

Optimization of the hygrothermal and acoustic properties of insulating materials formulated from waste furnishing elements and recyclability of these materials

L. EL KHOURY (1), O. HAMD AOUI (1), H. ALLAM (2), L. IBOS (1)

(1) Centre d'Etudes et de Recherche en thermique, environnement et systèmes, Université de Paris-Est, 61 avenue du général de Gaulle 94000 Créteil
(2) University of Bordeaux, 16 Avenue Léon Duguit, 33600 Pessac

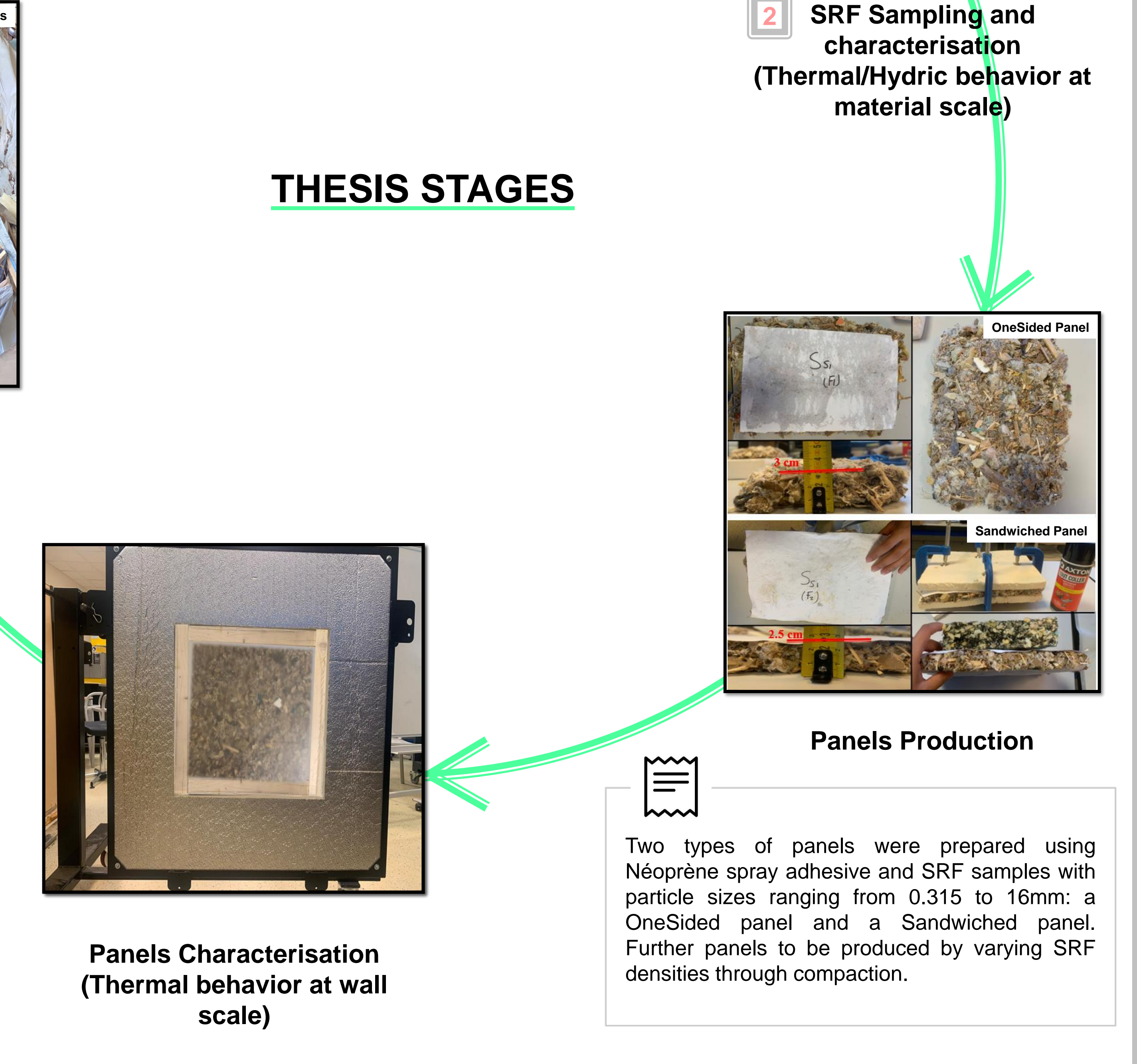
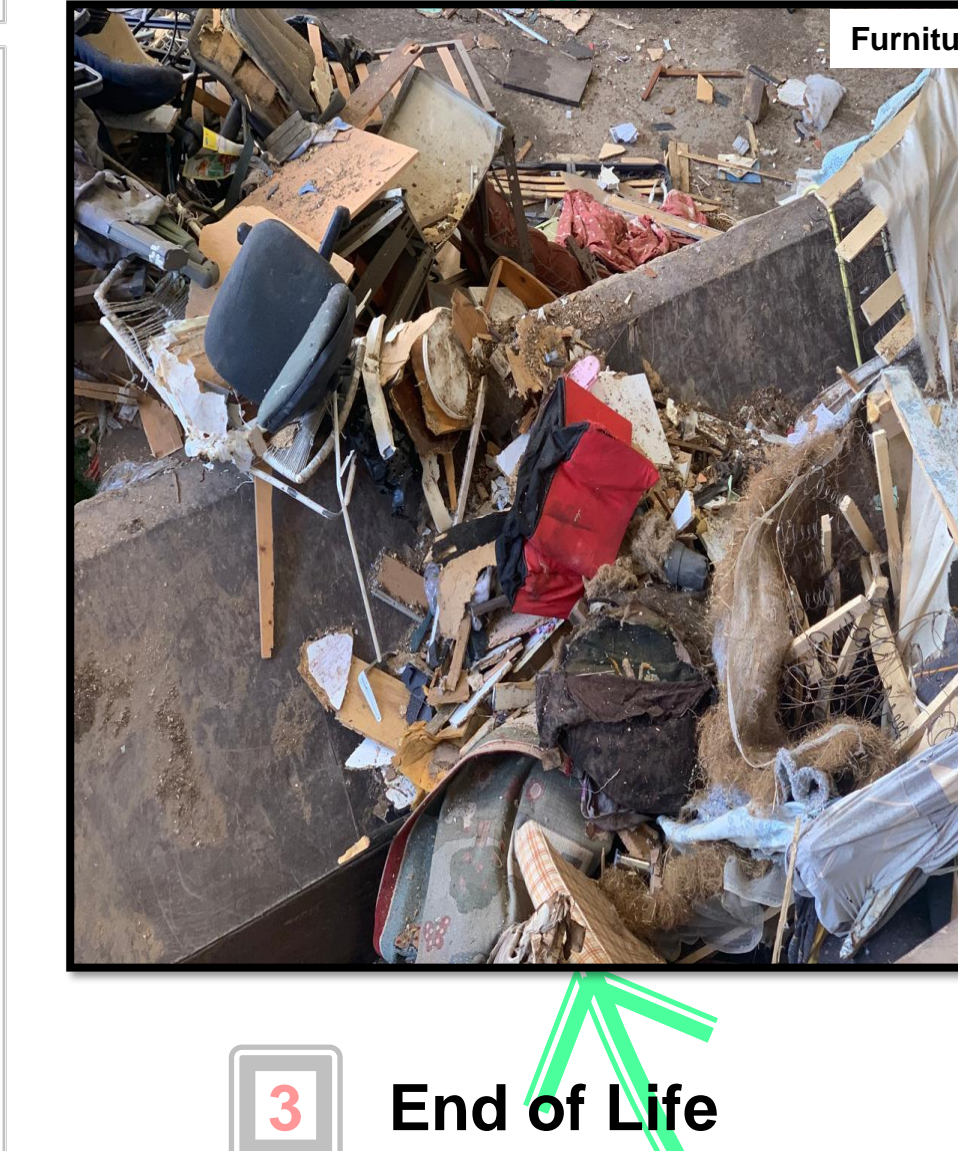
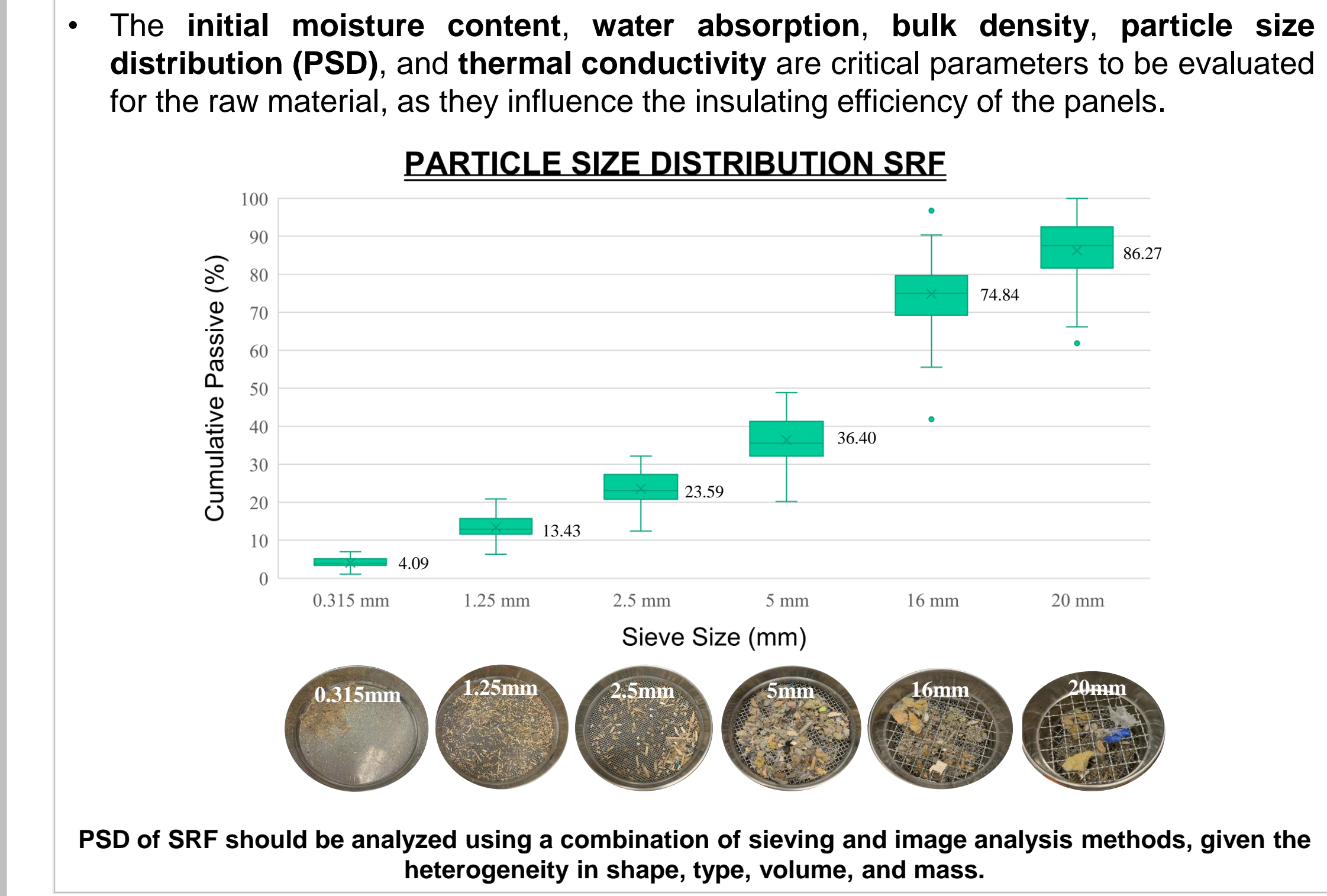
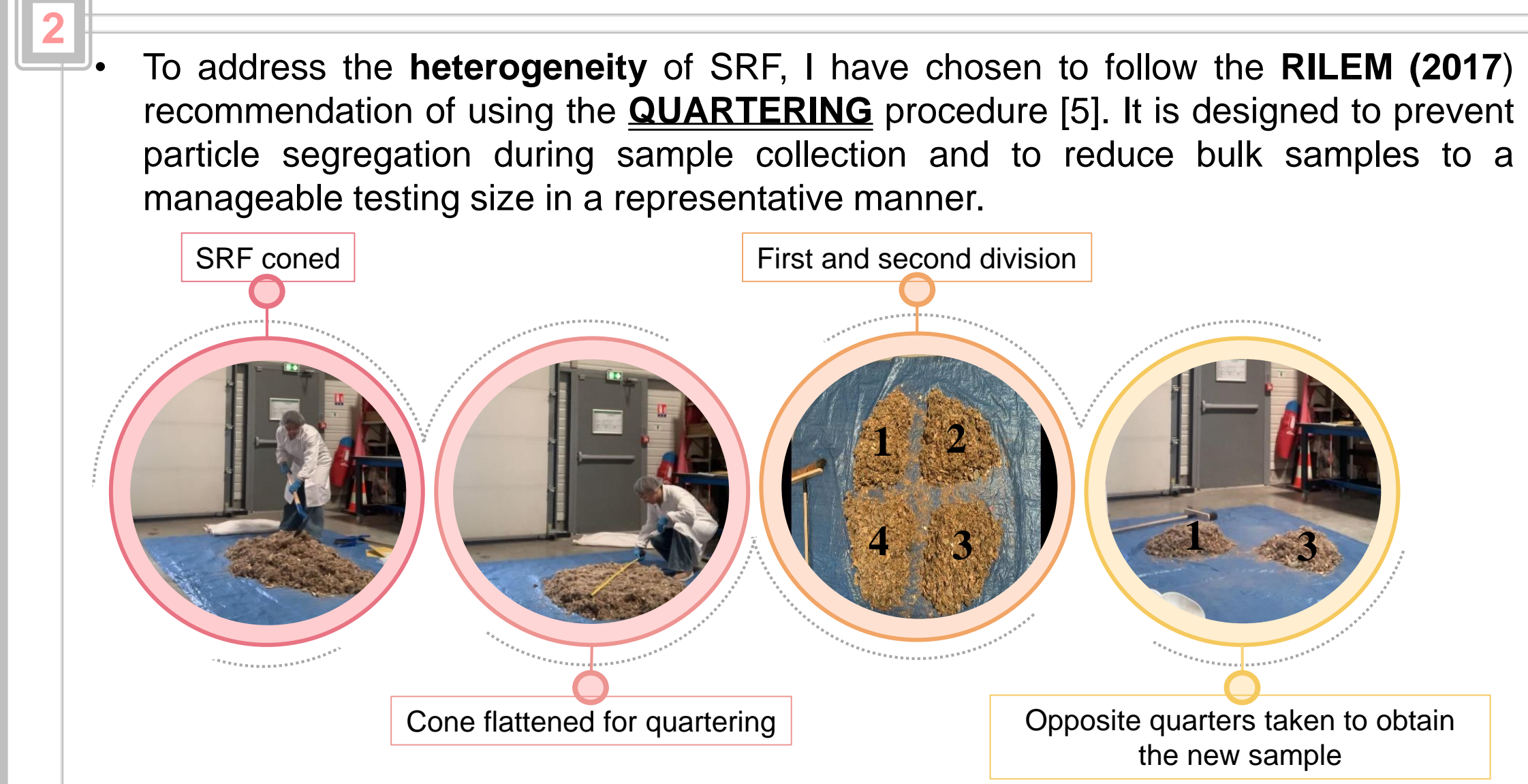
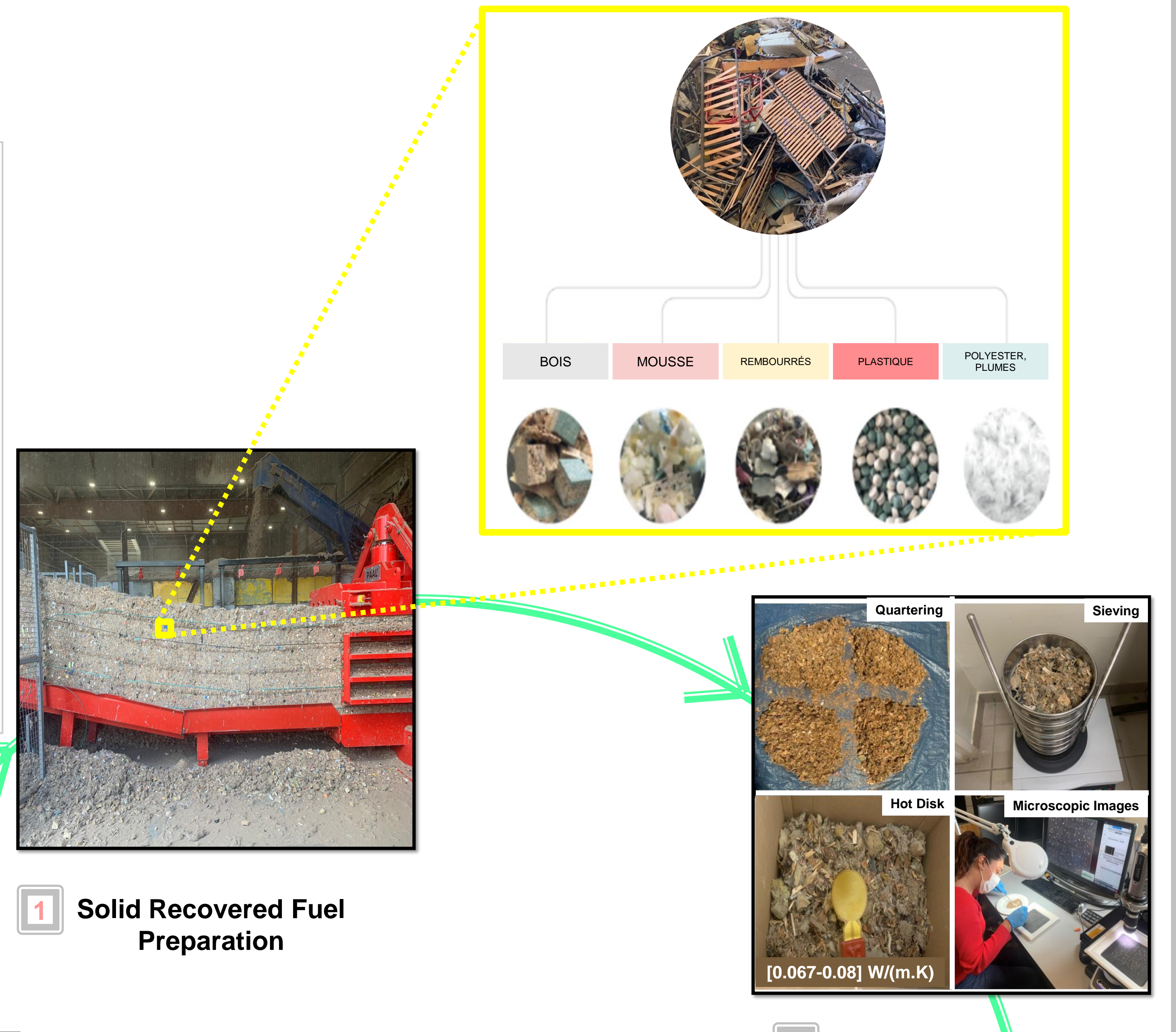
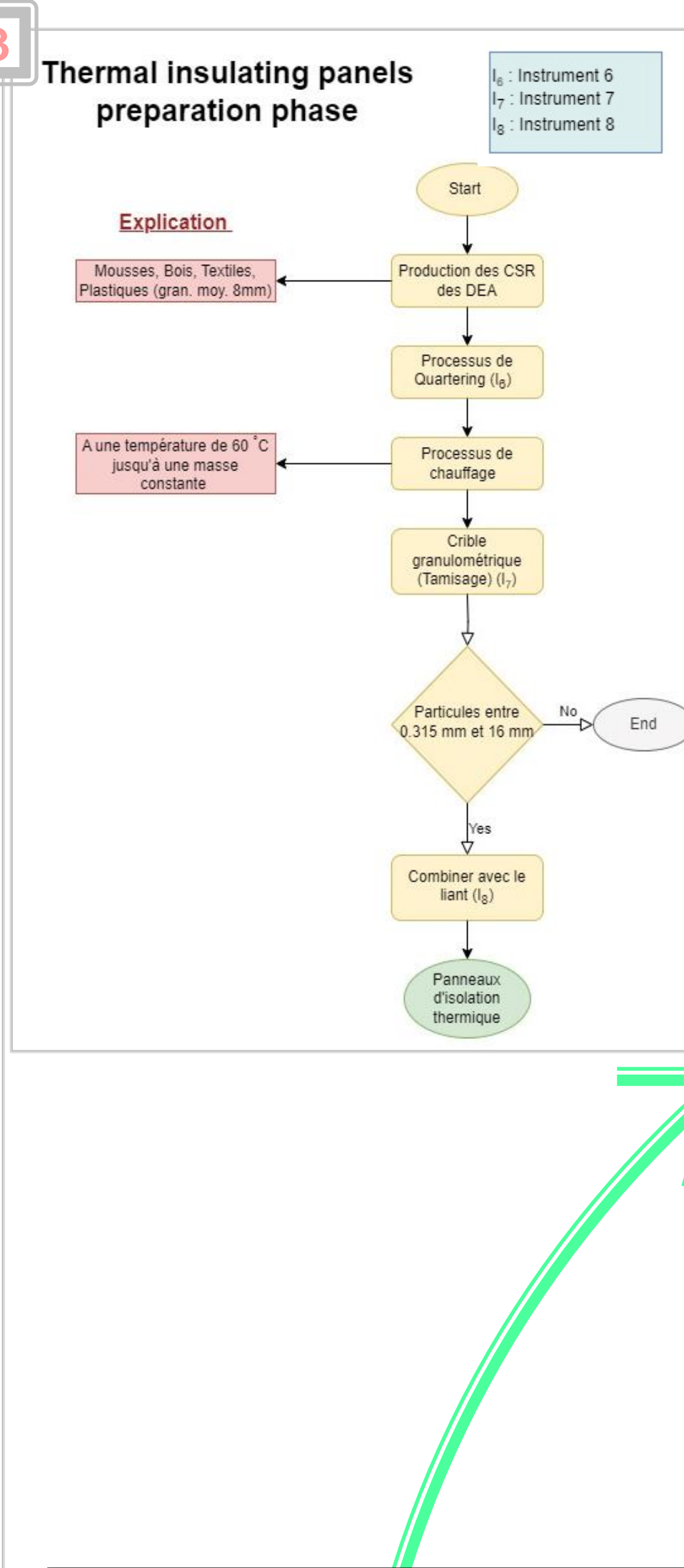
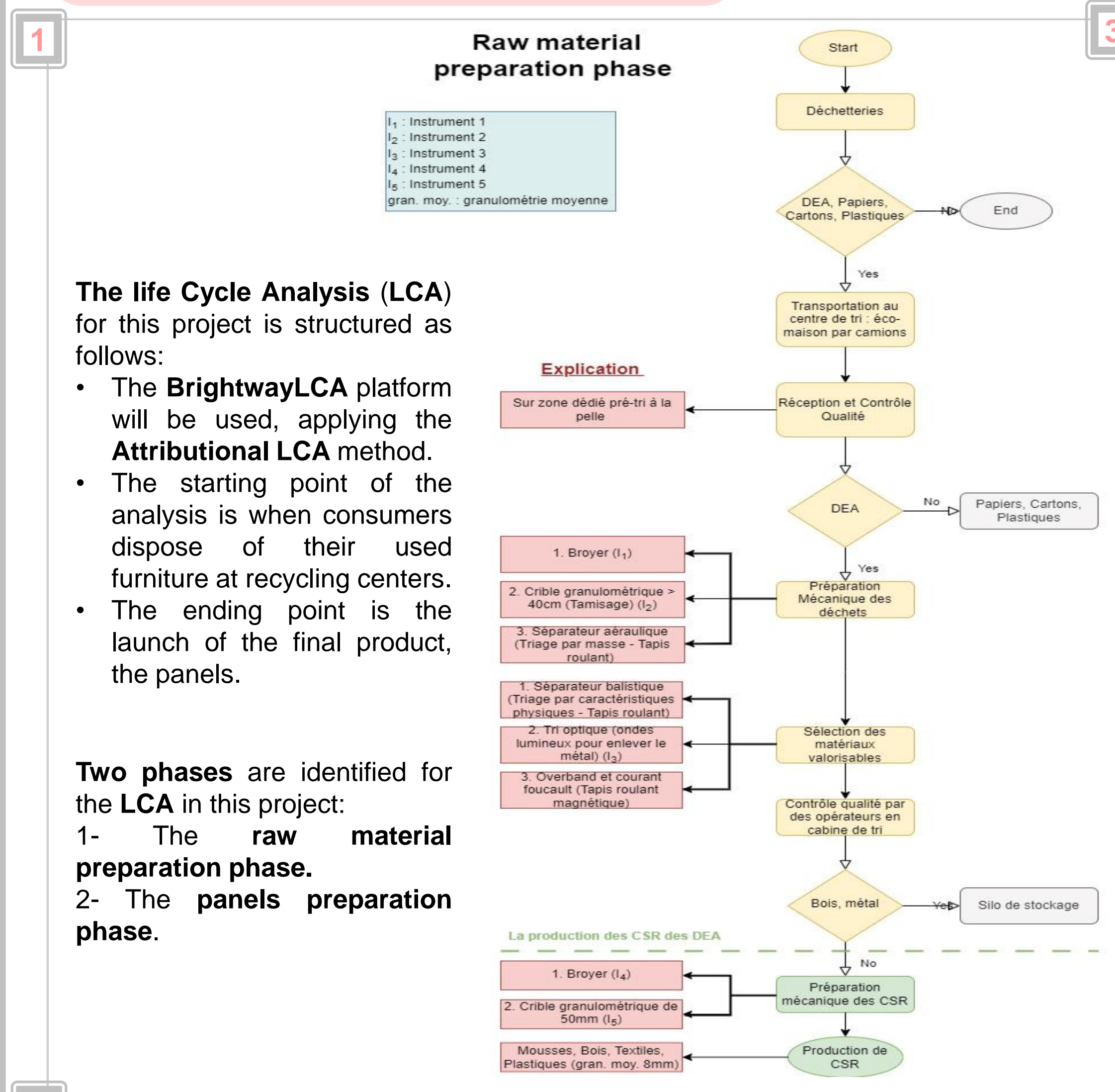
Introduction

