



# **PILOTING UPCYCLING SOLUTION TO TACKLE ON LABEL PACKAGING WASTE IN MALAYSIA**

## **Progress Report**

**PROJECT TEAM**  
**3rd Dec 2022**

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### **1. Project summary**

This report presents the findings of the Materials In Works (MIW) piloting upcycling solution to tackle on label packaging waste project. The information contained in the report is based on the methodology designed within the framework of the initial project proposal to understand the characteristics of the business model, evaluate its impact/outcomes and identify the main barriers and enablers. Materials In Works (MIW), a company that works its effort and evolution towards attaining the goal of “diverting valuable wastes from ending up in landfill”.

Across Southeast Asia, paper liner waste from the label packaging value chain is mostly disposed of via the landfill method. At these landfill sites, pollution is also a very common problem, where contaminated water, such as Leachate can harm the surrounding environment. Materials In Works (MIW) with the help of researchers from Malaysia Public Universities, has been working on creating an upcycling solution to tackle on-label packaging waste streams that are traditionally considered not-recyclable and usually end up in landfill. MIW typically sets up a collection and processing platforms for the waste streams. This platform is usually funded by

businesses that are looking to enhance their environmental performance. The waste collected by programme participants is upcycled and sold to manufacturers that make new products and materials using them. Where possible, MIW and the partners focus on how to integrate reclaimed materials into specific products. With 70% of the beachhead market, Malaysia, it is estimated that close to 60 kilo tons of carbon dioxide will be offsetted which is equivalent to taking 13,000 cars off the road for 1 year.

Activities involving the preparation to build a pilot lab leading to a larger scale manufacturing plant for making recovered cellulose pulp from paper liner waste as raw materials are enabled by the seed money won via Environmental NGO Accelerator Perak Program. Most importantly the result from the activities proved that Materials In Works (MIW) was capable of securing some label packaging stakeholders/investors on board and the technology is feasible to scale from lab into pilot manufacturing scale which again is a growing level of interest for corporate organizations with social responsibility goals.

## 2. Project Team:

Input your team structure based on the table below:

<b>Role</b>	<b>Name</b>	<b>Profile</b> <i>(linkedin profile or cv)</i>
Technical Director	John Ooi Chong Sen	<a href="https://www.linkedin.com/in/john-ooi-chong-sen/">https://www.linkedin.com/in/john-ooi-chong-sen/</a>
Technical Advisor	Dr. Leh Cheu Peng	<a href="https://www.linkedin.com/in/chou-peng-leh-1572b152/">https://www.linkedin.com/in/chou-peng-leh-1572b152/</a>

## 3. Project Partners:

Input all partnership, collaboration your team has secured for this project (if applicable):

<b>Name</b>	<b>Description</b>
Universiti Sains Malaysia (USM)	Extension of Research Collaboration Agreement with USM for the purpose of building a pilot plant that can deliver recovered cellulose pulp in a larger commercial scale

## **4. Activities Report:**

### **4.1 Major Activities:**

**Objective 1: To build a pilot lab leading to a larger scale manufacturing plant for making recovered cellulose pulp from paper liner waste as raw materials**

Activity 1: To pilot a smaller scale machine that will create as a base towards larger scale manufacturing plant

Activity 2: Research and development on the upcycle paper liner waste

- Work with machinery supplier
- Purchase tools for scale-up studies
- Concoct the involved process / parameters to upcycling
- Compute on machinery & process costing to scale-up pilot plant

**Objective 2: To secure funding to build 1 ton lab based from finding of pilot project**

Activity 1: To build the supply chain with various stakeholders to be part of a more sustainable ecosystem

Activity 2: To build interest from future investor

The outcome of the activities allowed Materials In Works (MIW) to confidently set up a 1 ton capacity pilot plant by proving the technology is feasible to scale into larger scale and at the latter stage, to seal a commercial agreement which includes LOI and MOU with early adopters from the label packaging industry. Apart from that, MIW successfully engaged with Decago group for the preparation of fundraising matters via Equity Crowdfunding (ECF).

### **4.2 Special event (if any):**

Not applicable.

## **5. Impact Measurement**

- To increase efficiency of yield rate of pre-industrial upcycling process (Baseline: 75%)
- To produce a Research Report (inclusive of benchmark studies and treatment parameters) at the end of campaign
- Quantity of lab sample produced (Baseline: 1g)  
\*Limited by the instruments Universiti Sains Malaysia (USM) had in their lab

- Written agreements from label packaging stakeholders and paper manufacturers
- Potential funders/investors approached

## 6. Sub Projects outcomes and impact (if any)

Not applicable.

## 7. Financial Report

Report on Budget Implementation based on each Category:

NO	CATEGORY	PLANNED	ACTUAL	PERCENTAGE
1	Marketing & Communication	RM0	RM0	Nil
2	Material	RM6,300	RM2,000	13.33
3	Logistic	RM5,00	RM500	3.33
4	Labor	RM4,200	RM3,000	20.00
5	Allowance for Machine Expert	RM4,000	RM0	0.00
<b>TOTAL</b>		RM15,000	RM5,500	

Current budget is under spending due to some delays happening on the key activities. Eg. allowance to be paid for Machine Expert.

