S2Biom

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Webinar:
Matching Biomass and Conversion Technologies with Bio2Match

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ALTERRA WAGENINGEN UR

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Agenda

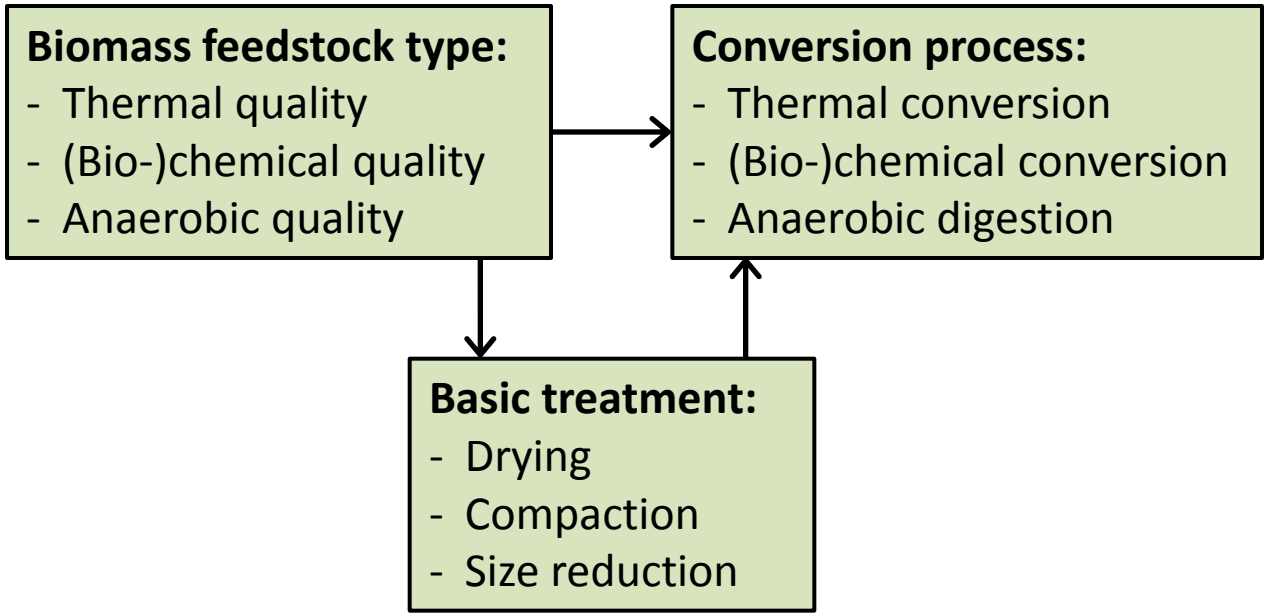
- Introduction
- Tool methodology and matching indicators
- Databases underlying the tool
  - Technology database
  - Biomass properties database
- Using the tool
- Bio2Match demonstration
- Questions, feedback, discussion

Introduction

- Different regions…
  - Supply different types of biomass with different characteristics
  - Demand different products
- How to optimize the resource-efficient use of biomass at EU level?
- Goal: support stakeholders in the bio-economy with a matching tool.

