



Driving forces and basic conditions of developing a wood-based bio-refinery in Switzerland

Workshop II – February 5, 2016

School of Agricultural, Forest and Food Sciences HAFL, Zollikofen



SWISS NATIONAL SCIENCE FOUNDATION



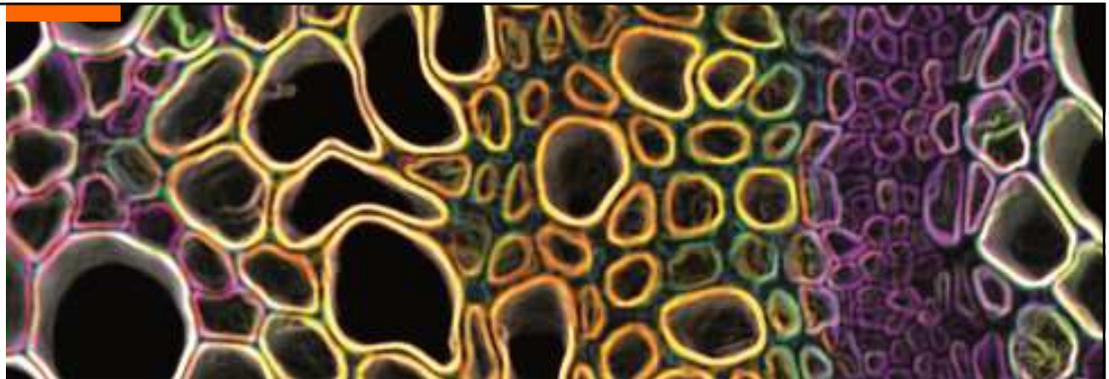
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Resource Wood
National Research Programme NRP 66



NRP 66 "Resource Wood" : A holistic approach

The goals of NRP 66 "Resource Wood"

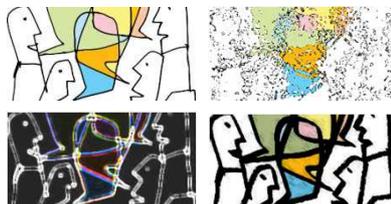
In particular, the programme aims to achieve

1. a broader understanding of wood-based material flows and improvements to wood supplies,
2. new knowledge and technologies for using wood as a basic component in chemical products and for manufacturing new composite materials,
3. further technical advances in the generation of power from wood and in using it as a material for structures and buildings, and
4. competitiveness through added value in wood-based industries; enhanced skills and research capacities in Switzerland.

