Our Commitment to a Sustainable Future

01

Introduction to Hansol Paper Global Trends

Introduction to Hansol Paper

Hansol Paper

Overview

Founding date	1965
Headquarters	Seoul, Korea
Business areas	Fine paper, specialty, thermal, carton board, printing & writing paper, food packaging biomaterials
Employees	1,639
Credit rating	A0
ESG rating	A

Sales

Unit: USD

Printing & Writing paper

Carton board

Thermal paper

Fine paper

Specialty papers

Food Packaging

Wet tissues

Cellulose fiber

Sustainability at a Glance

Global Trends ① Global Plastics Treaty

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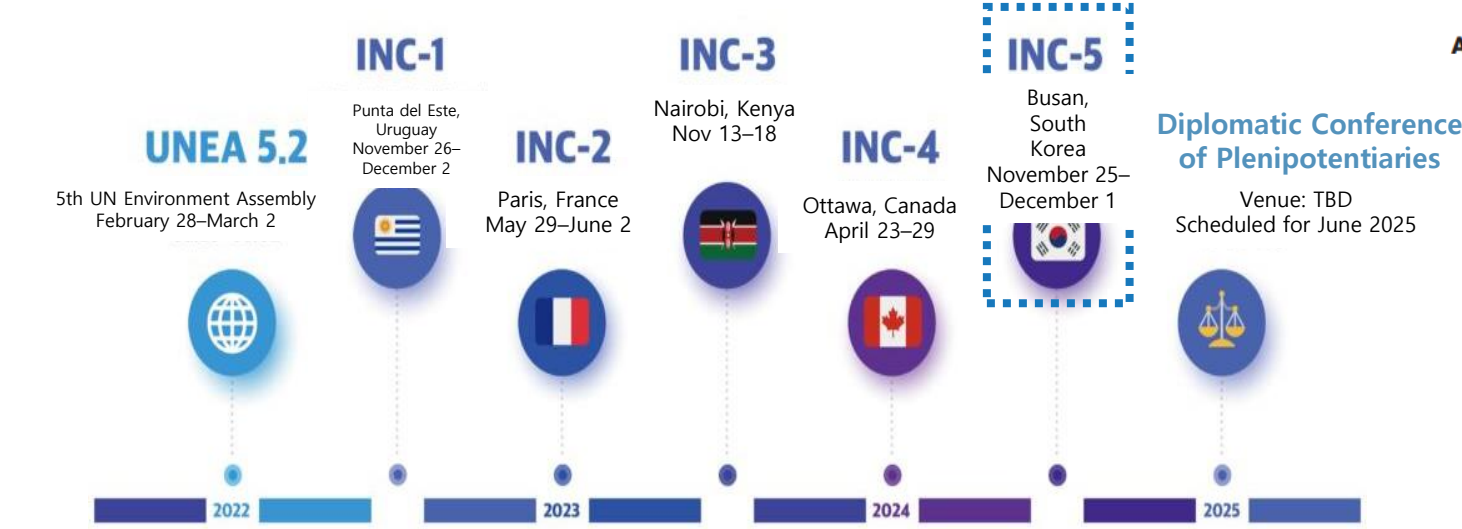
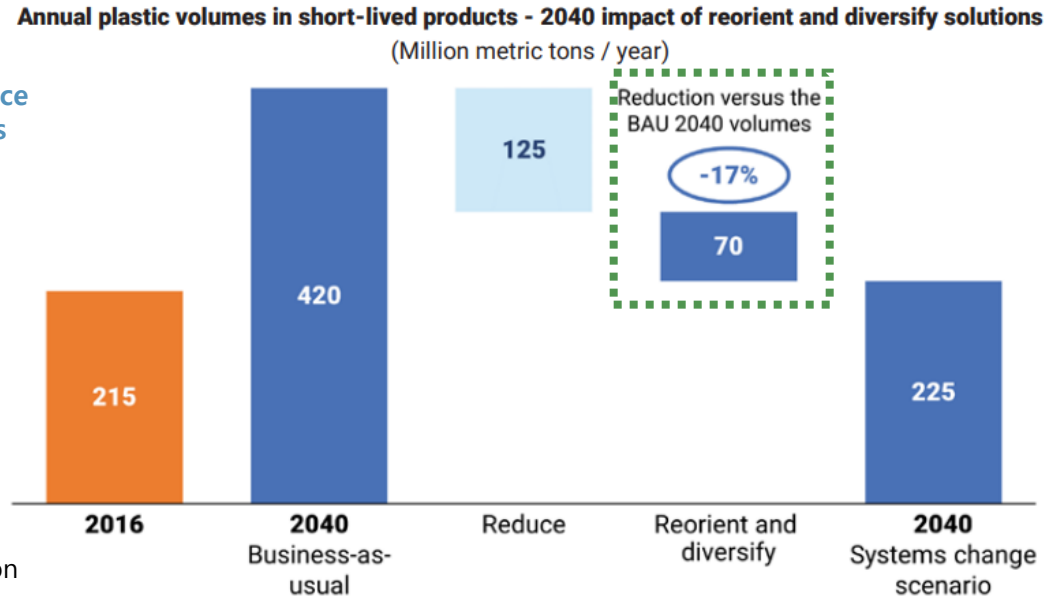
At global treaty meetings, key issues such as the reduction of primary plastic polymer production and usage reduction are being discussed, but **no consensus has been reached due to opposition from oil-producing and manufacturing countries.** Additionally, there is a lack of discussion on plastic alternatives. As highlighted in the UNEP report, we should focus on "Reorienting and diversifying" materials.

