



# Bio Energy

Hydro-treated Vegetable Oil (HVO)



Bio Marine Fuel



Bio Diesel



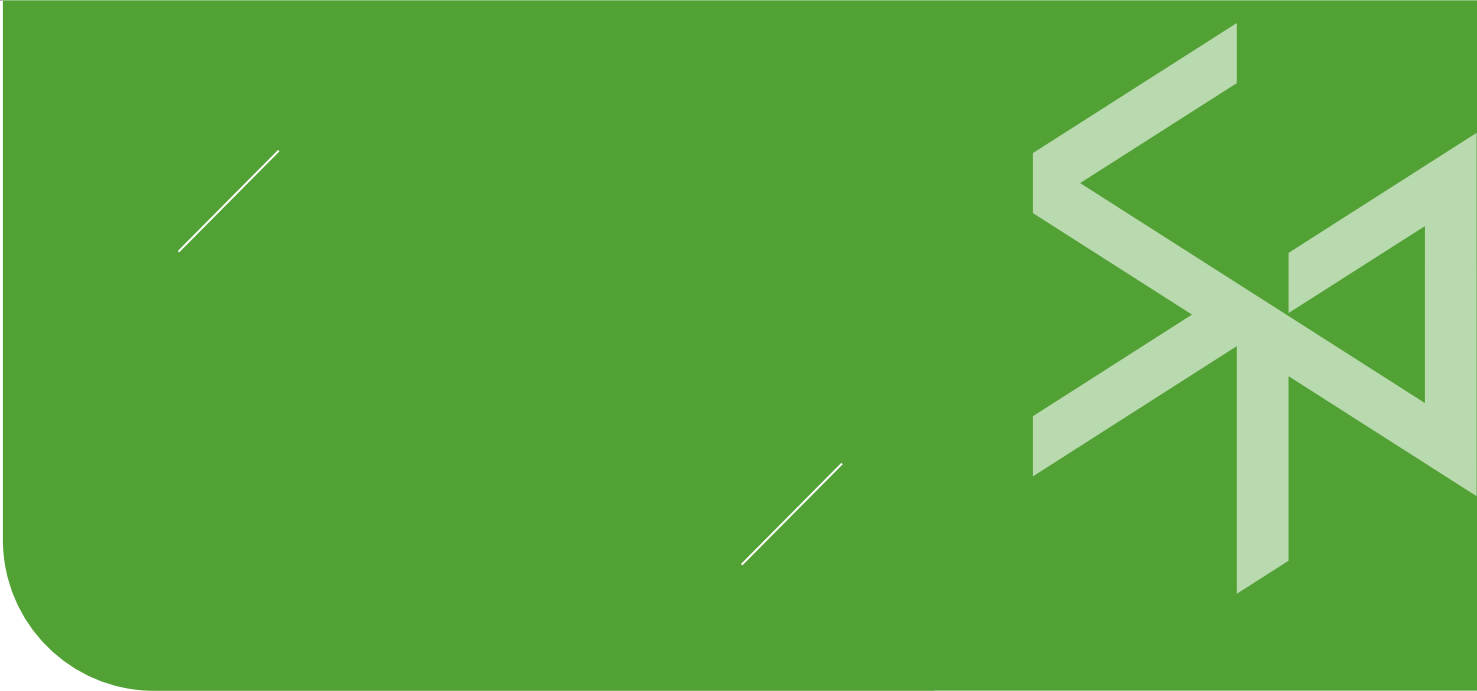
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<http://dsdansuk.com>



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DS DANSUK  
Promotional Video



Bioenergy Business  
Promotional Video

## 1 Company Introduction



## Founding Philosophy

“  
**A company should keep developing and contribute to society.**  
”

Since its foundation in 1965, DSDANSUK has been serving as an eco-friendly energy and materials company engaging in the business of bioenergy (bio diesel/bio heavy oil, etc.), battery recycling (recycled lead, etc.), and plastic recycling (PVC stabilizers, etc.).

As Korea's largest bioenergy producer, we are diversifying our business portfolio based on our strong supply network and secured global partnerships.

We aim to become a company trusted by all stakeholders based on trust and responsibility for customers and, furthermore, to become a company contributing to the development of local communities and the nation.

## Company Introduction

<b>Company Name</b>	DS DANSUK CO., LTD.
<b>Establishment Date</b>	July 1, 1965
<b>CEO</b>	Han Seung-uk, Kim Jong-woan
<b>No. of Employees</b>	416 persons (as of December 31, 2023)
<b>Head Office Location</b>	Sihwa Head Office – 165, Hyeomnyeok-ro, Siheung-si, Gyeonggi-do (Jeongwang-dong) Seoul Office – 6th floor, Seogo Building, 18, Saimdang-ro (Seocho-dong), Seocho-gu, Seoul
<b>Website</b>	<a href="http://dsdansuk.com/">http://dsdansuk.com/</a>
<b>Business Area</b>	Bioenergy, Battery Recycling, Plastic Recycling

# History

## PART 1.

1965  
~  
1989

### Establishment, laying the foundation for fine chemistry

- 1965 · **Founded Novel Industry Company**, developed and manufactured manganese sulphate
- 1969 · Developed and manufactured cuprous oxide and copper oxide
- 1973 · Developed and manufactured red lead and litharge
- 1982 · Designated as a prioritized small/middle-sized company for modernization
- 1984 · Developed and manufactured PVC stabilizer  
· Founded Novel Industrial Co., Ltd.
- 1989 · Changed the company name to Dansuk Industrial Co., Ltd.