Tool methodology

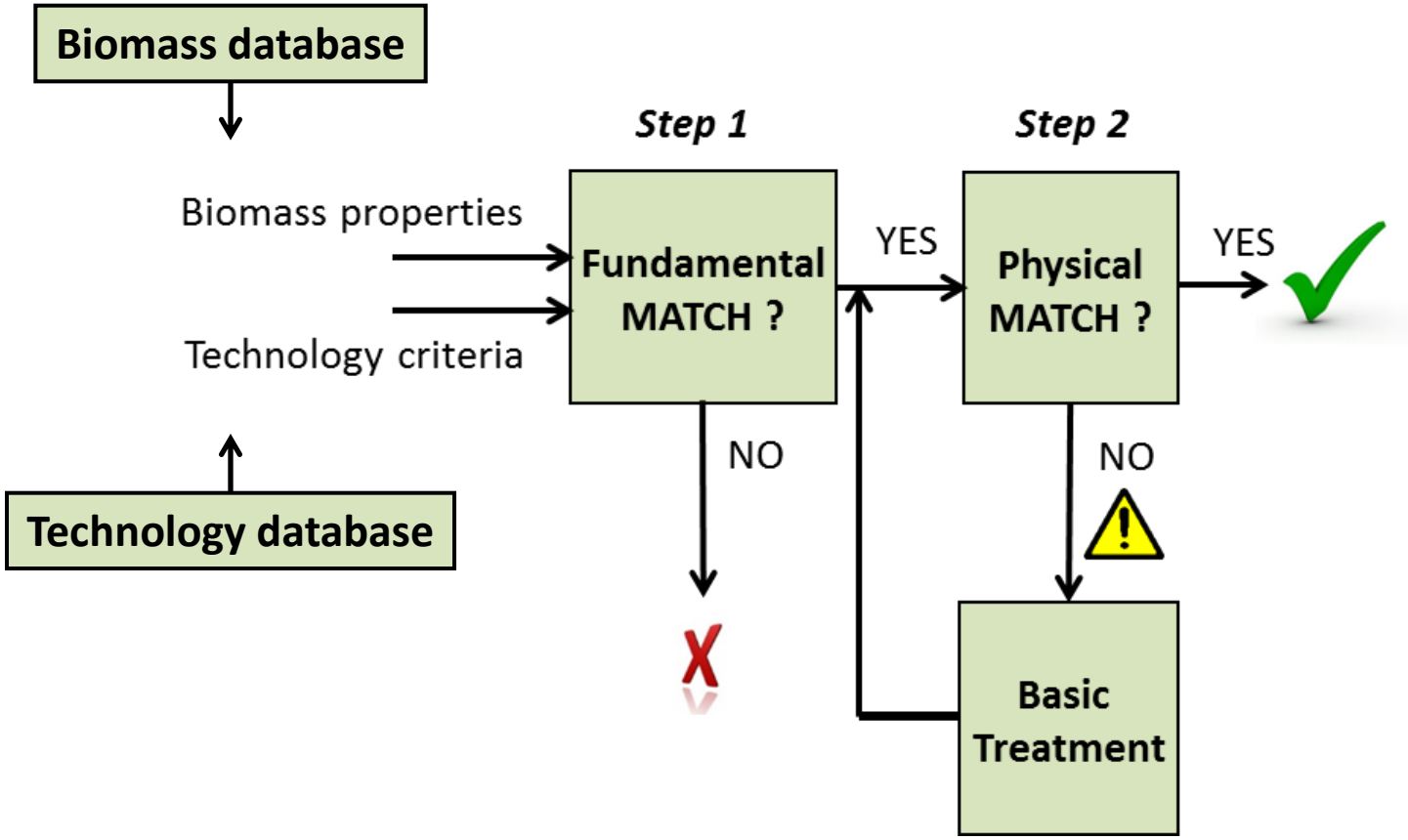
- Biomass and technology matching, classification system:



- Distinction between ‘fundamental’ and ‘easy to modify’ properties.

Tool methodology

- Biomass and technology matching, methodology:



Matching indicators

Quality indicators used for matching biomass and technologies:

- Fundamental properties:
  - **Thermal:**
    - Chlorine content (corrosion)
    - Ash deformation temperature (slagging and fouling)
    - Ash content (product yield, processability, costs)
    - Nitrogen content (NO_x emissions)
  - **(Bio-)chemical:**
    - Cellulose + hemicellulose content (product yield)
    - Lignin content (processability)
    - Ash content (processability, costs)
  - **Anaerobic digestion:**
    - Biogas yield (product yield)
    - Application of digestate possible (costs)
- Physical properties:
  - **All:**
    - Moisture content (product yield, processability)
    - Bulk density (processability)

Matching indicators

Classification of each quality indicator for the matching tool, using ranges:

- Biomass properties:
  - Class 1: ideal biomass (e.g. very low ash content: < 1 wt-%)
  - Class 2: desirable biomass (e.g. low ash content: 1 - 3 wt-%)
  - Class 3: undesirable biomass (e.g. high ash content: 3 - 10 wt-%)
  - Class 4: very undesirable biomass (e.g. very high ash content: > 10 wt-%)

- Technology criteria:
  - Property X (e.g. ash content): Able to handle biomass of classes 1-2
  - Property Y (e.g. chlorine content): Able to handle biomass of classes 1-4
  - Property Z (e.g. carbohydrate content): Able to handle biomass of class 1

- In this way you can see if there is a match (or why not) and if a technology could perhaps use lower quality biomass as well.