The **construction industry** is a major contributor to **carbon emissions** and **energy consumption** [1]. Supporting France's goal of carbon neutrality by 2050, this PhD research aims to repurpose **Solid Recovered Fuel (SRF)** from **furniture waste**, provided by **Eco-maison**, as a sustainable insulation material prioritizing its recyclability. While currently valorized energetically, the process incurs high costs to prepare and pack the SRF to be shipped without financial returns [2].

In collaboration with Eco-maison, **LARIS** (Université d'Angers), and **LMDC** (INSA Toulouse/UPS – Tarbes), the project seeks to optimize the **thermal** and **acoustic** properties of **SRF-based panels**, contributing to a **circular economy** [4]. A **life cycle analysis (LCA)** will also be conducted for the optimized panels to assess their environmental impact.



Thesis Progress



THESIS STAGES

This research work is financed by the "Campus des Métiers et des Qualifications d'Excellence"

References

- [1]: France | Energy profile. (2021).
- [2]: Éléments d'ameublement - Données 2020 - 7ème édition du rapport de l'ADEME <https://librairie.ademe.fr/dechets-economie-circulaire/6063-elementes-d-ameublement-donnees-2021.html>
- [3]: SEINE MULTI RECYCLAGE-CTHP OISSEL-mai2024.pdf. (s. d.).
- [4]: La loi anti-gaspillage dans le quotidien des français : concrètement ça donne quoi ? Document de référence septembre 2021 https://www.ecologie.gouv.fr/sites/default/files/Document_LoiAntiGaspillage%20_2020.pdf
- [5]: Amziane, S., Collet, F., Lawrence, M., Magniont, C., Picandet, V., & Sonebi, M. (2017). Recommendation of the RILEM TC 236-BBM : Characterisation testing of hemp shiv to determine the initial water content, water absorption, dry density, particle size distribution and thermal conductivity. *Materials and Structures*, 50(3), 167. <https://doi.org/10.1617/s11527-017-1029-3>