Novel Industry Company in the early days

## PART 2.

1995  
~  
2001

### Securing a foothold for growth through concentration of competitiveness

- 1995 · Relocated to Sihwa Industrial Complex, secured modern manufacturing infrastructures and research facilities
- 1996 · Selected as 'Proud Small/Medium-Sized Company' by the Department of Trade and Industry
- 1999 · Received the Minister of Commerce, Industry and Energy Award in the National Productivity Awards (R&D)  
· Designated as the 'Company with Excellent Productivity'
- 2000 · Received the Presidential Award for contributor to productivity improvement
- 2001 · Acquired patent on electric furnace manufacturing technology  
· Venture business certification (new technology developing company)  
· Completed construction of fine chemical plant building  
· Selected as a company with superior technologies



Relocation to Sihwa Industrial Complex

## PART 3.

2005  
~  
2015

### Challenges and changes through business diversification

- 2005 · Completed construction of the plant in the High-Tech Industrial Development Zone of Hunan Province, China
- 2007 · **Completed bio diesel production plant and facility construction, established glycerin production system**
- 2011 · Completed construction of remelted lead plant (Soryong-dong, Gunsan-si, Jeollabuk-do)
- 2012 · Completed refined oil system
- 2013 · Completed construction of LDH plant (Osikdo-dong, Gunsan-si, Jeollabuk-do)  
· Received the USD 100 Million Export Tower Award
- 2014 · **Completed bio heavy oil production plant**



Completed bio diesel production plant



Completed bio heavy oil production plant

## PART 4.

2016  
~  
2023

### Securing future growth engines and globalization

- 2016 · **Started bio diesel facility operation at Pyeongtaek 2 Plant**
- 2017 · Acquired affiliated company Samil Innocom (Current Dansuk Advanced Materials)
- 2018 · **Started bio diesel facility operation at Pyeongtaek Plant 1**
- 2019 · Started Pakistan Plant operation, acquired Malaysia Plant
- 2020 · Received the USD 200 Million Export Tower Award
- 2021 · Started bio diesel facility operation at Jecheon Plant
- 2022 · **First export of bio marine fuel (BMF) to Europe**  
· Received the USD 300 Million Export Tower Award
- 2023 · Started construction of LIB recycling factory, completed the construction of copper melting and casting process  
· Changed the company name to DS DANSUK CO., LTD.  
· **Acquired the shares of affiliated companies DS WOOL BIO, HIVE, and DS E&E**  
· **Listed in marketable securities market (KOSPI)**