Conversion technology database

- Direct combustion of solid biomass
- Gasification technologies
- Syngas platform
- Fast pyrolysis
- Torrefaction
- Treatment in subcritical water
- Techniques from pulp & paper
- Chemical pretreatment
- Biochemical hydrolysis
- Fermentation to ethanol and bio-based products
- Anaerobic digestion

Select a technology to view the details

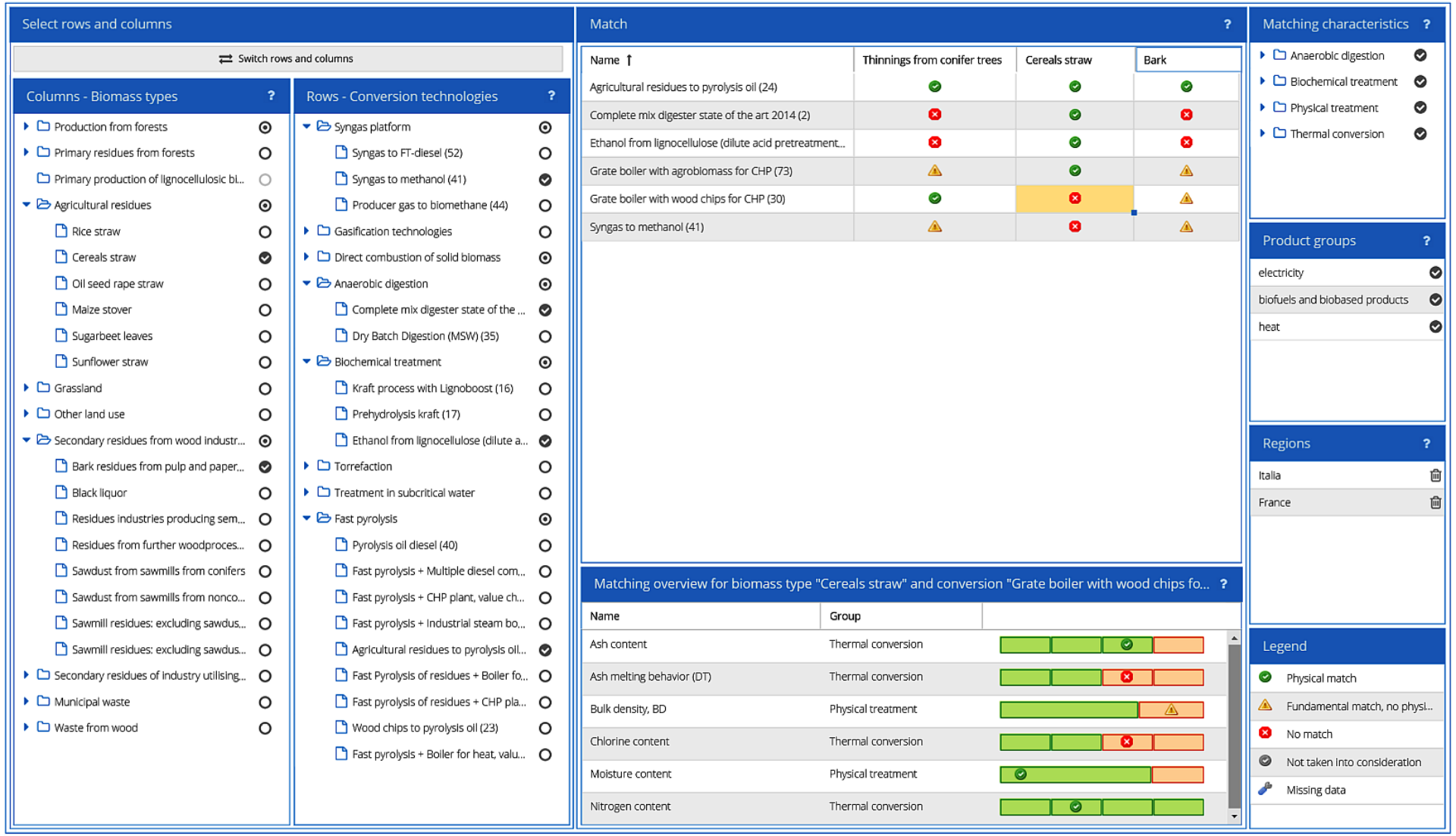
Database contains (a.o.):

- Description of main operating principle
- Level of commercial application
- Technology Readiness Level
- Type and capacity of product output
- Conversion efficiencies
- Investment costs
- Labour requirement
- Feedstock quality criteria