Global Plastics Treaty Timeline



Plastic Usage Scenarios



* Source : Greenium, UNEP Turning off the Tap (2023)

Global Trends ② European Packaging and Packaging Waste Regulation (PPWR)

Hansol Paper

In the EU, the PPWR* legislation, which mandates the recycling and reuse of packaging materials, is set to take effect in July 2026. With the anticipated increase in demand for paper packaging as an alternative, global paper companies are actively developing substitute products. Hansol Paper is expanding the development of packaging materials tailored to the required strength and barrier properties for replacing flexible packaging.

European Packaging and Packaging Waste Regulation (PPWR)

Overview

An EU regulation that mandates (or encourages) the recycling and reuse of packaging materials by setting strict recycling and reuse targets for packaging.

Target

Packaging sold, imported, or distributed within the EU, and packaging of products manufactured within the EU.

Details

① Ban on single-use plastic packaging starting from 2030.
② Obligation to recycle a certain percentage of each packaging material after use.
③ Requirement to include recycled content in plastic packaging materials.

* PPWR : European Packaging and Packaging Waste Regulation

Trends in Paper Companies

Products

GPI, PPWR-compliant paper sealing trays (June 2024)
DS Smith, paper carrier box (May 2024)
Amazon Europe, paper delivery envelopes (under review)

Joint Development

[Paper] UPM, [Chemical] Henkel, Michelman, [Machinery] Bobst, [Food] Nestlé:
Increased cases of joint development/launch through consortiums.

Hansol Paper

Expanded product range from high-barrier, high-strength to low-barrier, low-strength products based on packaging (envelopes/auto-sealing) and food (frozen/ambient) types. Currently developing paper with enhanced strength for ambient/auto-sealing types.

Global Trends ③ Technologies to Address Plastic Issues

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Various efforts are underway to address plastic waste issues, including plastic recycling and biodegradable plastics. Paper is an eco-friendly material that can contribute to solving plastic problems, and it is actively being developed as a "Re-orient" material. Hansol Paper is devoted to developing and expanding paper materials that can replace plastic.

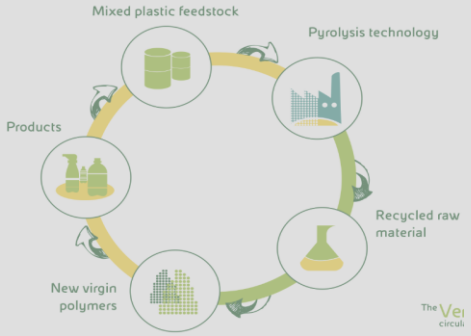
Mechanical Recycle

A method of sorting plastics that are difficult to recycle, cleaning dirty plastics contaminated with foreign substances, and recycling them into regenerated raw materials.

Source : Mikacycle

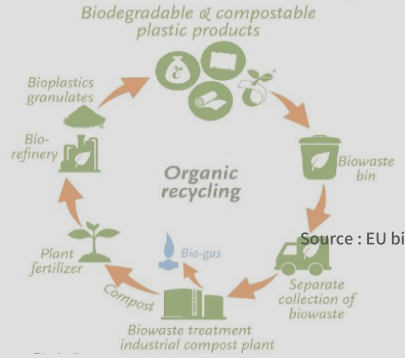
Chemical Recycle

A process of completely reverting plastics in their polymer form back to their original monomer form through chemical reactions.



Biodegradable

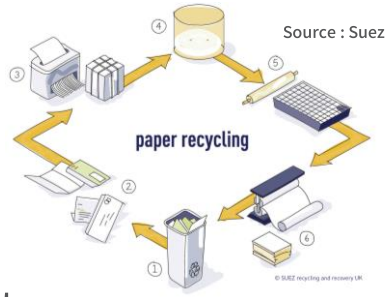
Plastics that are biodegradable under specific conditions or in nature, produced using microorganisms and renewable resources.



Source : EU bioplastics

Replace

Utilizing managed forest resources from plantation areas to produce paper, food packaging, and cushioning materials. This is a highly recyclable and eco-friendly resource.



Source : Suez

Advantages
① Contributes to carbon cycle through the management of plantation areas.
② Over 90% recyclability, contributing to resource circulation.