Pyeongtaek Plant 1



First export of bio marine fuel (BMF) to Europe



Received the USD 300 Million Export Tower Award



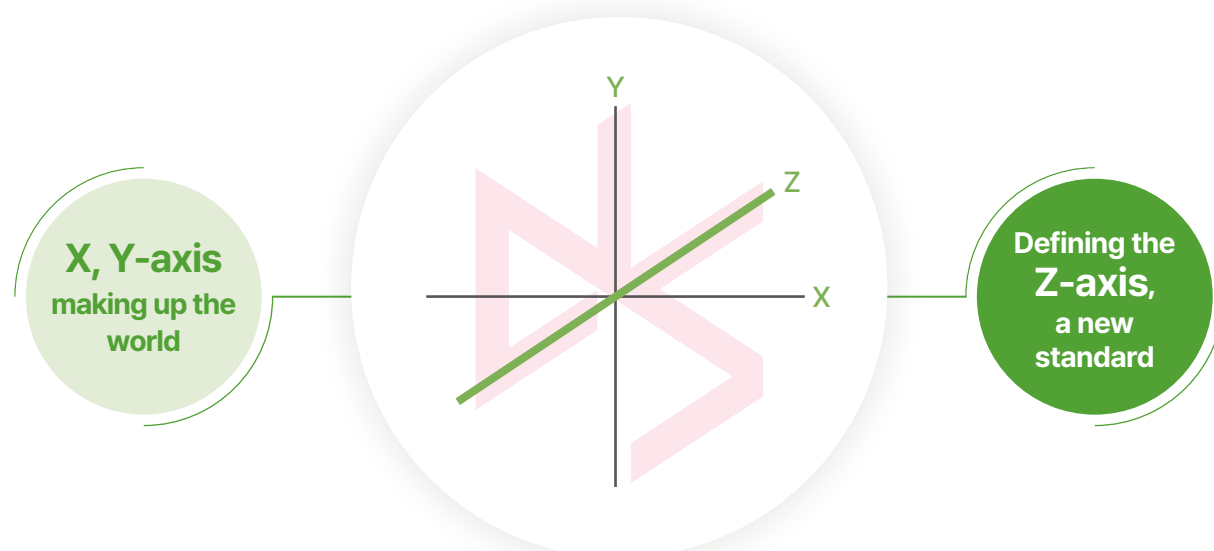
## Corporate Identity



### Define Standard

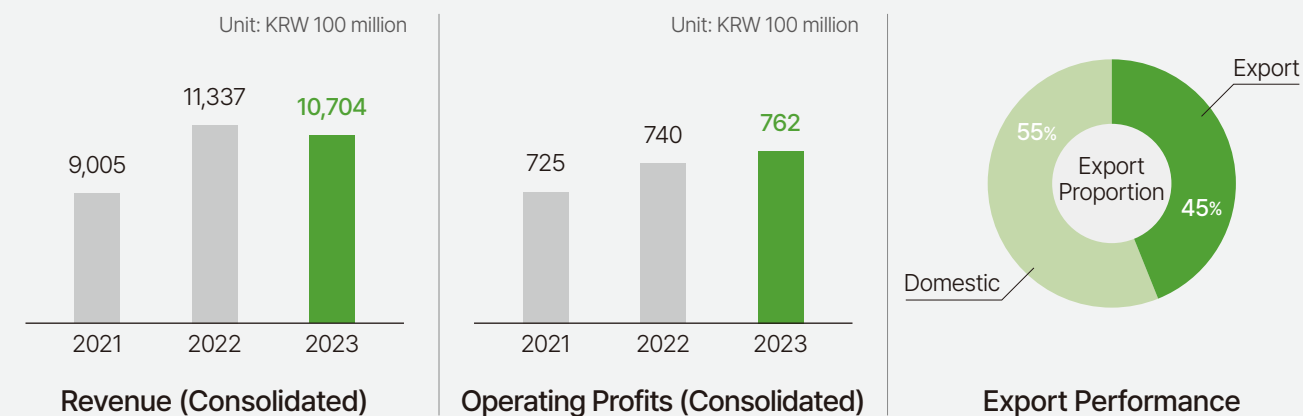
DS DANSUK, Defining the new standard.

Our technologies come together with new ideas to discover previously unavailable possibilities, present industry standards through continuous challenges towards new things and professions, and create a new standard to make our lives more abundant.

