

# Global advanced materials company

# LG Chem



# Contents

Introduction of LG Chem



- / Introduction of LG Group
- / Introduction of LG Chem
- / Business of LG Chem



# History

**1947**

Established as  
Lucky Chemical  
Industrial Co.  
(now LG Chem)

**1958**

Established as  
Goldstar Co.  
(now LG Electronics)

**1987**

Completed  
'Lucky Gold Star  
Tower'

**1995**

Established as a New  
Corporate Identity  
(Lucky Goldstar → LG)

**1996**

Established as  
LG Telecom  
(now LG U+)

**2017**

LG Group's 70<sup>th</sup>  
Anniversary

**2003**

Established as  
LG Corp.



LG  
Group

Introduction of LG Chem

## Subsidiary



### Chemicals

LG Chem  
LG Hausys  
LG Household & Healthcare  
Farm Hannong  
etc.

24



### Electronics

LG Electronics  
LG Display  
LG Innotek  
etc.

14



### Telecommunications & services

LG U+  
LG CNS  
LG International  
LG Sports  
etc.

32

\* Figures represent the number of affiliates  
\* Total of 70 including LG Corp.  
\* As of 2019

LG  
Group

Introduction of LG Chem

**Subsidiary**

\* As of 2019



Affiliates



Workforce



Sales

Total of **70**

**250,000** (person)

USD **137.2** Billion



LG  
Group

Introduction of LG Chem

**LG Way**



VISION

**No. 1 LG**



Behavioral  
Mode

**Jeong-Do  
Management**



Management  
Principles

**Customer –  
Value Creation**

**People –  
Oriented Management**

Introduction of LG Chem

# LG Chem | Vision

We connect science to life  
for a better future



Customer Focus



Agility



Collaboration



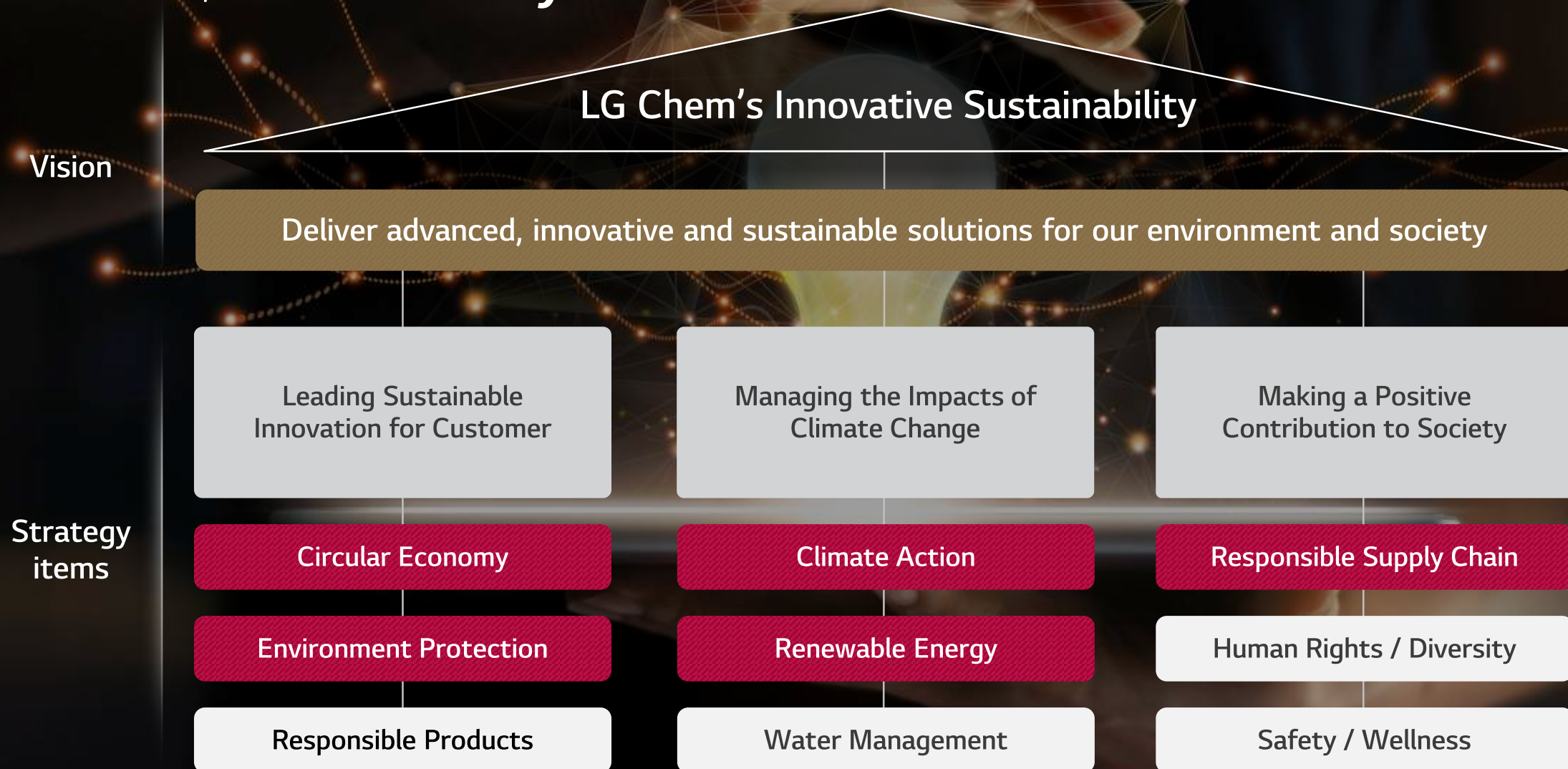
Passion



Sustainability



# LG Chem | Sustainability





2019 : The First Korean Chemical Company To Enter

# GLOBAL TOP 10

\* By Chemical & Engineering News Published by ACS(American Chemical Society)







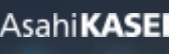
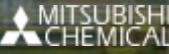

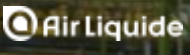