Global Trends ④ Trends in Paper Packaging in Europe (Sweden, Finland, Netherlands)

Hansol Paper

Europe is transitioning to paper packaging to replace plastic, with variations depending on the product type. For ambient temperature foods, paper and paper + film materials are generally applied, and most fruits and vegetables have been switched to paper packaging. For cold chain foods, due to the need for visibility (transparency), some products use a sealing tray format combining film and paper.

Trends in Paper Packaging Applications for Ambient Temperature Foods

Trends in Paper Packaging Applications for Cold Chain Foods

Global Trends ⑤ Trends in Japanese Paper Packaging

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In Japan, overall packaging design tends to be elaborate, with a high proportion of glossy and decorative packaging materials being used. For ambient temperature foods, some products are using matte paper materials; however, most are still combined with aluminum due to technical issues. As for cold chain foods, it is still difficult to find examples of paper-based materials being applied, indicating a need for further technological development.

Trends in Paper Packaging Applications for Ambient Temperature Foods

Trends in Paper Packaging Applications for Cold Chain Foods

02

Hansol Paper’s Eco-Friendly Packaging/Materials

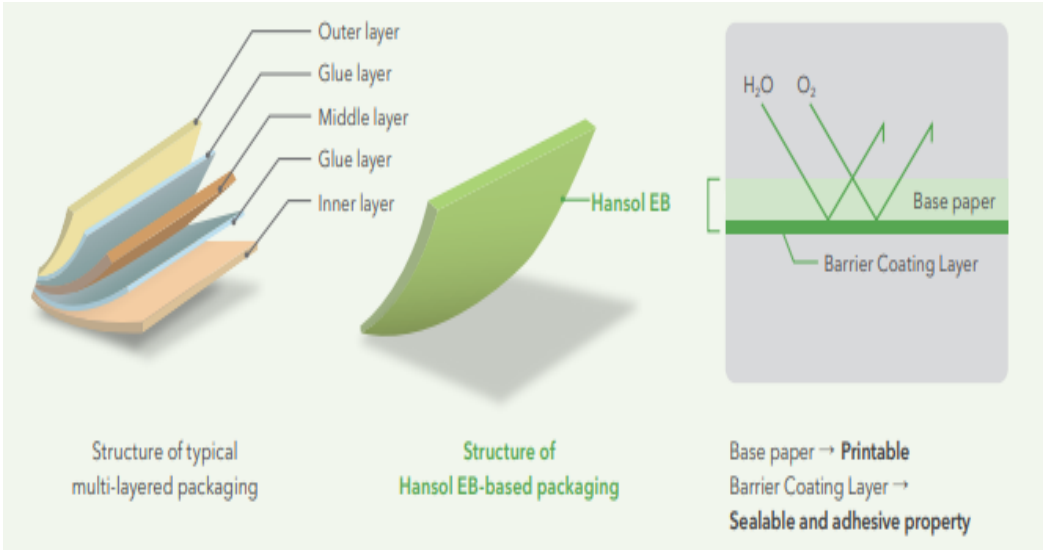
Hansol Paper

Eco-Friendly Packaging ① Introduction to High Barrier Paper

Most food packaging materials are made of plastic, and the demand for alternatives is steadily increasing over time. The high barrier paper developed by our company, Protego, replaces the aluminum and plastic typically used to enhance the barrier properties of packaging. It offers high oxygen and moisture barrier performance while simplifying the production process with a single barrier layer.