Four dialogue platforms to promote exchange between theory and practice

Advancements in timber construction

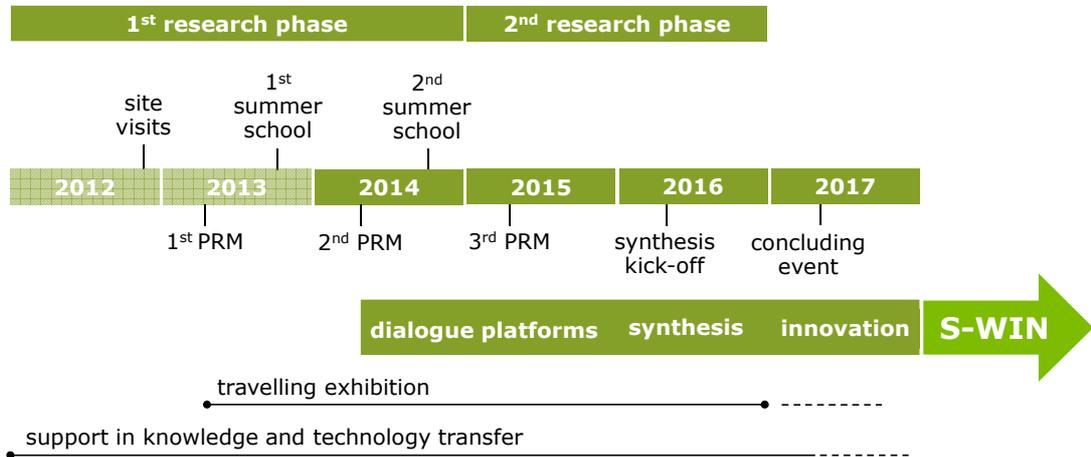
Novel ways in bio-refining of wood



Innovative wood-based materials for new applications

Provisioning and sustainable use of wood

NRP 66 schedule



Dialogue field „Novel ways in bio-refining of wood“: **Key questions and short feedback from Workshop I (Dec 10, 2015)**

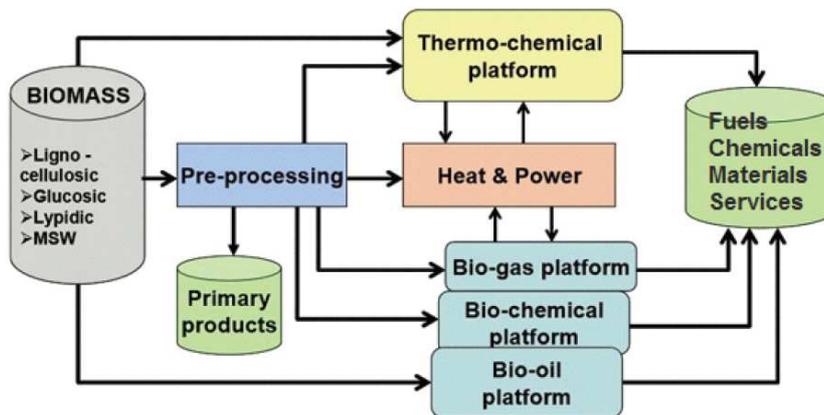
Issues and key questions

- **Which bio-refinery concepts would be best suited to Switzerland** or certain regions (in terms of scale/ size and location of the plants, value added and the impact on wood resources)? Which is the best way of bio-refining wood in Switzerland?
- **Are there markets and opportunities for Swiss industry** for products and services derived from wood biomass in general and in particular in Switzerland (energy services, specialty chemicals, commodity chemicals or other high-value chemicals based on wood)?
- **Which framework conditions** (i. e. political, economic and regulatory framework, technical norms and standards, societal values etc.) are necessary in order to realize an efficient bio-refining of wood in Switzerland?

Looking back to Workshop I (Dec 10, 2015)

- **First overview on bio-refinery concepts:** definition, routes and processes, products, services and applications
- **Wood use in bio-refineries** (hardwood and softwood)
- **State of the art** in pre-treatment and conversion methods, engineering challenges, "steam explosion" as an ideal route for using lignin
- **Agro Energie Schwyz:** project of heating station (20 MW) and steam turbine (4.5 MW), an example of using wood for district heating. Future: wood gasification project? Boundary conditions not so easy.
- Environmental and economic aspects
- Gaps in research and development, industrial needs
- Market aspects

Bio-refinery concept: A tentative definition



"A biorefinery is an integrated processing facility that converts biomass into value-added products and energy."

Source: F. Maréchal (EPFL)

First conclusions

- Technically, it is possible to gain any petroleum-based chemical product or energy source through refining wood or another renewable raw material. It is, however, not yet clear whether such an approach is rewarding from a financial and ecological point of view.
- In Switzerland, the framework conditions are presumably unsuitable for synthesizing basic chemicals; the focus should rather be on high-value specialty chemicals.
- It is also thinkable for Switzerland to invest in technology development only, then export the know-how and produce abroad.
- The materials and energy sources produced in foreign bio-refineries could ultimately be re-imported in Switzerland in a needs-oriented way.
- "I personally do not believe that a commercial bio-refinery will ever exist in Switzerland." (S. Biollaz)