# Brand value of chemical Companies “Global No.4”

\* By Brand Finance Group in the UK

## Top 10 Most Valuable Brands

1	 <b>BASF</b> We create chemistry	—	2020 : \$7,878m 2019 : \$8,253m	-4.5%
2	 <b>DOW</b>	—	2020 : \$4,843m 2019 : \$6,819m	-29.0%
3	 <b>سابك</b> Sasab	—	2020 : \$4,334m 2019 : \$3,964m	+9.3%
4	 <b>LG Chem</b>	—	2020 : \$3,500m 2019 : \$3,338m	+4.9%
5	 <b>Linde</b>	NEW	2020 : \$2,861m	-
6	 <b>lyondellbasell</b>	—	2020 : \$2,637m 2019 : \$3,073m	-14.2%
7	 <b>AsahiKASEI</b>	▲ 3	2020 : \$2,368m 2019 : \$2,246m	+5.4%
8	 <b>MITSUBISHI CHEMICAL</b>	—	2020 : \$2,287m 2019 : \$2,535m	-9.8%
9	 <b>DU PONT</b>	▼ 4	2020 : \$2,200m 2019 : \$3,261m	-32.5%
10	 <b>Air Liquide</b>	▼ 3	2020 : \$1,982m 2019 : \$2,594m	-23.6%



# LG Chem | History



- 1947 Established as Lucky Chemical Industrial Corporation
- 1969 Listed on Korea Stock Exchange
- 1974 Renamed company to Lucky Corporation
- 1976 Completed the Yeosu PVC Resin Plant
- 1979 Opened the Daedeok Central R&D Center

## 1980's Earlier

## 1990's

- 1995 Renamed to LG Chem, Ltd.  
Completed construction of Tianjin PVC plant in China
- 1998 Completed construction Cheongju plant for rechargeable batteries



- 2001 Spun-off the company  
(LGCI, LG Chem, LG Household & Healthcare)
- 2003 Acquired Hyundai Petrochemicals
- 2004 Completed construction of Ochang Techno Park  
Established LG Chem (China) Investment Co., Ltd
- 2005 Established a polarizer back-end subsidiary in Poland
- 2007 Merged with LG Petrochemicals Co., Ltd
- 2009 Spun-off Industrial Materials Business (LG Hausys)

## 2000's



## 2010's

- 2010 Started construction of automotive battery plant in Michigan, USA
- 2015 Established LG Chem Nanjing New Energy Solution Co., Ltd. In China
- 2016 Acquired Dongbu Farm Hannong (Farm Hannong)
- 2017 Merged with LG Life Sciences Co., Ltd  
Established LG Chem Wroclaw Energy Sp. z o.o. in Poland
- 2019 Launched Osan Tech Center in China