Plastic waste issue

Eco Barrier paper



Eco-Friendly Packaging ① LCA Assessment Results for High Barrier Paper

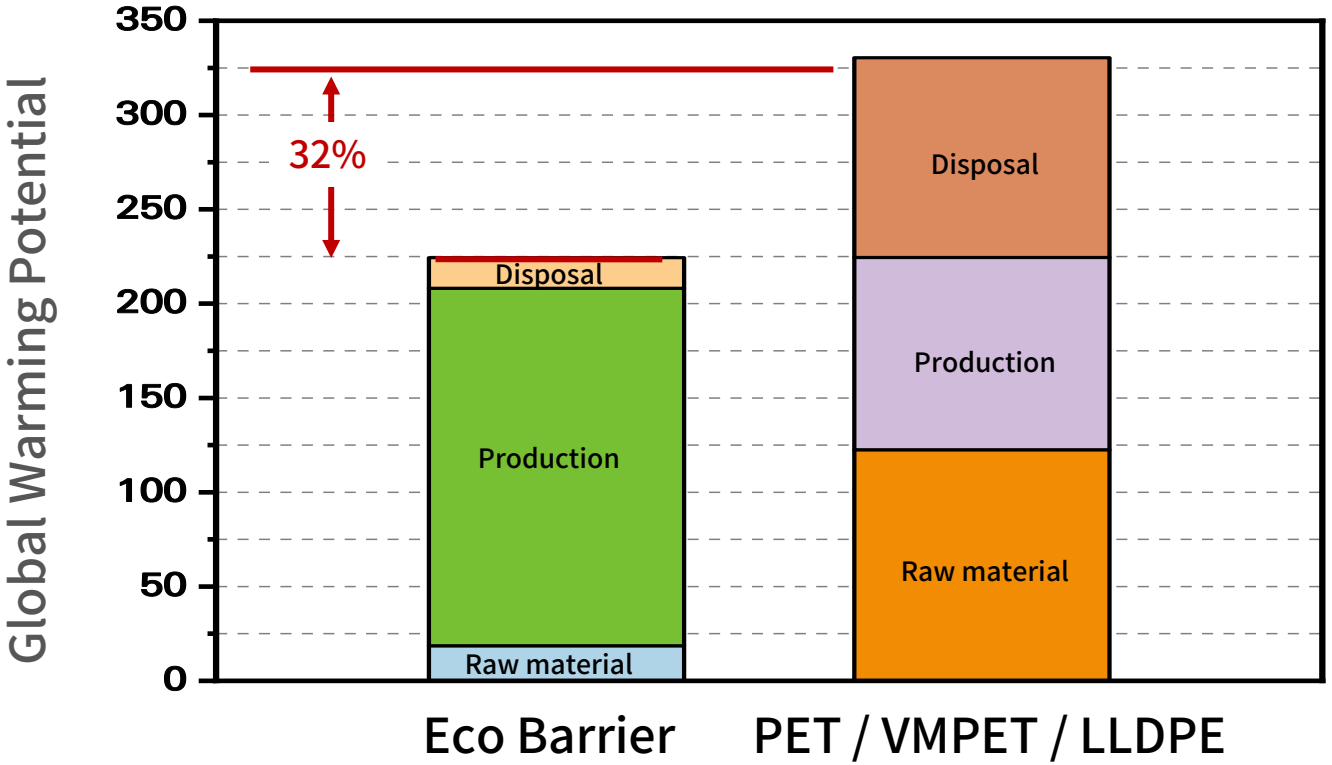
Hansol Paper

Comparison of Carbon Emissions Based on LCA Between High Barrier Paper and Aluminum + Plastic Coated Film (for Pouch Packaging):

The carbon emissions during raw material extraction and product manufacturing are similar; however, during the disposal process, paper emits approximately 7 times less carbon.

→ Aluminum + plastic coated film: **difficult to recycle, typically incinerated, high carbon emissions.**

→ Paper: can be **reused through material recycling, relatively low carbon emissions.**



* LCA (Life Cycle Assessment) : A method for evaluating the environmental impact of a product throughout its stages of raw material extraction, production, and disposal, primarily focusing on measuring carbon emissions.

Eco-Friendly Packaging ① Application Cases of High Barrier Paper

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Eco-Friendly Packaging ① Application Cases of High Barrier Paper

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Eco-Friendly Packaging ② PE-Free Paper Cups/Containers/Packaging Materials

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A material developed to replace the plastic (PE) coating used in traditional paper cups, containers, and packaging. It utilizes water-based coating technology to ensure **recyclability, biodegradability, and food safety in paper packaging materials.**

Paper cup/straw

Paper cutlery/Cake box

Eco-Friendly Packaging ③ Paper Sealing Tray

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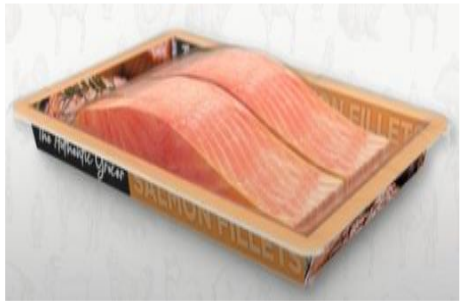
A paper-based alternative to plastic trays primarily used for low-temperature foods (85% paper + 15% plastic film). It is 85% lighter than plastic (17g/2g), easier to recycle, and reduces plastic usage.

Just tear off film, recycle paper tray

Application products

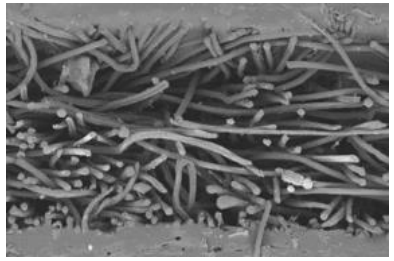


Eco-Friendly Packaging ④ Natural Pulp-Based Wet Wipes

Hansol Paper

Wet wipes that replace traditional plastic nonwoven fabric with natural pulp-based nonwoven fabric. These wipes are compostable in soil, flushable, and made from materials free of harmful substances and microplastics.