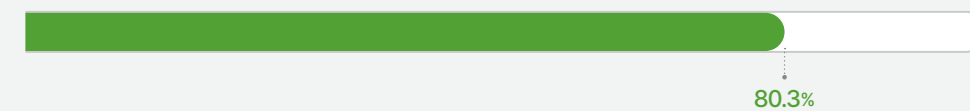


## 2 DS DANSUK Highlights \* as of 2023

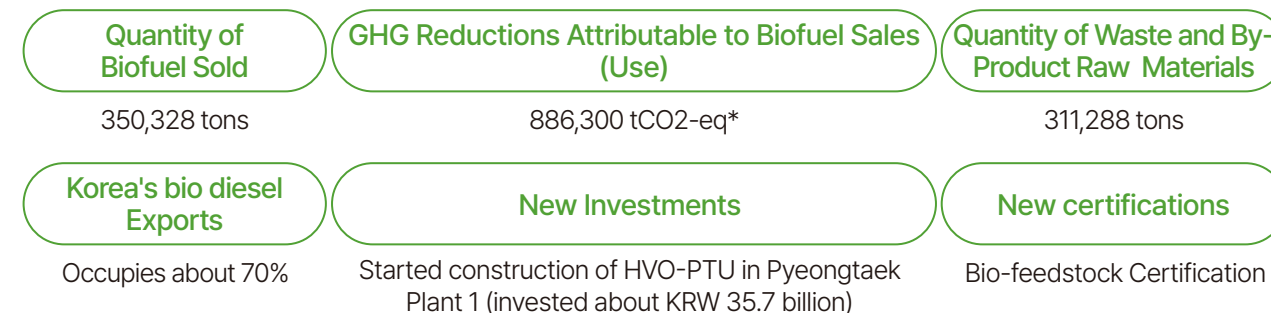
### Company Highlights



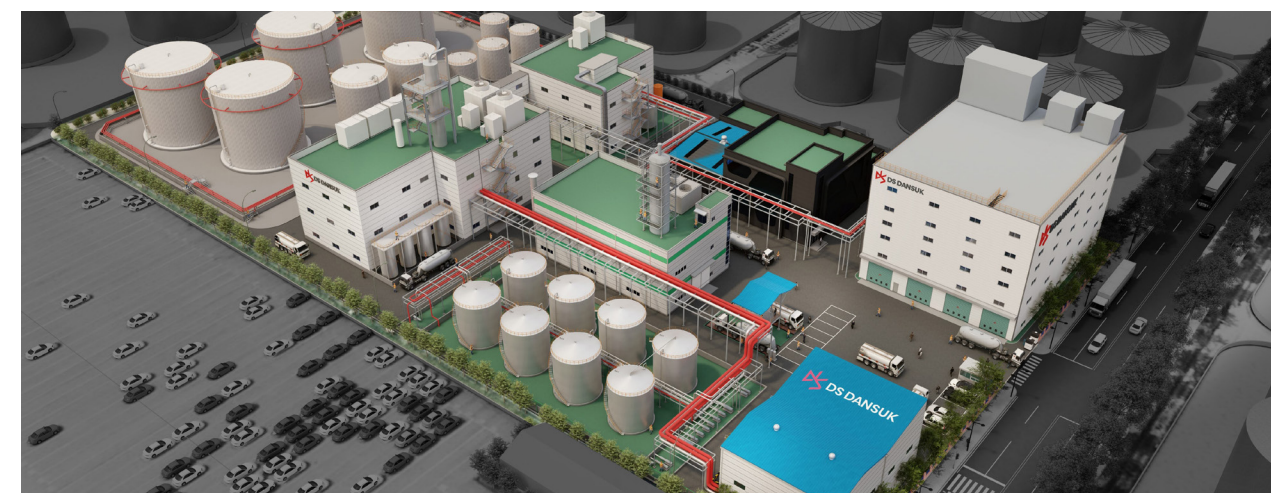
Proportion of Eco-friendly and Circular Economy Revenue



### Business Highlights



\*Source of reduction attribution calculation: ISCC-EU Methodology and others



Aerial View of the HVO Pre-Treatment Unit at DS DANSUK Bio Pyeongtaek Plant 1





# PRODUCT PORTFOLIO

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Bio Diesel

Bio Heavy Oil

Bio Marine Fuel

Hydro-treated Vegetable Oil (HVO)

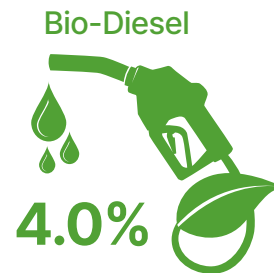


### 3 Business and Product Overview

## Bio Diesel

### Product Information

As an eco-friendly renewable transportation fuel, bio diesel is produced by synthesizing UCO (used cooking oil) and animal and vegetable oil as raw materials, unlike general diesel, which is produced by refining crude oil. In addition, bio diesel is a popular next-generation energy source due to its fuel performance similar to that of diesel, perfect compatibility with diesel engines, and excellent lubrication properties. Currently, bio diesel is mandated to be blended at 4.0% in transportation diesel fuel under the Renewable Fuel Standard (RFS).



### Development and Supply

DS DANSUK has been manufacturing and selling bio diesel meeting the quality standards of domestic oil refineries since 2007. In addition, DS DANSUK's bio diesel is being actively exported to global oil companies after entering overseas markets by meeting the strict certification requirements of advanced countries such as the US and the EU.

### Characteristics

#### Bio diesel effect (when replacing 1kl of diesel)

- 1 Reduction of about 2.6 tons of GHG
- 2 No SO<sub>2</sub> generation during use as fuel
- 3 Reduction of exhaust gas (carcinogenic substances) emissions including fine dust, CO, and HC

\*Source: Korea Bioenergy Association website and others

### Purpose

Fuel for diesel automobiles / heavy construction equipment

### Production Process



◀ Smart UCO at Sihwa Plant (Automated used cooking oil can processing equipment)

## Core Competiveness

Korea's Largest bio diesel Production Capacity			
300KT CAPA	Pre-treatment	Alcohol Neutralization (Less than FFA5)	Various range of FFA feedstock available with flexibility
		Chemical Neutralization (Less than FFA10)	
		Ester with Glycerin (Less than FFA100)	

Korea's Only Bioenergy Company Capable of Exporting to the EU and the US at the Same Time			
EXPORT	EU	UCOME, Food Waste ME, POMEME*	ISCC-EU, Dutch Double Counting, ISCC CORSIA PLUS
	US	UCOME, TME	Registered US EPA, California LCFS Greet 3.0, Oregon CFP Greet 3.0

\*Palm Oil Mill Effluent Methyl Ester

Owns a Global Supply Chain that Reliably Sources a Variety of Raw Materials			
FEED STOCK	UCO Usage	22,000 tons/month, Korea and overseas	(1) Secured UCO supply network in Korean and overseas market (2) Private label cooking oil (Griwell) supply and recovery system
	Other Raw Material Usage	Less than 5,000 tons/month	Cow fat, acid oil, etc.