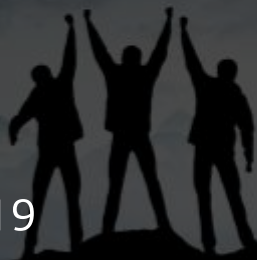
Introduction of LG Chem

# LG Chem | Financial Results



Sales in 2019

USD **24.5** Billion

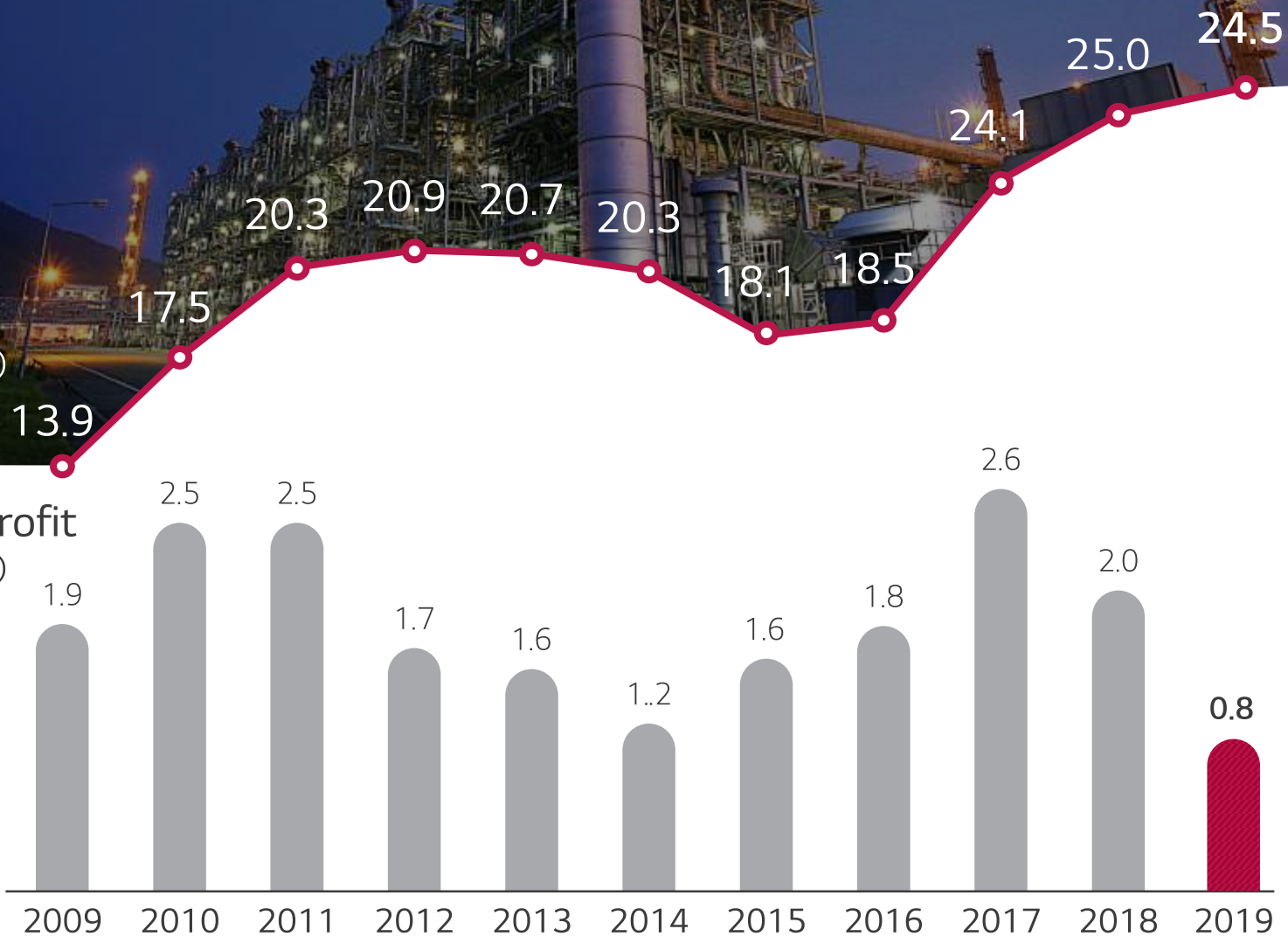


Operating profit in 2019

USD **0.8** Billion

Sales  
(Unit : Billion USD)

Operating profit  
(Unit : Billion USD)