## 8. Challenges and Lessons Learned

Challenges	Description	Mitigation / Lessons Learned
Internship unreachable halfway	Incident of student intern refuses to reply/pick up phone calls	<ul style="list-style-type: none"> <li>- The Professor took the place to reply on what had been requested by the company</li> <li>- Hiring one back-up person to handle the project (preferable to be lab assistant)</li> </ul>
Activities are not complete on time	Incident of listed activities are not complete based on plan	Call for regular weekly meetings, if possible secure a face-to-face meeting with students and Professor.
The stirring speed parameter used in lab is not	Lab machinery is using 300 RPM speed but only 70 RPM available for	Call for a machine trial with the machinery supplier before making any purchase.

available in commercial scale	commercial scale machinery	
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## 9. Methods of Assessment

Impact Indicator	Baseline (B)	Target deliverables	
		B + 3 months	B + 6 months
To increase efficiency of yield rate of pre-industrial upcycling process	75%	78%	80%
Research Report Benchmark studies Parameters	0	0	1
Quantity of lab sample produced	1g	25g	25g
5 written agreement (signed letter of interest as early adopter) from label manufacturer	0	0	5
2 written agreement (signed letter of interest as early adopter) from paper manufacturer	0	0	2
1 Business Plan that will be used to get investor and future funding	0	1	1
8 potential funders approached	2	2	8

## ANNEX

All the data, statistic, material, photos that you can use as the reference, have to link with the content of the part above

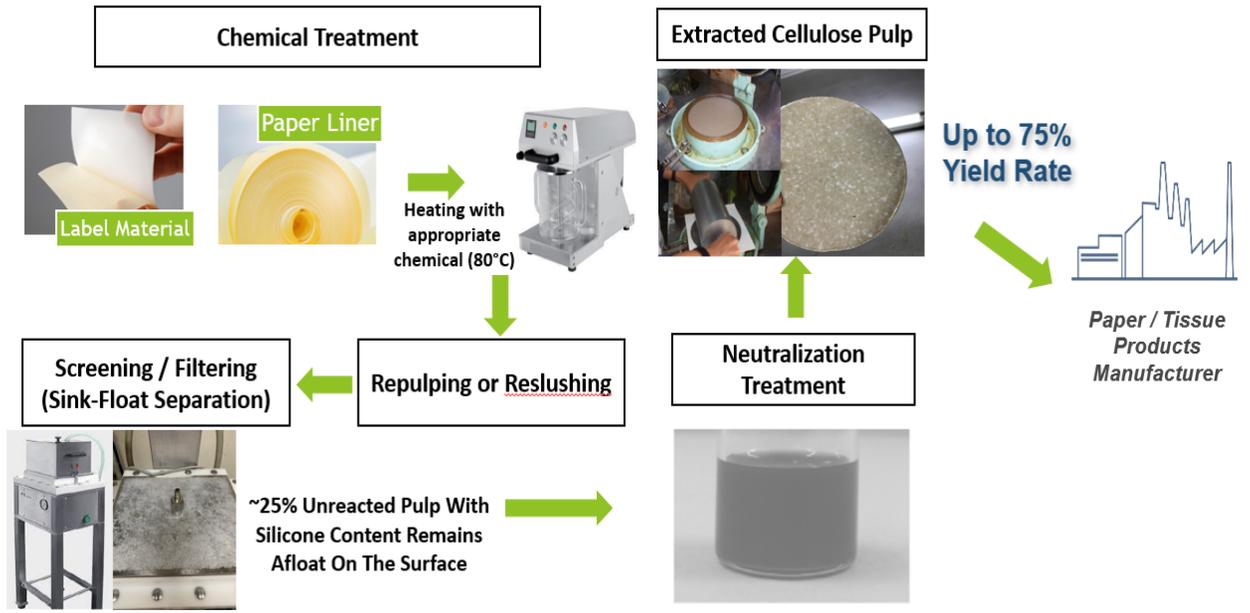
- Thermomix machine purchased for simulation study



- Enhanced sample produced with Thermomix machine  
\*No transparent spots found in the samples made



- Defined processes after going through multiple experimentations



- USM granted extension on RCA for piloting upcycling solution project



Rujukan Kami : AO2447  
Tarikh : 08 September 2022

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KEPUTUSAN BORANG HAL EHWAL PENGURUSAN GERAN (HEPG)  
TAJUK PROJEK : RESEARCH COLLABORATION ON RECYCLABILITY OF GLASSINE PAPER  
NO. AKAUN : 304 /PTEKIND /6501236 /M180

Dengan segala hormatnya perkara di atas adalah dirujuk dan Borang HEPG yang diterima pada 06 September 2022 adalah berkaitan.

2. Sukacita dimaklumkan bahawa pihak Universiti telah meluluskan lanjutan tempoh geran selama 12 bulan mulai 01 Februari 2022 sehingga 31 Januari 2023 untuk projek penyelidikan seperti tajuk di atas.

3. Sehubungan dengan itu, tempoh baharu geran ini dengan mengambil kira kelulusan pelanjutan ini adalah selama 20 bulan. Pihak kami memohon kerjasama puan untuk mengemukakan laporan di akhir tempoh geran kepada Pejabat ini.

Sekian, terima kasih.

"WAWASAN KEMAKMURAN BERSAMA 2030"

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

  
(MOHD FAISAL BIN ABU BAKAR)  
Penolong Pendaftar Kanan

s.k. Pengarah  
Pejabat Pengurusan & Kreativiti Penyelidikan

Dekan  
Pusat Pengajian Teknologi Industri

Penolong Bendahari Kanan  
Seksyen Kewangan Penyelidikan  
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