Secured Korea's Largest Raw Material and Product Storage Infrastructure					
STORAGE	Status of Currently Owned Tank Terminals	Tank Terminal	No. of Tanks	Capacity (KL)	Location
		Pyeongtaek Plants 1, 2	6	17,550	Pyeongtaek
		Daea Tank Terminal	35	73,500	Pyeongtaek
		Sedong Enertank	16	103,900	Pyeongtaek
		Samyang Baker Tank Terminal	5	3,800	Incheon
		Hanil Tank Terminal	1	4,300	Pyeongtaek
		Total	63	203,050	
	Status of Tank Terminals Under Construction	Name of Tank	Purpose	Capacity (KL)	Location
		TK-301	Product	4,301	Pyeongtaek
		TK-302	Product	4,301	
		TK-303	Raw Materials/Product	4,301	
		TK-304	Raw Materials/Product	4,301	
		Total		17,204	

#### ※ Tank terminal infrastructure

- Manage raw material-specific quality and GHG reduction certifications with 63 tanks ranging in capacity from 1,000KL to 13,000KL

Bio Heavy Oil

Product Information

Bio heavy oil is a renewable energy source produced from unused waste resources, such as bio diesel by-products (pitch), animal fat, food waste oil, and palm by-products.

Development and Supply

DS DANSUK's bio heavy oil is being supplied to Korea Midland Power and Korea Southern Power as replacement of heavy oil (B-C oil) for the purpose of fulfilling the mandatory supply to the power generation companies according to the 2012 Renewable Energy Portfolio Standard (RPS).

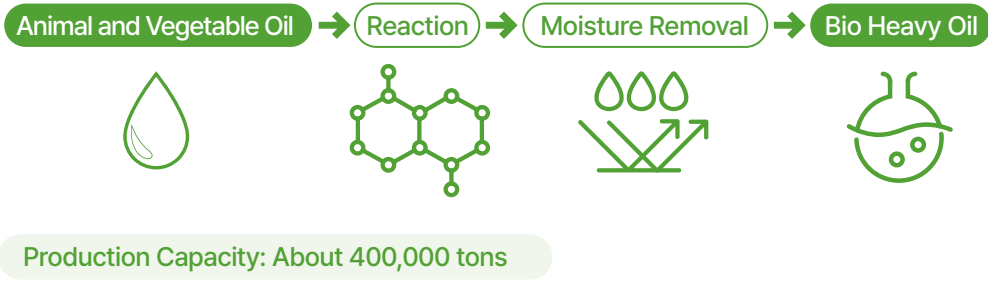
Characteristics

- Compatibility with B-C oil power generation facilities
  - Compared to B-C oil, reduces fine dust by about 28%, nitrogen oxides by 39%, GHGs by 85%, and sulfur oxides by 100%
- \*Source: Korea Bio Energy Association website

Purpose

Thermal and industrial power generation facilities / industrial boilers

Production Process



Bio Marine Fuel

Product Information

Bio marine fuel is an eco-friendly fuel capable of completely replacing fuels for existing B-C fuel-based ships. DS DANSUK produces bio marine fuel using low-grade oil and fat by-products as its raw materials.

Development and Supply

As the sulfur content of marine fuel is limited with the implementation of IMO 2020 and the necessity to reduce carbon increased, bio marine fuel took the spotlight as an alternative to marine fuel. DS DANSUK has been developing its own bio marine fuel technology and discussing certification systems/quality standards with global oil refineries and shipping companies. As a result, DS DANSUK exported bio marine fuel based on bio heavy oil for the first time in the world, setting a global standard. The company is continuing to strengthen its position in the marine fuel market.

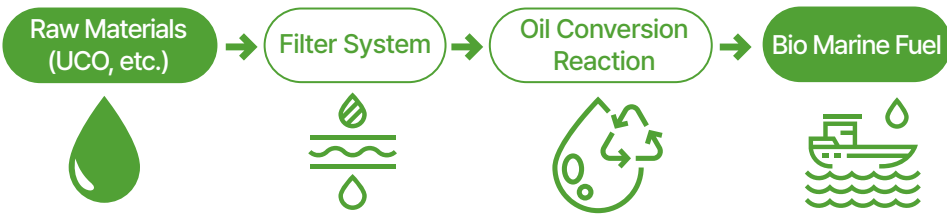
Characteristics

- Produced with ultra-low sulfur content and 100% biogenic materials
- Reduces CO2 generated in using marine fuel compared to existing fuel
- Complies with international ISO quality standards for existing marine fuel

Purpose

Marine fuel

Production Process



Core Competiveness

350KT CAPA	Leader of Bio Marine Fuel		
	BMF 100	BMF 20	BMF 100
		Can be blended with VLSFO, LSFO, MGO	
QUALITY	Proven Quality		
	ISO 8217 Standard Certification Specifications		
	C-14 Biogenic 100%		
FEED STOCK	Diverse Raw Materials		
	UCO, Residue of FAME end distillation, fatty acids, cashew nut shell liquid (CNSL), palm, SBEO*, food waste oil, etc. <div>*Spent Bleaching Earth Oil</div>		
STORAGE	Secured Sustainability with Reduced GHG		
	Based on own by-product materials: about 4.29g CO2/MJ (reduced by 95.44%)		ISCC-EU, Dutch Double Counting Certification Available
	Based on externally-sourced by-product materials: about 8.0g CO2/MJ (reduced by 90.00%)		



## Hydro-treated Vegetable Oil (HVO)



DS DANSUK is promoting the HVO business by introducing a pre-treatment unit (production capacity: about 300,000 tons/year) to enter the HVO and Sustainable Aviation Fuel market, which is the next generation of eco-friendly bioenergy.