Source: P. Poldervaart, Report on WS I

Morning programme

- **Part 1: Concepts for bio-refining wood**
"From the sugar platform to biofuels and biochemicals", Final report for the European Commission, 2015, *Luca Bertuccioli (E4tech Lausanne)*
- **Part 2: Opportunities and limits**
 - Production of lignocellulosic ethanol and its use as biofuel in engines. *Michael Studer (BFH-HAFL) and René Schweiz (Scania Schweiz)*
 - Transformation of wood into chemical commodity feedstock. *Paul Dyson (EPFL) and Daniel Zollinger (Lonza)*
- **Part 3:** Discussion sessions (in parallel): (1) Energy products and services, (2) Chemical products based on wood biomass.
- **Lunch** with the possibility to visit the laboratory of M. Studer's research group (optional)

Part 3: Discussion sessions (in parallel)

- **Group 1: room B.4.10**
ENERGY PRODUCTS AND SERVICES
Focus on biofuels (liquid and gas) from wood biomass.
Chair: Markus Zeifang (KTT officer of the SCCER BIOSWEET)
- **Group 2: plenary room (Hörsaal 3)**
CHEMICAL PRODUCTS BASED ON WOOD BIOMASS
Focus on commodity and value-added chemicals from wood-biomass
Chair: Martin Riediker (president of the Steering Committee of NRP 66)
With input by Thomas Kläusli, Chief Marketing Officer, AVA Biochem

Lunch (12.30 – 1.30 p.m.)

- Tables are reserved in the self-service restaurant of the HAFL
- You can choose between a rich salad bowl (from the buffet) and one of the two daily menus (fish/meat)
- Please return to the plenary room (Hörsaal) for coffee and dessert.

Afternoon programme

- **A short report from the discussion sessions** (2x15')
- **Part 4: Basics and frameworks conditions**
 - Short input of Urs Glutz *Swisspower Services AG*
 - Recommendations based on a new study by the Swiss Academy of Engineering Sciences (*Christian Suter, SATW*)
 - Exemption of biofuels from the mineral oil tax: A key to producing fuels from renewable feedstocks in Switzerland? (*Sarah Grieder, Federal Department of Finance*)
 - The forestry perspective (*Alfred Kammerhofer, FOEN*)
- **Part 5: Panel discussion** "The future of bio-refinery in Switzerland"
Chair: Jakob Rhyner (member of the Steering Committee of NRP 66)
- **Closing remark and next steps** (*Martin Riediker & Enrico Bellini*)
- **End with an aperitif** offered by Michael Studer and his research team

Part 5: Panel discussion

- **Topic:** The future of bio-refinery in Switzerland
- **Leading questions:** Is there a future for bio-refining in Switzerland? Which bio-refinery concepts would be best suited to Switzerland (or certain regions) in terms of scale/ size and location of the plants, value added and the impact on wood resources? Which is the best way of bio-refining wood in Switzerland?
- **Panel members:**
 - Federal Office for the Environment: *Rolf Manser*
 - federal Department of Finance: *Sarah Grieder*
 - Energy sector: *Urs Rhyner, AGRO Energie Schwyz AG*
 - SATW: *Christian Suter*
 - Chemical sector: *Thomas Kläusli, AVA BIOCHEM*
 - Sciences / NRP 66: *François Marechal & Paul Dyson, EPFL*
- **Chair:** Jakob Rhyner, member of the Steering Committee of NRP 66



Closing remark and next steps

Next steps

- All presentations (PPT) and a short report about today's workshop will soon be available on www.nrp66.ch
- Kick-off meeting for the programme synthesis in NRP 66 (April 14-15, 2016, Olten) – a joint event of the four dialogue platforms of NRP 66 involving the research community and representatives of various enterprises, NGOs and public administration (upon invitation)
- Elaboration of the thematic synthesis "Novel ways in bio-refining of wood"

Thank you for your attention and participation!
www.nrp66.ch

