lund University |
| 101 | Schmidtgen | Georg | Bavarian Research Alliance |
| 102 | Schonewille | Wijnand | Port of Rotterdam |
| 103 | Sekita | Julia | Mazovia Regional Representative Office |
| 104 | Senac | Thomas | Roquette Frères |
| 105 | Siljama | Meri | Embassy of Finland |
| 106 | Simoes | Henrique | European Commission |
| 107 | Skarvelakis | Kostas | ALMA Consulting Group |
| 108 | Slusarczyk | Heike | Forschungszentrum Juelich |
| 109 | Soede | Matthijs | European Commission |
| 110 | Soetaert | Wim | Ghent University |
| 111 | Sormann | Monika | Ministry of Flanders |
| 112 | Soto | Inès | University Goettingen |
| 113 | Steinmetz | Vincent | CARINNA - Champagne-Ardenne Research and Innovation agency |
| 114 | Stokoe | John | ESR Ltd / InfraLeuna |
| 115 | Struyf | Igor | Belgian Science Policy Office |
| 116 | Tari | Thomas | INRA Sciences en Société - IFRIS Université Paris-Est Marne La Vallée |
| 117 | Tayeb | Jean | INRA |
| 118 | Thomas | Daniel | Pôle IAR |
| 119 | Tomozei | Luciana | EBB - European Biodiesel Board |
| 120 | Tompa | Istvan | Eszak-Alföld Regional Development Holding |
| 121 | Valayer | Jean | Biomim-Greenloop N.V./S.A. |
| 122 | Vamosi | Gabor | ENEREA Eszak-Alföld Regional Energy Agency |
| 123 | Vandeputte | Luc | Vandeputte Oleochemicals |
| 124 | Van Driel | Corry | SenterNovem |
| 125 | Vanhulle | Sophie | Wetlands Biosciences SA |
| 126 | Van Ree | René | WUR - AFSG |
| 127 | Venus | Joachim | ATB Potsdam - Leibniz - Institute for Agricultural Engineering - Dept. Bioengineering |
| 128 | Venturi | Piero | European Commission |

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|-----|-------------|------------|--|
| 129 | Vink | Tim | Honeywell Specialty Materials - Renewable Energy & Chemicals |
| 130 | Warnant | Gaëlle | Agrobiopôle Wallon Asbl |
| 131 | Wellisch | Maria | Natural Resources Canada, CanmetENERGY |
| 132 | Wertz | Jean-Luc | |
| 133 | Westenbroek | Annita | CEPI/KCPK |
| 134 | Willems | Philippe | Value for Technology bvba |
| 135 | Wyman | Vic | Bioenergy Business |
| 136 | Zakrzewska | Malgorzata | New University of Lisbon |
| 137 | Zamboni | Alessandro | University of Bologna |
| 138 | Zeevalkink | Jan | TNO Industry and Science |
| 139 | Ferchichi | Maria | ISAB |