### Replacement of bio diesel

Expanded from 1<sup>st</sup> generation bio diesel to 2<sup>nd</sup> generation bio diesel(HVO)

Became the first Korean manufacturer and supplier of sustainable aviation fuel (SAF)

### Production Process



### HVO Business Plans

300KT CAPA	Target Business Model		
	Manufacture up to 300,000 tons of sustainable aviation fuel	Commercialization of bionaphtha, a by-product	Construction of grey/ green hydrogen plant (50,000 tons/year)
	HEFA SPK (A2(6-2011)) Standard Qualification	To start HVO plant construction in 2026	
Strength	Ability to Supply Pre-Treated Raw Material Specialized for HVO		
	Production feedstock	UCO, Residue of FAME end distillation, fatty acids, cashew nut shell liquid (CNSL), POME, SBEO*, food waste oil, etc.	
	Raw materials for sale		
Location	West Coast Industrial Belt	Cert.	Acquired Certifications
	Hydrogen Supply Network (Grey to Green)		ISCC CORSIA PLUS, ISCC EU
	Logistic hub utilizing West Coast ports		EPA, California LCFS, Oregon CFP

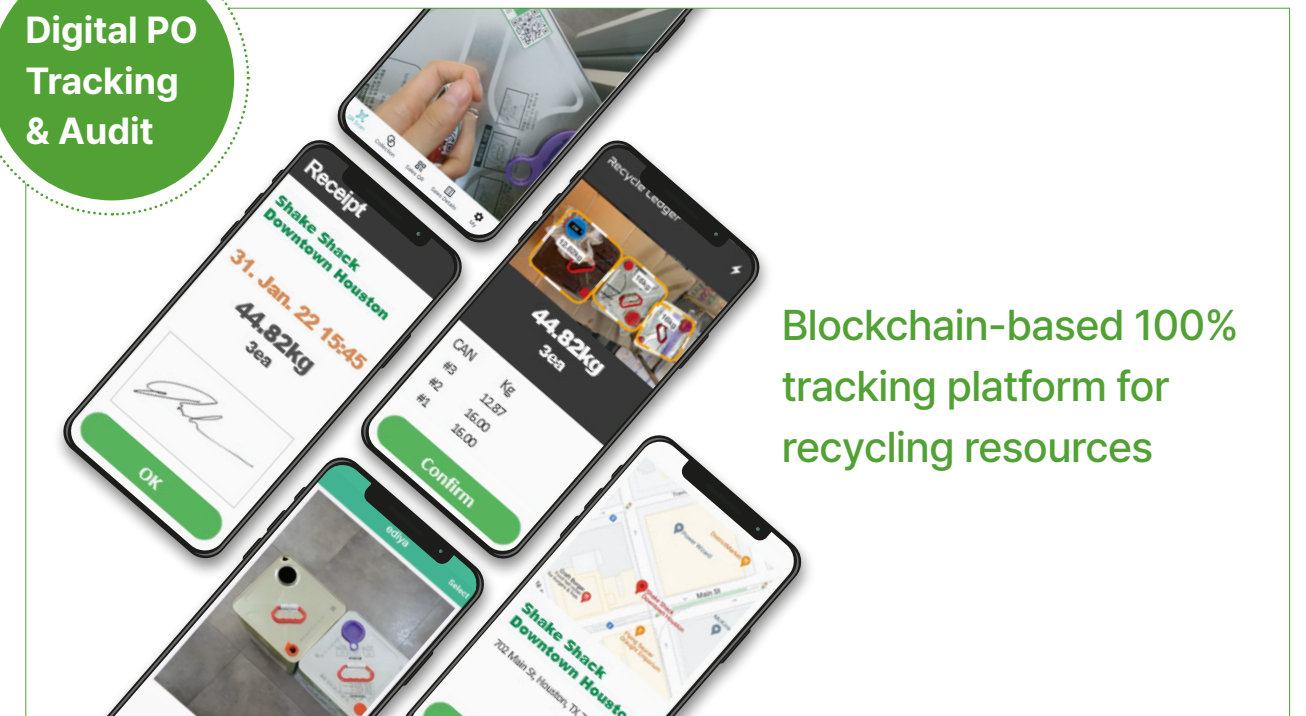


HVO Plant Site

Gunsan Recycling Plant

## Introduction of blockchain-based IT platform for digitalized traceability

### Digital PO Tracking & Audit



Blockchain-based 100% tracking platform for recycling resources

01

Accurately and quickly records who, where, when, and how much raw material is collected