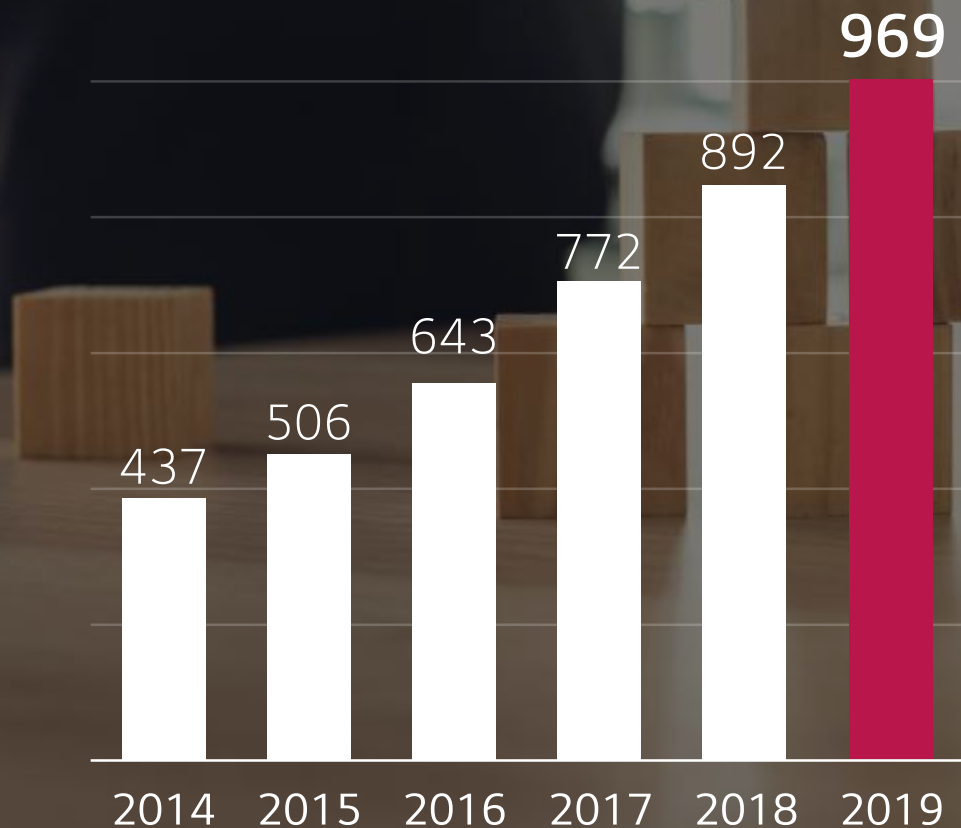




# LG Chem | R&D Status

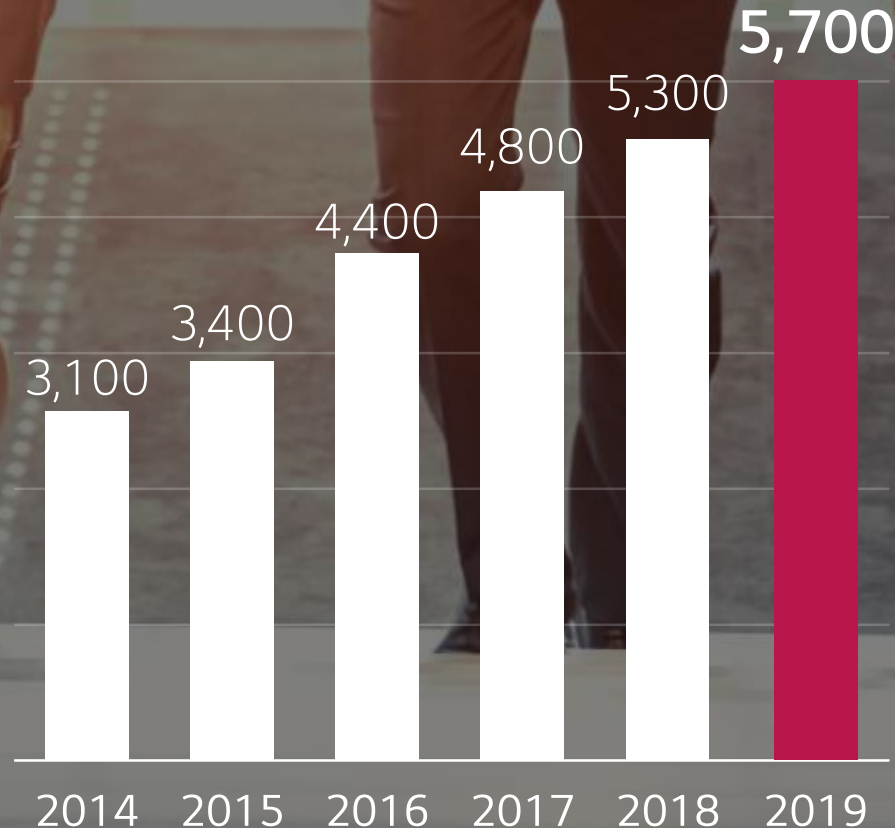
## R&D Expense

Unit : Million USD



## R&D Workforce

Unit : Person



# LG Chem | Domestic Sites



**Headquarter/R&D Campus Magok**  
(Est.1987/Est.2018)



**R&D Campus Gwacheon**  
(Est.2015)