Concept

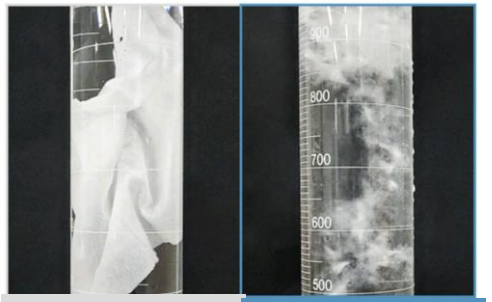


Plastic Fabric

→

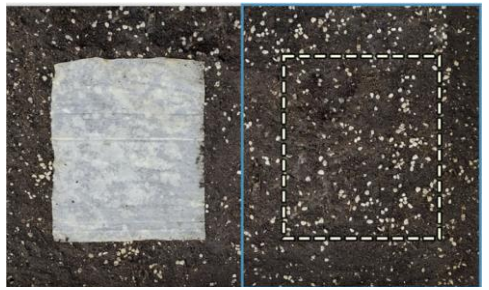
Natural Pulp-Based Fabric

Feature



Plastic Fabric

Wet Wipe Fabric That Saves Whales



Experiment Day 41

32 Harmful Substances Not Detected
by Nationally Accredited Testing Agency KOTITI

Eco-Friendly Materials ⑤ Lignocellulosic Functional Materials

Hansol Paper

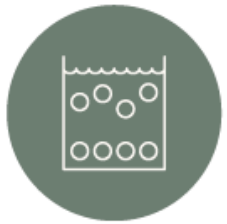
Cellulose fiber (Duracle) can replace petrochemical-derived thickeners with naturally derived alternatives. Ligno Cellulose (SSEIF) is a functional filler made from lignocellulosic by-products, offering carbon reduction and functional benefits. Both materials can be applied across various industries and have the advantage of reducing the use of petrochemical-derived materials.

Duracle® (Cellulose fiber)