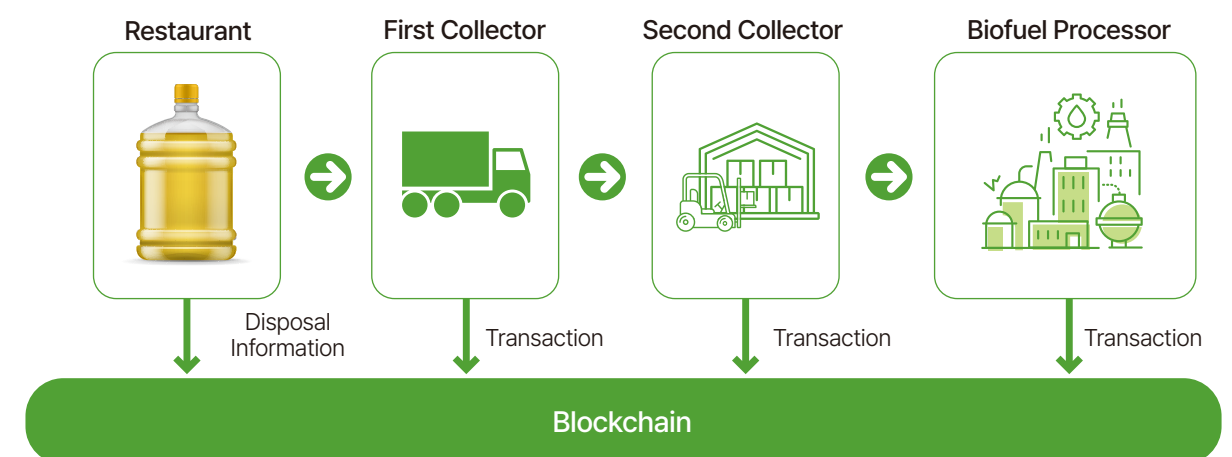
02

A system that responds to different raw material collection methods in different countries

03

Provides sources of raw materials, such as UCO, and GHG information for auditors

- Collector logs in
- Smartphone GPS+Google Map
- Smartphone (base station) time information
- Image recognition, etc.





4 Certification System

Certification Status

Certifications	Subject (Raw material or product)	Business Site	Authority	Year of Acquisition
US EPA Registration	Waste/Fat/Grease, Soybean oil	Sihwa	US Environmental Protection Agency (EPA)	2012~
	Waste/Fat/Grease	Pyeongtaek1, Pyeongtaek2		2018~
California LCFS Registration	Soybean oil	Jecheon	California Air Resources Board	2014~
	Korean Animal fats, UCO	Sihwa		2019~
Oregon CFP Registration	Korean UCO	Pyeongtaek2	Oregon Department of Environmental Quality (DEQ)	2018~
	Korean Animal fats, UCO	Sihwa		2020~
European ISCC EU Certification (Bio diesel plant, Refinery)	Bio diesel, bio marine fuel, Esterified fatty acids, Residue of FAME end distillation	Sihwa, Pyeongtaek1, Pyeongtaek2	European Commission ISCC EU	2012~
	UCO, Food Waste, POME, SBEO	Sihwa, Pyeongtaek1, Pyeongtaek2		2019~
European ISCC EU Certification (Trader with storage)	UCO	Sihwa	European Commission ISCC EU	2017~
European ISCC EU Certification (Collecting point)	UCO	Sihwa		2019~
European ISCC EU Certification (Point of origin)	Residue of FAME end distillation, Crude Glycerin	Sihwa, Pyeongtaek1, Pyeongtaek2	European Commission ISCC EU	2017~
ISCC CORSIA PLUS Certification (Collection point)	MSW, PFAD, Tallow, UCO, Refined oil, Fatty acid	Sihwa, Pyeongtaek1		2020~
ISCC CORSIA PLUS Certification (Treatment plant for waste/ residues)			ISCC Association ICAO Council	2021~
ISCC CORSIA PLUS Certification (Biorefinery)				2023~
ISCC CORSIA PLUS Certification (Trader with storage)			Italy GSE (Energy Service Management)	
Italian INS Certification (Waste Producer)	Residue of FAME	Sihwa, Pyeongtaek1		
Italian INS Certification (Producer of by-product)	Crude Glycerin	Sihwa, Pyeongtaek1	Italy GSE (Energy Service Management)	
Italian INS Certification (Producer of bio diesel / intermediate product)	Food waste, POME, SBEO	Sihwa, Pyeongtaek1		2024~
Italian INS Certification (Trader with/without storage)	Vegetable oils, Wastes, Residues and by-products, Intermediate products, Biofuels	Sihwa, Pyeongtaek1	European Commission ISCC EU	
European ISCC-PLUS Certification (Scope Point of origin)		Gunsan1		
European ISCC-PLUS Certification (Plastic Waste Collector)	Mixed plastic waste	Gunsan 1	European Commission ISCC EU	
European ISCC-PLUS Certification (Trader with storage)		Gunsan1, Sihwa		2021~
European ISCC-PLUS Certification (Plastic Waste)	Circular PP, Circular PE, Circular PVC	DS Advanced Materials	European Commission ISCC EU	
European ISCC-PLUS Certification (Compounding plant)	Circular PP, Circular PE, Circular PVC	DS Advanced Materials		
European ISCC-PLUS Certification (Trader with storage)	Circular PP, Circular PE, Circular PVC	DS Advanced Materials	European Commission ISCC EU	2021~