**Leadership Center / Tech Center**  
(Est.1991/Est.2019)



**R&D Campus Daejeon**  
(Est.1979)



**Osong Plant** (Est.2009)  
Bio Similar, Vaccine



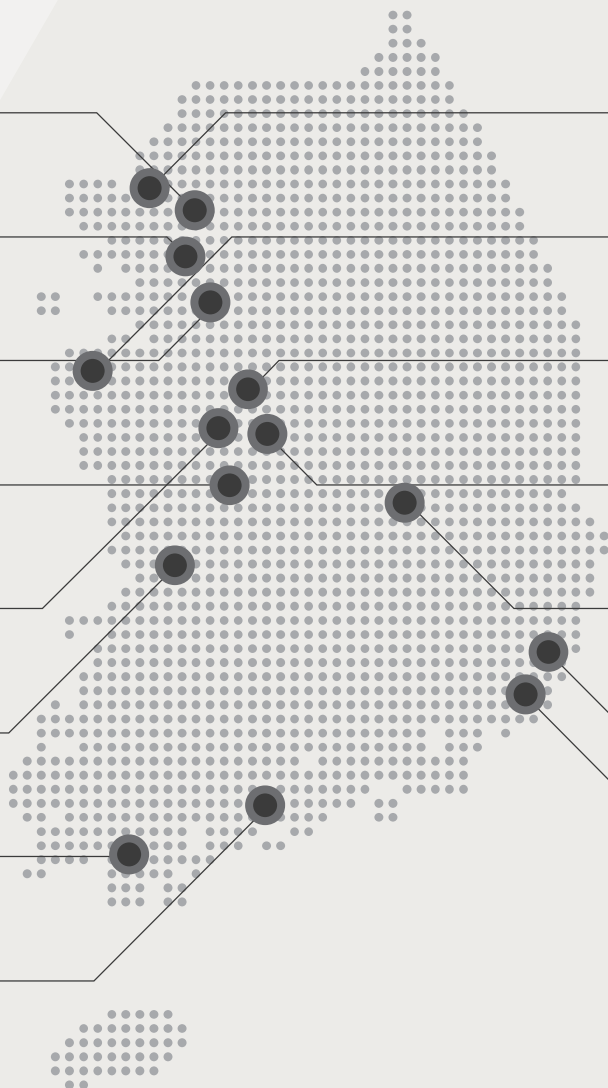
**Iksan Plant(3)** (Est.1991/Est.1995/Est.2011)  
EP, ABS / Pharmaceutical / Battery Materials