Natural Bio-based

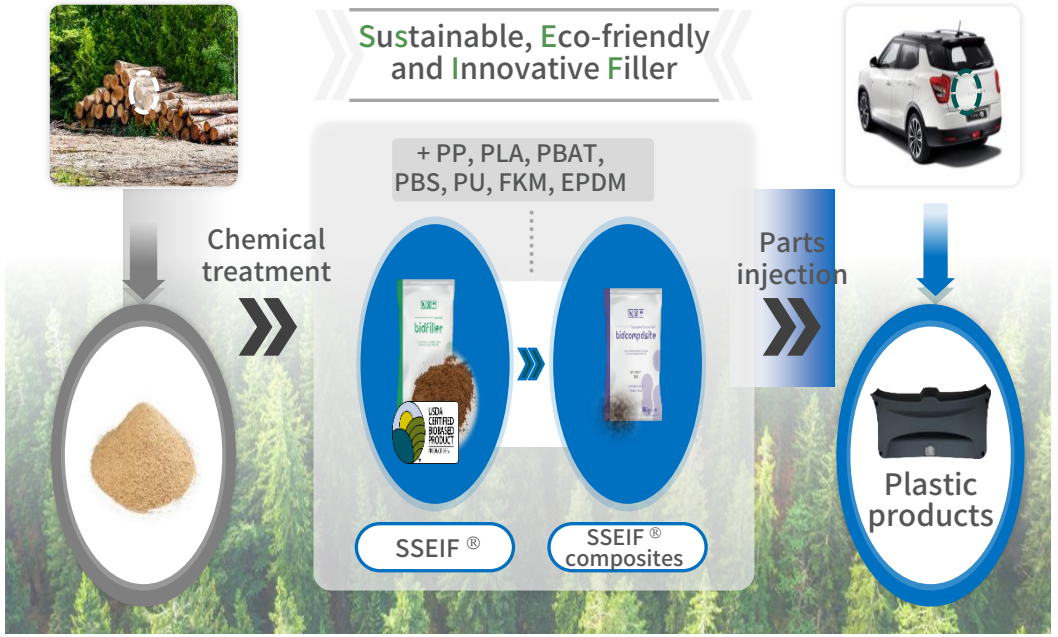
Excellent thickening performance

Non-sticky, fresh skin-feel moisturizing performance



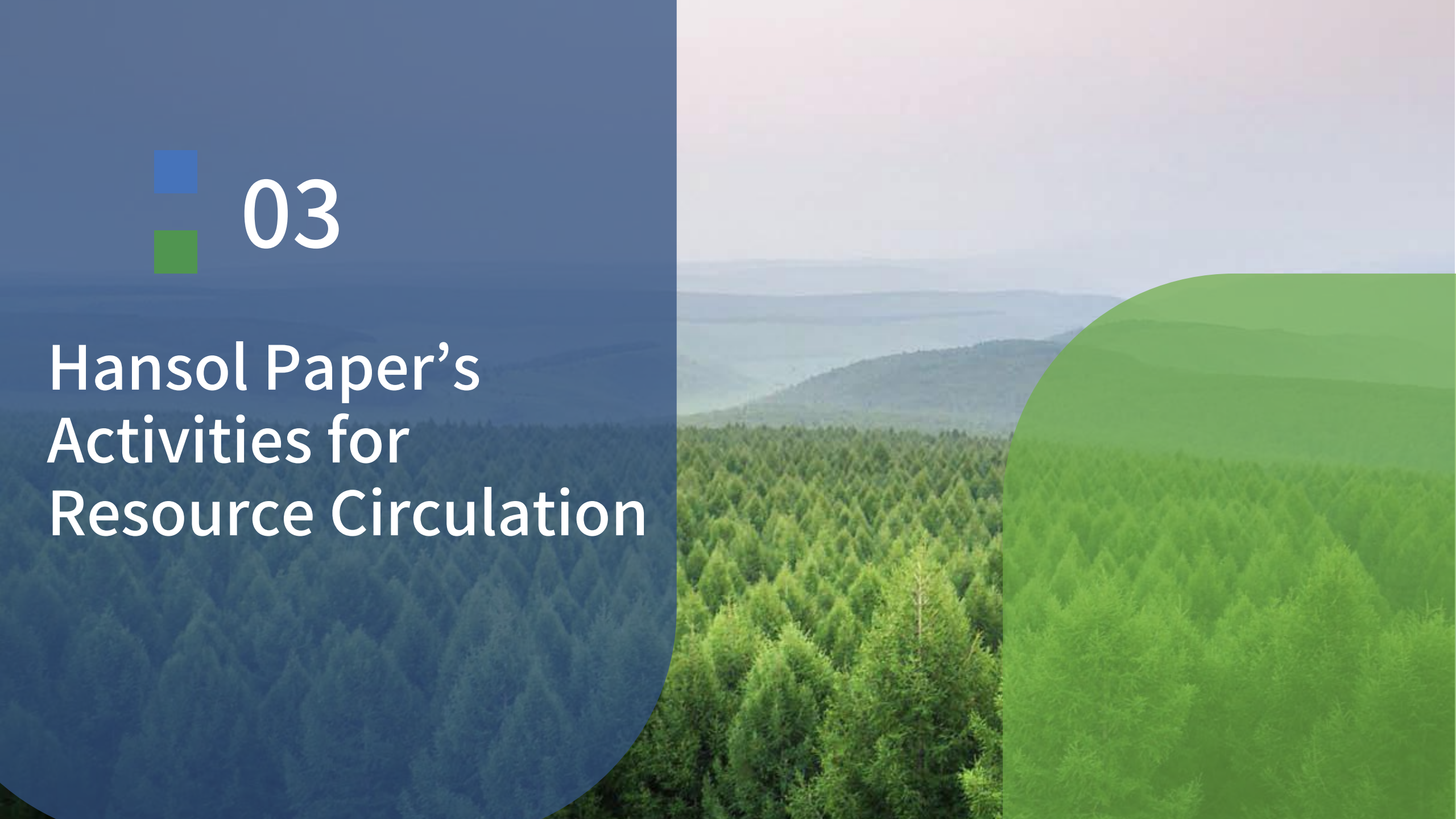
Strong dispersion performance

SSEIF® (Ligno cellulose)



03

Hansol Paper’s Activities for Resource Circulation



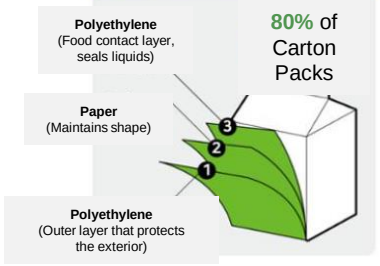
Resource Circulation ① Carton Pack Recycling

Hansol Paper

The domestic recycling rate for paper packs is 13.7% (as of 2022), and due to the increase in sterilized cartons, the recycling rate has decreased. It is necessary to find ways to increase the recycling rate at all stages, including production, consumption, sorting, collection, and recycling. Hansol Paper is working to increase the recycling rate by confirming feasibility through equipment investments.

Carton packs

Regular Cartons



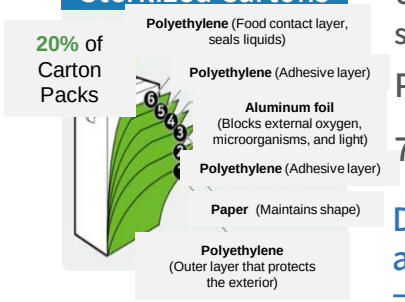
Used for products that require cold storage, such as milk and juice.