Biomass properties database

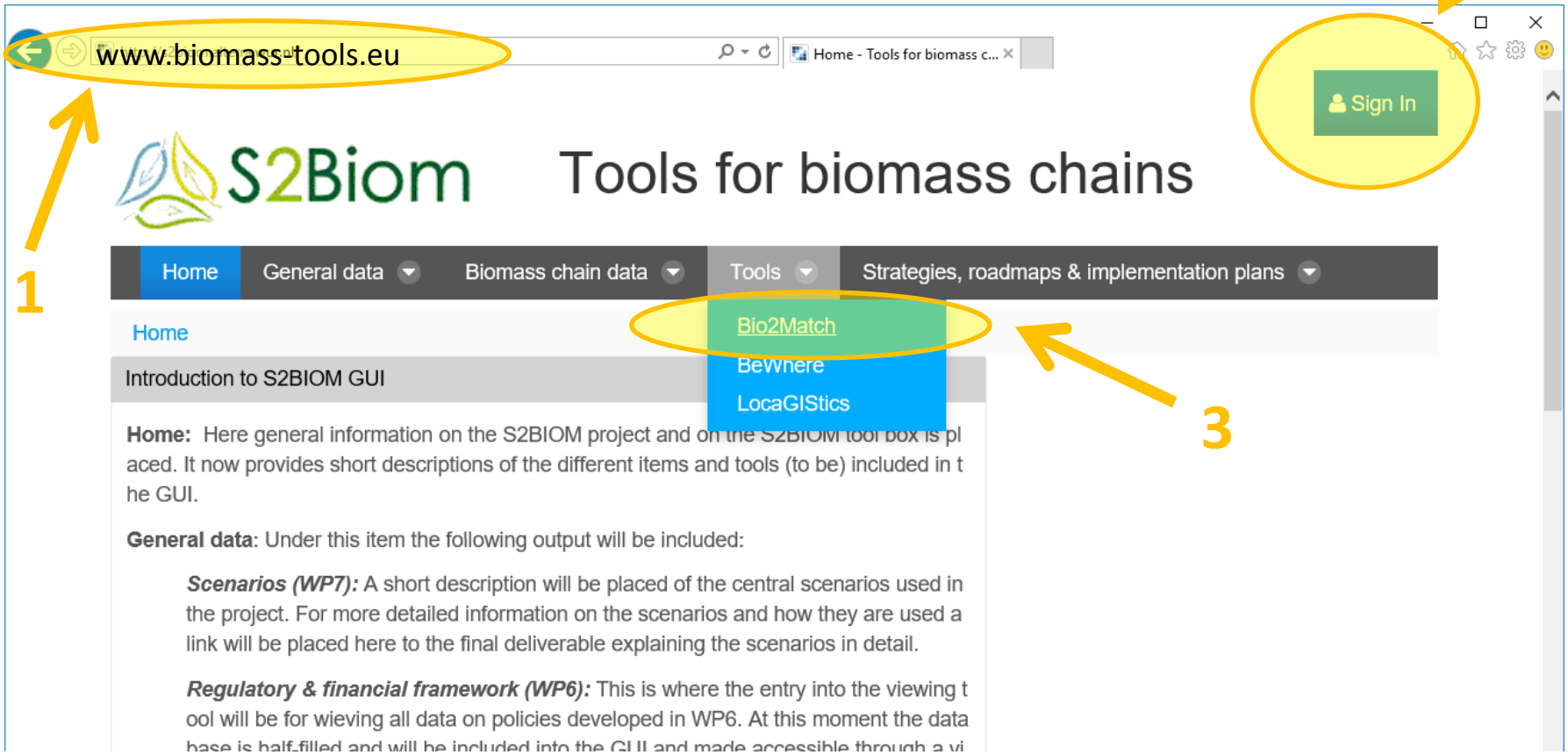
- Database prepared by experts from within the consortium, based on literature, containing 50 entries in the following categories:
  - Forestry biomass: - Primary forestry products
    - Primary forestry residues
  - Agricultural biomass: - Primary production of lignocellulosic crops
    - Agricultural residues
    - Grassland
  - Other land use: - Biomass from landscape maintenance
    - Biomass from roadside
  - Industrial residues: - Secondary residues of wood industries
    - Secondary residues of industries using agricultural products
  - Consumer waste: - Biodegradable municipal waste
    - Post-consumer wood
- Database contains typical, high and low values on the matching indicators.