**Naju Plant** (Est.1984)  
Octanol, Butanol, Plasticizers



**Yeosu Complex** (Est.1976)  
NCC, PVC, ABS, SAP, PE, AA



**Paju Plant** (Est.2011)  
LCD Glass



**Daesan Complex** (Est.2005)  
NCC, SSBR, PVC



**Ochang Plant** (Est.2005)  
Rechargeable Batteries, Polarizer, Stripper



**Cheongju Complex** (Est.1980)  
OLED Material, Photoresist,  
Cathode Material, RO membrane



**Gimcheon Plant** (Est.2008)  
SAP



**Ulsan Plant** (Est.1974)  
Plasticizers



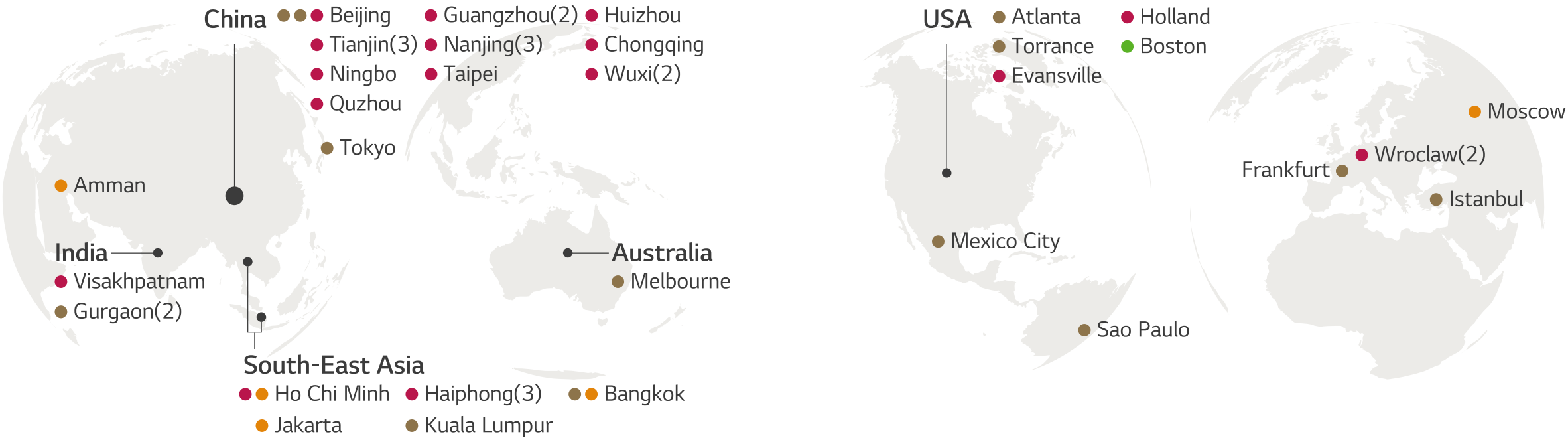
**Onsan** (Est.1979)  
Fine Chemical





# LG Chem | Overseas Sites

● Manufacturing Subsidiaries (25)   ● Sales Subsidiaries (14)   ● Regional Branch Offices (5)   ● R&D Center (1)



## Asia

- Beijing (Est.2004) - Polarizer
- Tianjin (Est.2004) - EP  
(Est.2005) - PVC,VCM,EDC  
(Est.2009) - SBS
- Guangzhou (Est.2002) - EP  
(Est. 2018) - Polarizer
- Chongqing (Est.2015) - EP
- Ningbo (Est.1996) - ABS, SBL, EP
- Nanjing (Est.2003) - Mobile Battery, Polarizer  
(Est.2014) - Automotive Battery  
(Est. 2017) - ESS Battery
- Huizhou (Est.2009) - ABS
- Wuxi (Est.2017) - ESS Battery Pack  
(Est.2018) - Cathode Material
- Quzhou (Est.2018) - Precursor
- Taipei (Est.2004) - Polarizer
- Tokyo
- India (Est.1996) - PS, EPS, Pharmaceuticals
- Haiphong (Est.2017) - Polarizer  
(Est.2018) - EP  
(Est.2019) - Mobile Battery Pack
- Ho Chi Minh (Est.1995) - Plasticizers
- Bangkok
- Jakarta
- Kuala Lumpur
- Amman

## Australia

- Sydney

## America

- Atlanta
- Torrance
- Troy
- Holland (Est.2000) - Automotive Battery
- Evansville (Est.2018) - Sealant
- Sao Paulo
- Mexico City

## Europe

- Wroclaw (Est.2005) - EP  
(Est.2016) - Automotive Battery
- Moscow
- Frankfurt
- Istanbul

# LG Chem | Business Area



## Petrochemicals

- NCC
- PolyOlefins
- PVC/Plasticizers
- ABS
- Acrylates/SAP
- Rubber/Special Polymers

## Energy Solution

- IT&New Application Battery
- Automotive Battery
- ESS Battery

## Advanced Materials

- Automotive Material
- IT Materials
- Industrial Materials

## Life Sciences

- Primary Care
- Specialty Care
- Aesthetic





01

# Petrochemicals Company



# Petrochemicals Company

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## Establishment (Year)

1976

## Sales (\$)

13.3 Billion \* As of 2019

## Workforce (Person)

Domestic 5,484 / Overseas 2,271

## Business Area

Petrochemical Products

**2019**

Launched Osan Tech Center

**2015**

Launched Hwanam Tech Center in Nanjig, China

**2010**

Acquired Dow Polycarbonate business

Established Manufacturing Subsidiary in China  
(Rubber / Special Polymers)

**2007**

Merged with LG Petrochemicals Co., Ltd.

**2003**

Acquired PVC Business of Hyundai Petrochemicals Co., Ltd.

**1995 ~ 1998**

Established Manufacturing Subsidiary in  
China / India / Vietnam (PVC, ABS)

**1976**

Completed Yecheon PVC resin factory  
Entry into the petrochemical business



# Production Capacity (As of 2019)

Unit : KTA

Ethylene	2,400	HDPE	550	Oxo- Alcohol	299
Propylene	1,430	LDPE/EVA	465	Acrylic Acid	631
BD	330	POE	300	SAP	480
BTX	816	PP	385	ABS	2,040
SM	710	PVC	1,245	PS	142
EG	180	VCM	1,390	EPS	136
Phenol	710	CA/EDC	997	Specialty Resin	508
BPA	495	Plasticizer	380	Synthetic Rubber	515



# Naphtha Cracking Center (NCC)

LG Chem's naphtha cracking center (NCC) processes produce basic materials for the petrochemical industry, including ethylene and propylene. The raw materials produced from the BPA processes are used in polycarbonate(PC) resins and epoxy materials.

