DECISION SUPPORT METHODOLOGY FOR DESIGNING EFFICIENT AND SUSTAINABLE RECYCLING PATHWAYS

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Presentation of MTB Company trades

Machines de Triage et de Broyage
Sorting and shredding machinery

Integration and Engineering of recycling solutions
Manufacturing of Equipment for sorting and shredding
Recycling of complex objects
Presentation of the study scopes

Main steps of the step-by-step approach

- Environmental Assessment: LCA and MFA Evaluation on specific processes
- Performances validation: Using Environmental Technology Verification (ETV)
- Systematising the approach

The purpose of our work is to provide customers with the results of the environmental evaluation during the design phase

- Our methodology address the pre-recycling processes design
Recycling pathway and unit processes modelling

Each process is defined by different elements in the database:
- Generic and variable Life Cycle Inventory data
- Variable technical data output
- Economic data

Each step of the recycling pathway is modelled as:

- Flow A0
  - \( \sum \) Elementary flows
  - Purity
  - Quantity

- Flow A1
- Flow A2
  - \( \sum \) Elementary flows
  - Purity
  - Quantity

- Unit Process A
  - Size reduction
  - Materials sorting
  - Shifting (x, y and z axis)
Presentation of the main steps of the methodology

Input data comes from customer specifications used for
- Pathways design draft
- Process step selection

MTB engineering team selects operational details and process parameters

<table>
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<tr>
<th>Bill of Specifications</th>
<th>Pathway Proposals</th>
<th>Process Parameters</th>
<th>Sustainable Evaluation</th>
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<tbody>
<tr>
<td>Waste Characterisation</td>
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<td>Purchaser criteria</td>
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<td>Economic data</td>
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<td>Etc.</td>
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MTB engineering team selects operational details and process parameters

Process Design Choices

Database Evaluation Tools

LCA MFA S-LCA

Purpose Operational Environment Data Additional
The key performance indicators selection was made according to:

- Indicators necessary for the stakeholders
- Indicators from the Environmental Technology Verification protocol

Evaluation is done by summing every unit process performance.
Next working steps and implementation of the methodology

Complete the database
- Implement data from MTB equipment and processes
- Add processes from other manufacturers
- Stay wide for new technologies coming on the market

Implementing the design steps to introduce our tool
- Modification of the bill of specifications to take into account some LCA Inventory Information
- Add connections between the various design tools
- Provide the evaluation results to customers
THANK YOU FOR YOUR ATTENTION