5 Current Business Sites

Head Office, Sihwa Plant

165, Hyeomnyeok-ro , Siheung-si, Gyeonggi-do

**Factory Area** | Land 26,193m<sup>2</sup> / Building 17,190m<sup>2</sup>  
**Main Products** | Bio Diesel / Bio Heavy Oil, Bio Marine Fuel, PVC stabilizer

Bio diesel capacity: about 70,000 tons/year



Gunsan Recycling Plant

10, Seohae-ro, Gunsan-si, Jeonbuk State

**Factory Area** | Land 37,083m<sup>2</sup> / Building 7,429m<sup>2</sup>  
**Main Products** | Recycled lead (Pb), Lead alloy (Pb Alloy), Copper alloy

Gunsan Fine Chemicals Plant

137, Muyeok-ro, Gunsan-si, Jeonbuk State

**Factory Area** | Land 19,853m<sup>2</sup> / Building 5,379m<sup>2</sup>  
**Main Products** | LDH / Hydrotalcite, Compound PVC stabilizer



Pyeongtaek Bio Plant 1

216, Pyeongtaekhangman-gil, Poseung-eup, Pyeongtaek-si, Gyeonggi-do

**Factory Area** | Land 20,810m<sup>2</sup> / Building 4,003m<sup>2</sup>  
**Main Products** | Bio Diesel

Bio diesel capacity: about 100,000 tons/year



Pyeongtaek Bio Plant 2

11, Poseunggongdansunhwan-ro, Poseung-eup, Pyeongtaek-si, Gyeonggi-do

**Factory Area** | Land 2,060m<sup>2</sup> / Building 1,693m<sup>2</sup>  
**Main Products** | Bio Diesel

Bio diesel capacity: about 80,000 tons/year



Jecheon Bio Plant

39, Cheongpungho-ro 24-gil, Geumseong-myeon, Jecheon-si, Chungcheongbuk-do

**Factory Area** | Land 6,785m<sup>2</sup> / Building 1,921m<sup>2</sup>  
**Main Products** | Bio Diesel

Bio diesel capacity: about 30,000 tons/year

Domestic Affiliates and Overseas Sites

Domestic Affiliates



**HIVE**  
52, Udusan-gil ,Wonju-si,  
Gangwon State

**Factory Area** | Land 1,813m<sup>2</sup> / Building 479m<sup>2</sup>  
**Main Products** | Cooking oil (soybean oil and 6 others)



**DS WOOL BIO**  
48-7, Jageunhansul-gil, Bibong-myeon,  
Cheongyang-gun, Chungcheongnam-do

**Factory Area** | Land 4,752m<sup>2</sup> / Building 900m<sup>2</sup>  
**Main Products** | Animal fat

**DS Metal Materials**

25-4, Cheomdangieop 4-ro,  
Sandong-myeon, Gumi-si,  
Gyeongsangbuk-do

**Factory Area** | Land 3,425m<sup>2</sup>  
Building 1,218.2m<sup>2</sup>  
**Main Products** | Litharge, etc.

**DS Advanced Materials**

43, Ogyegongdan-gil,  
Geumho-eup, Yeongcheon-si,  
Gyeongsangbuk-do

**Factory Area** | Land 18,040m<sup>2</sup>  
Building 1,887m<sup>2</sup>  
**Main Products** | EP compound,  
PCR Plastic

**DS E&E**

100, Wolchongongdan-ro,  
Gunbuk-myeon, Haman-gun,  
Gyeongsangnam-do

**Factory Area** | Land 2,135m<sup>2</sup>  
Building 340m<sup>2</sup>  
**Main Products** | Recycled plastic  
materials  
(ABS, PP, HIPS , etc.)

Overseas Sites



**Dansuk Malaysia**  
81700 Pasir Gudang, Johor,  
Malaysia

**Factory Area** | Land 16,500m<sup>2</sup>  
Building 7,152m<sup>2</sup>  
**Main Products** | PVC stabilizers,  
non-toxic  
stabilizers



**Dansuk Pakistan**  
Estate Rawind Road, Lahore,  
Pakistan

**Factory Area** | Land 3,630m<sup>2</sup>  
Building 2,475m<sup>2</sup>  
**Main Products** | PVC stabilizers,  
lead-based  
stabilizers



**Dansuk Zhuzhou China**  
51 Yulu Industrial Park, Huanghe  
N Rd, Tianyuan District, Zhuzhou,  
Hunan, China

**Factory Area** | Land 34,327m<sup>2</sup>  
Building 4,026m<sup>2</sup>  
**Main Products** | Raw material  
SCM, new material  
development

DS DANSUK