## Naphtha Cracking Center



Ethylene/Propylene



BD



BTX



MTBE/Butene-1



SM



EO/EG

## BPA



## Applications



Poly Carbonate



Epoxy Resin

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- 02 Energy Solution Company
- 03 Advanced Materials Company
- 04 Life Sciences Company





## Polyolefins (PO)

LG Chem's polyolefin(PO) processes produce synthetic resins, such as polyethylene (PE) and polypropylene (PP), used in containers and packaging materials, which are recognized in the global market for their outstanding quality.

LD / LLD / HD / POE / EVA



### Applications



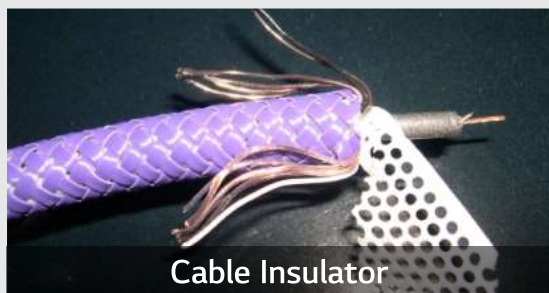
Medical Appliances



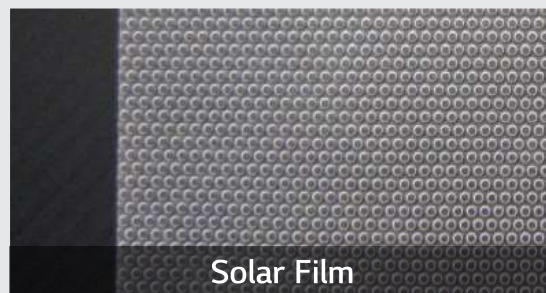
Korean Floor Heating System



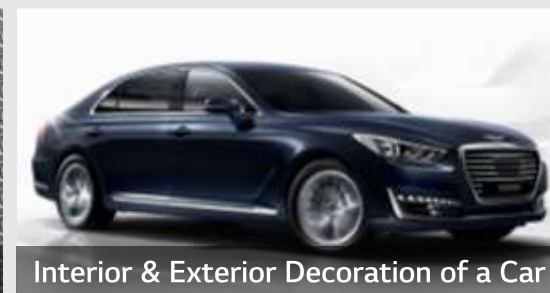
Packing Materials



Cable Insulator



Solar Film



Interior & Exterior Decoration of a Car

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- 02 Energy Solution Company
- 03 Advanced Materials Company
- 04 Life Sciences Company



## PVC / Plasticizers

LG Chem's polyvinyl chloride(PVC) processes produce synthetic resins used for chassis and pipes, while plasticizers produce raw materials that add flexibility to the PVC.

LG Chem's CNT processes produce Carbon Nanotubes which have superior electrical, thermal, and mechanical properties

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- 02 Energy Solution Company
- 03 Advanced Materials Company
- 04 Life Sciences Company

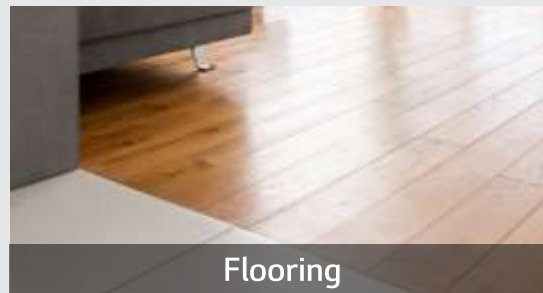
## PVC / Caustic Soda / Plasticizers



### Applications



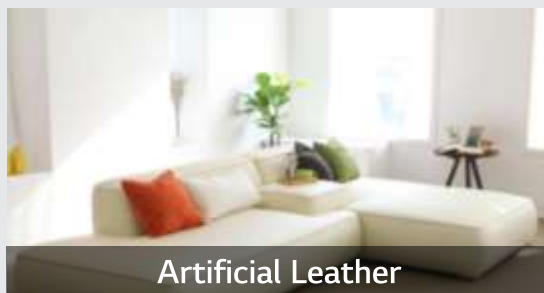
Sash



Flooring



Pipe



Artificial Leather



Cable Sheath



Cathode Material





# Acrylonitrile Butadiene Styrene (ABS)

LG Chem's acrylonitrile butadiene styrene(ABS) processes produce high-performance materials, used in automobiles, home appliances, and IT devices, that have excellent heat resistance, impact resistance, and processability.