PE (printed layer) + white pulp + PE (inner layer)

80% white pulp, 20% PE

Relatively easy to recycle and can be used for high-grade materials
→ Requires additional equipment investment

Sterilized Cartons



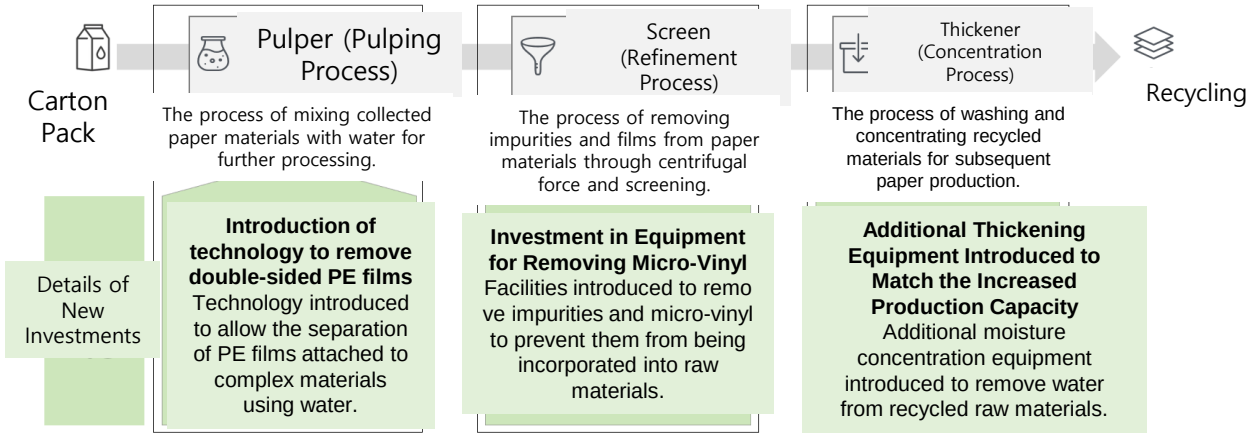
Used for products that can be stored at ambient temperatures, such as soy milk and juice.

PE (printed layer) + yellow pulp + PE + Al + PE (inner layer)

70% yellow pulp, 20% PE, 10% aluminum

Difficult to recycle and lacks proper sorting, collection, and system infrastructure
→ Requires additional equipment investment as well as policy and institutional support

Equipment Investment Details



Test results show that the quality of recycled paper products (color/strength) is satisfactory.

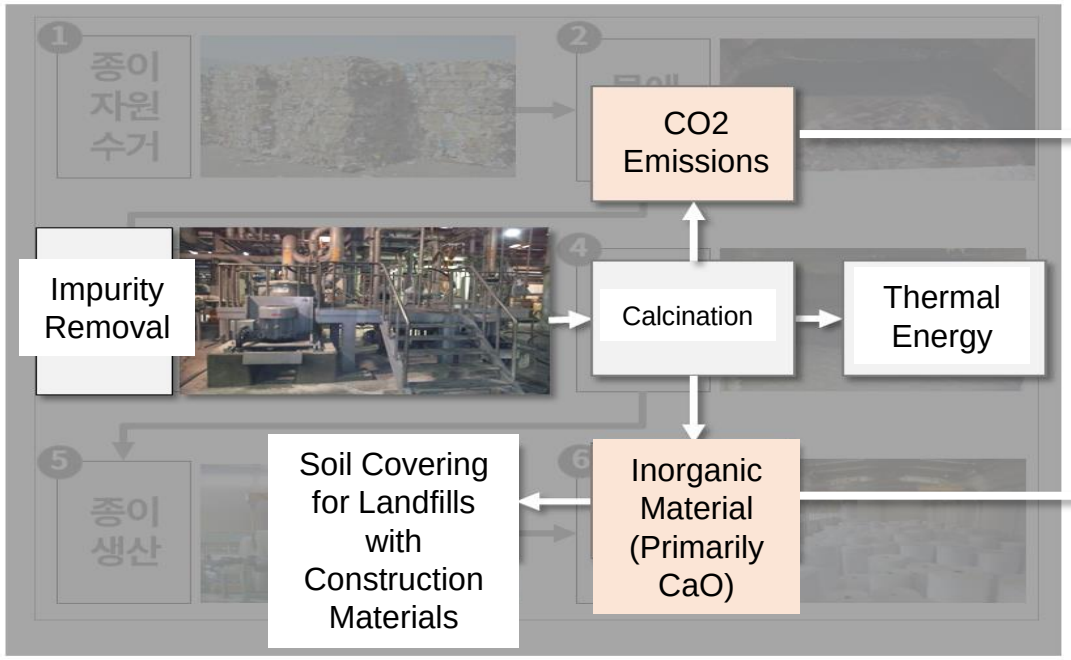
With improvements in sorting, collection, and system infrastructure, the domestic recycling rate of carton packs can be increased.

