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Kick-off meeting

WP2: Social business model tools

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Objectives

- Transfer of knowledge about
 - (i) stakeholder needs and smart territories in rural and SMEs in relation to biomass processing
 - (ii) use of mathematical tools for modelling and simulating small biorefineries
 - (iii) design of intelligent communities and automisation of biomass processing in rural areas and SMEs
 - (iv) life cycle assessment tool for making decision about new business models in biorefinery.
- Create knowledge about
 - (i) new algorithms in smart communities for using biorefineries in rural areas
 - (ii) new business models of biorefineries and new portable pieces of equipment in rural areas
 - (iii) and new mathematical models by artificial neural network analysis in biorefinery.
- Skill development for choosing the best processing steps in biorefinery.



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Tasks

- **Task 2.1. Stakeholder needs, business model creation and automisation.**

(Leading by AUTH) M10-M23

To study the stakeholder needs for SMEs and rural areas in lignocellulosic processing.

To create business models and automisation processes for small biorefineries in cellulose-based products..

- **Task 2.2. Simulation and optimisation of the processes**

(Leading by UC) M13-M35

To model and simulate the biomass processing steps using Aspen software. Hydrolysis processes, pyrolysis, hydrothermal processes and cellulose fibres production will be studied in this step and considering all of the results at laboratory scale from 1.1 (characterisation of the raw materials), 1.2 (hydrolysis methods), 1.4 (production of biochar) and 1.5 (production of fibres).

Recommendations in the processing of biomass fibres and other cellulose-based products for SMEs and rural areas will be given.



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Tasks

- **Task 2.3. Artificial neural network**
(Leading by UPM) **M15-M37**

To model the biomass processing steps using Artificial Neural Network. Hydrolysis processes will be studied in this step. In addition to the results at laboratory scale from 1.1 (characterisation of the raw materials) and 1.2 (hydrolysis methods), other bibliographical results will be taken into account in this step in order to have a high amount of results for the neural analysis.

- **Task 2.4. Life Cycle Assessment**
(Leading by NIBIO) **M21-M41**

Use of life cycle assessment methodology using SimaPro in small biorefineries. The chosen business models in task 2.1 will be analysed by Life Cycle Assessment. Recommendations about the best models will be given. The results obtained in task 2.2 about the simulation of the processes and the results obtained in task 1.1 (characterisation), 1.2 (hydrolysis methods), 1.3 (energy production), 1.4 (biochar production) and 1.5 (fibre production) will be used in this task.



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Tasks

- **Task 2.5. Smart territories information management**
(Leading by UCC) **M22-M44**

To develop smart algorithms on machine learning to predict the system performance as a whole.

To model a smart system made up of sensors, pre-programmed controls, electronic devices and specialised software for the biomass processing to monitor and control the processes. Smart territories will be made using big data, IOT and/or AI approaches..

- **Task 2.6. Design of portable pieces of equipment**
(Leading by TWI) **M41-M46**

To design small and portable pieces of equipment taking into account the business models chosen in task 1.1 and the results of the life cycle assessment in task 2.4. Pre-treatment, biochar and fibre production will be considered. Materials, physical and mechanical variables, and the main characteristics of the pieces of equipment will be studied in relation of the results of tasks 1.2, 1.4, 1.5 and 2.2 and also based on the stakeholder needs of task 2.1. A preliminary design of the portable pieces of equipment will be done.



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Secondments

- **Task 2.1. Stakeholder needs, business model creation and automisation**

5 Secondments, 9 PM:

- AUTH→INOCURE 1 PM
- UCC→UC 2 PM
- LS-IWC→UCC 2+2 PM
- UCC→UC 2 PM

From M10 to M23

During the
first year

- **Task 2.2. Simulation and optimisation of the processes**

13 Secondments, 24 PM:

- UC→INOCURE 2 PM
- UC→ECORESOURCES 2 PM
- UC→UNACH 3+2 PM
- LUT→ECORESOURCES 1 PM
- NIBIO→UNACH 2 PM
- INOCURE→UC 2 PM
- INOCURE→BANGOR 2 PM
- ECORESOURCES→UC 1 PM
- UCC→LUT 2 PM
- UNACH→UC 2 PM
- FICH-UNL→UC 2+1 PM.

From M13 to M35



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Secondments

- **Task 2.3. Artificial neural network**

3 Secondments, 5 PM:

- UPM→ECORESOURCES 1 PM
- UPM→UNACH 2 PM
- UNACH→UPM 2 PM

From M15 to M37

- **Task 2.4. Life Cycle Assessment**

4 Secondments, 7 PM:

- BANGOR→UCC 1 PM
- NIBIO→UNACH 2 PM
- UNACH→NIBIO 2 PM
- FICHUNL→NIBIO 2 PM

From M21 to M41



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Secondments

- **Task 2.5. Smart territories information management**

3 Secondments, 7 PM:

- UC→UCC 3 PM
- UCC→UC 2+2 PM

From M22 to M44

- **Task 2.6. Design of portable pieces of equipment**

5 Secondments, 9 PM:

- UC→CCC 2 PM
- SGGW→INOCURE 2 PM
- SGGW→UCC 2 PM
- LUT→CCC 2 PM;
- ECORESOURCES→TWI 1 PM

From M41 to M46



Deliverables, Milestones and deadlines

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Number	Title	Beneficiary	Type	Dissemination level	Deadline
D2.1	Business models and needs for SMEs and rural areas in cellulose-based products	UC	Report	Public	M23
D2.2	Mathematical tools in small biorefineries: artificial neural network models, simulation and optimisation, and LCA	NIBIO	Report	Public	M41
D2.3	Smart systems in small biorefineries	UC	Report	Public	M44

Number	Title	Beneficiary	Deadline
MS2	Best business models in SMEs and rural areas	UC	M41
MS3	Preliminary design of portable pieces of equipment for biomass processing	TWI	M46



Other activities

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Symposium about the best tools for making decisions about the biorefinery options

(Leading by UPM; other organisers: BIOPLAT) M18-M20

Best tools for biorefinery options, including neural analysis, life cycle assessment, simulation by Aspen and others. This symposium will be organised by BIOPLAT and all companies involved in this platform will be invited. BIOPLAT is the Spanish Technology and Innovation Platform on Bioeconomy, constituted by the public-private agents of the biomass sector.

Training school about the production of artisan and artistic products from lignocellulosic resources using sustainable processes

(Leading by UC; other participants: Besarte Fibra Natural, Dínamo from ACCAS-NGO and a team from Artistic Organisations in Cantabria and Basque Country, Spain). M44-M46

The production of artisan and artistic products from lignocellulosic resources using sustainable processes (in Cantabria, hosted by UC and with the collaboration of two small companies Dínamo working with social exclusion people and Besarte from a rural perspective, and women involved in artistic products), related to WP2 and WP4. The production of ancient paper and bio-composites from an artisan and sustainable point of view will be given. Different sheet tests were carried out using charges of adhesives, dyes, UV protectors and additives. Some artistic possibilities in the final products will be studied: engraving techniques, dry drawing techniques, water drawing techniques and heat and solvent transfer. This experience will be useful to be transfer to the international partners.