Using Bio2Match



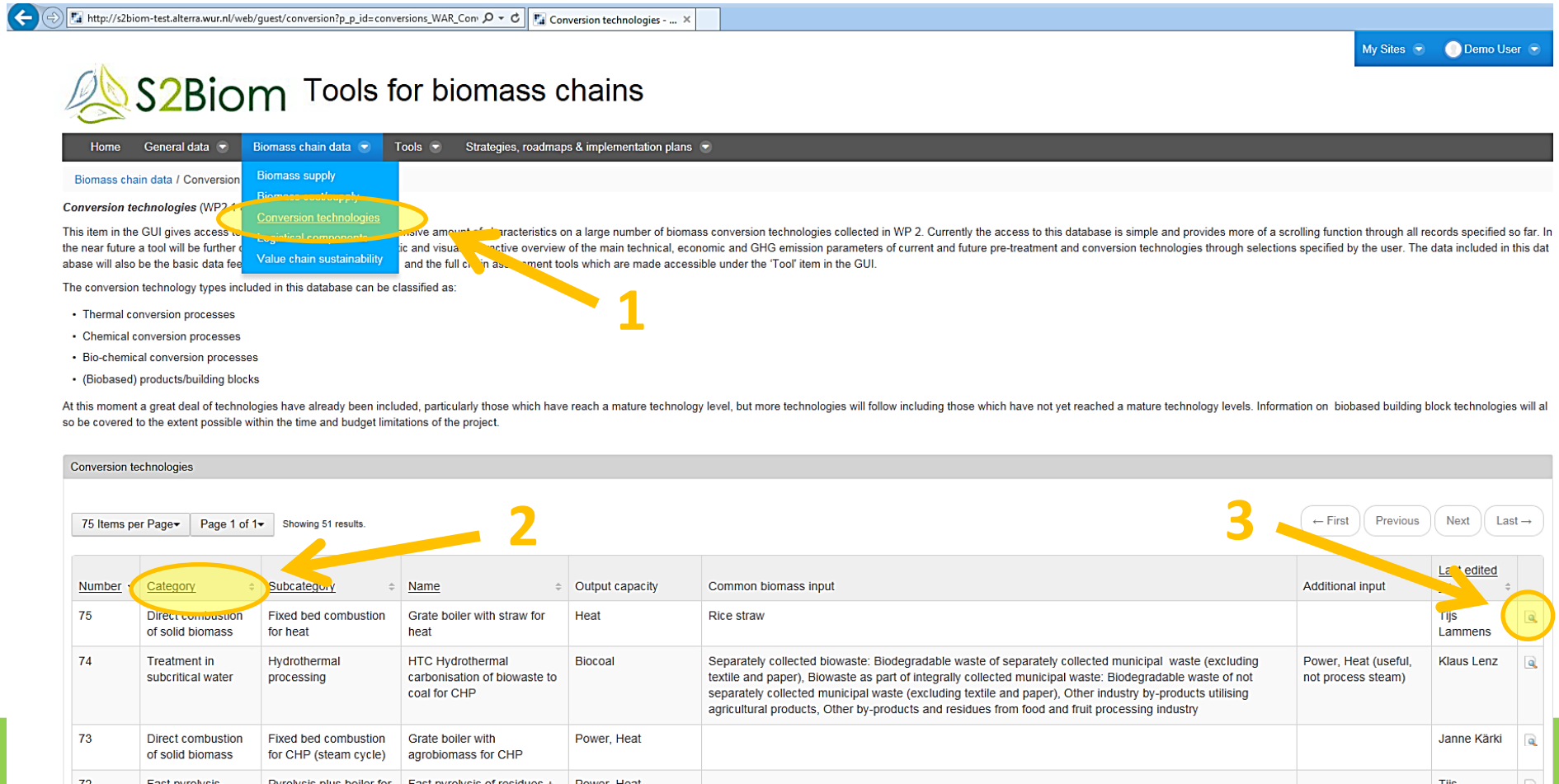
Work with Bio2Match

1. Go to www.biomass-tools.eu.
2. Sign in, using: screen name '**demo**' and password '**helsinki**'.
3. Click on 'Tools' – 'Bio2Match'.



Work with Bio2Match

1. The technology database can be accessed in ‘biomass chain data’.
2. Click on ‘Category’ to alphabetically order the technologies by category.
3. Click on the ‘view’ icon to access the information about that technology.



Bio2Match demonstration

www.biomass-tools.eu

Thank you for your attention!

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Biomass quality classification

Property	*Unit*	Quality class			
		1	2	3	4
Chlorine content	*wt-% d.m.*	<0.02	0.02-0.1	0.1-0.4	>0.4
Ash melting temperature	*^{o}C*	>1200	1000-1200	800-1000	<800
Ash content	*wt-% d.m.*	<1	1-3	3-10	>10
Nitrogen content	*wt-% d.m.*	<0.3	0.3-1	1-2.5	>2.5
Carbohydrates	*wt-% d.m.*	>65	50-65	30-50	<30
Lignin content	*wt-% d.m.*	<10	10-25	25-35	>35
Biogas yield	*m^3/ton a.r.*	>300	150-300	50-150	<50
Digestate has an application		Yes			No