Resource Circulation ② Waste Recycling

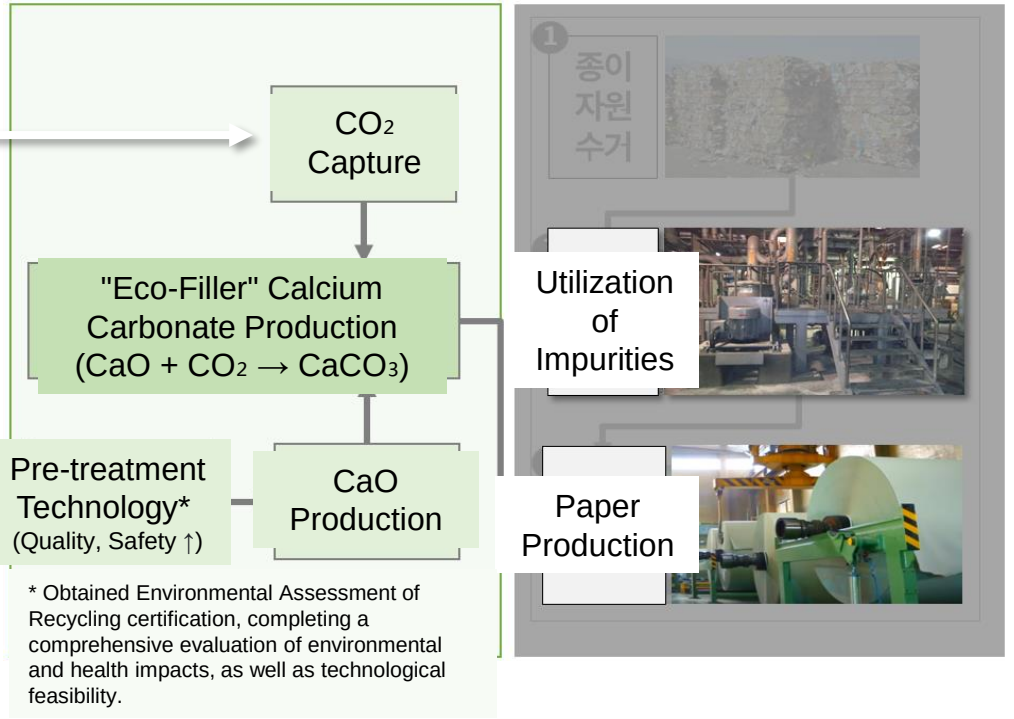
Hansol Paper

Through technology development that utilizes impurities generated from paper recycling, Hansol Paper ① Captured CO2 emissions from industrial boilers, and ② Recycled previously discarded waste, and combined the two technologies to produce "Eco-Filler" (calcium carbonate).
Through this process, Hansol Paper successfully reduced annual waste by 27,000 tons and CO2 emissions by 58,000 tons.

As–Is (Paper Resource Recycling Process)



To–Be (Eco-Filler Development)



Resource Circulation ③ Application of Upcycled Products

Hansol Paper

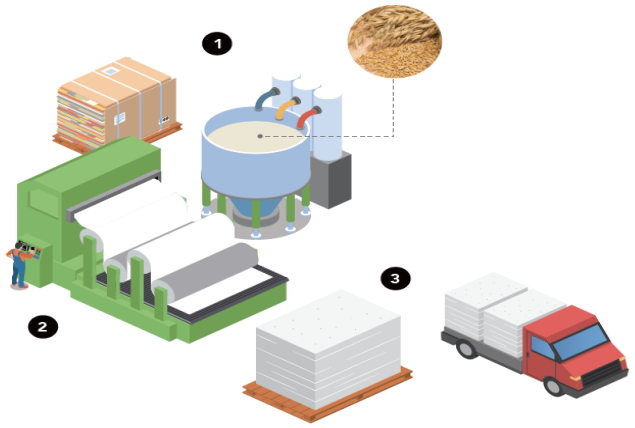
Hansol Paper has successfully incorporated various plant-based by-products into its paper manufacturing process to produce new products. From a marketing perspective, this achievement
① enhances the product identity of client companies and from a resource circulation perspective,
② it has resulted in the development of upcycled products.
The company plans to continue expanding the development of upcycled products to further contribute to resource circulation.

Raw Material Collection
(By-product collection)

Raw Material Processing
(By-product Preprocessing)

- Tangerine peel
- Aloe peel
- Cacao peel
- Oat peel

Paper Processing
(Added during paper manufacturing)



① Stock preparation
② Paper making process
③ Finish process

Product Supply
(By-product recycled paper)

04

Hansol Paper Mutual Growth Management

Mutual Growth Management

Hansol Paper

Signed an MOU with the Ministry of Environment, beverage manufacturers, and other partners to improve the recycling rate of sterilized cartons.

MOU on Sterilized Carton Recycling with the Ministry of Environment

MOU on Sterilized Carton Recycling with Beverage Manufacturers

Mutual Growth Management

Hansol Paper

We are working to replace plastic packaging through MOUs with various food and cosmetic manufacturers and aim to reduce CO2 emissions from the manufacturing processes by more than 50%.

MOU on Packaging Development for Health Supplements & Cosmetics

MOU on the Application of Carbon Capture Technology

05

Suggestion

Suggestion

To tackle the plastic issue, it is crucial for countries worldwide to expand policy support and invest in technological development. Hansol Paper is committed to ESG management and through the development of innovative papers and materials, aims to create a sustainable future as a leading paper company that serves humanity across the past, present, and future.