ABS / SAN / PS / EPS



## Applications



Interior & Exterior Decoration of a Car



Toy



Home Application Housing



Kitchen Container



Products Container



Building Insulation Material

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- 02 Energy Solution Company
- 03 Advanced Materials Company
- 04 Life Sciences Company



## Acrylates / SAP

LG Chem's acrylate processes produce raw materials used for paint, adhesives, and SAP. SAP effectively absorbs fluids in diapers and items for sanitary purposes.

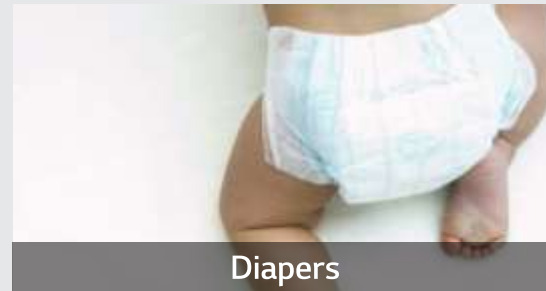
## Acrylates / SAP



### Applications



Plasticizer/ SAP Resin



Diapers



Paint



Adhesives



Cleaning agent for Semiconductors



Acrylic Fibers

01 Petrochemicals Company  
02 Energy Solution Company  
03 Advanced Materials Company  
04 Life Sciences Company





## Rubber / Special Polymers

LG Chem's synthetic rubber processes produce raw materials used in tires and golf balls, and the specialty polymer processes produce special adhesives that are versatile.

BR / MBS / LATEX / SBS



### Applications



Tire



Golf Ball



Shoe Insole



Impact Reinforcing Agent



Asphalt Modifying Agent



Medical Gloves

01 Petrochemicals Company  
02 Energy Solution Company  
03 Advanced Materials Company  
04 Life Sciences Company

02



# Energy Solution Company





# Energy Solution Company

## Establishment (Year)

1995

## Sales (\$)

7.2 Billion \* As of 2019

## Workforce (Person)

Domestic 6,571 / Overseas 13,753

## Business Area

IT & New Application/  
Advanced Automotive/ESS Battery

**2018**

Developed the world's first L-shaped battery

**2016**

Supplied lithium-ion batteries for NASA spacesuits

**2015**

Signed an agreement with AES to supply first-ever  
1GWh ESS battery

**2013**

Developed the world's first hexagonal pouch battery  
for smart watches

**2010**

Supplied the world's first lithium-ion batteries for PHEV

**2009**

Supplied the world's first lithium-ion batteries for HEV

**1995**

Started the development of lithium-ion batteries



## IT & New Application Battery

LG Chem's IT & New Application Battery Division was the first to mass-produce Lithium-ion Batteries domestically, and is now leading the global market through superior technology and productivity.

Cylindrical, Prismatic, Polymer



### IT & New Applications



Mobile Device



Power Tool



Electric Bicycle



Smart Mobility

### Major Customers

LG Electronics



VINFAST



BOSCH



ASUS

lenovo

StanleyBlack&Decker

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- 04 Life Sciences Company





## Advanced Automotive Battery

LG Chem produces world-renowned EV batteries, and has a product portfolio that encompasses all products related to car batteries from cells to modules, BMS, packs, and technical support.



### Automotive Solution



Cell



Battery Management System (BMS)



Module / Pack / Rack

### Major Customers



Mercedes-Benz



PORSCHE



RENAULT NISSAN MITSUBISHI



JAGUAR



- 01 Petrochemicals Company
- 02 Energy Solution Company
- 03 Advanced Materials Company
- 04 Life Sciences Company



## ESS Battery

With superior lithium ion battery technology and global production capacity, LG Chem supplies battery systems for ESS batteries in many different fields including electrical grid, household, commercial, and UPS (uninterruptible power supply).



### ESS Battery Solution



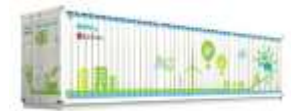
Cell



Battery Management System (BMS)

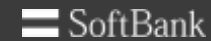


Module / Pack / Rack



Container

### Major Customers



- 01 Petrochemicals Company
- 02 Energy Solution Company
- 03 Advanced Materials Company
- 04 Life Sciences Company



03

# Advanced Materials Company



# Advanced Materials Company

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**Establishment** (Year)  
2019

**Sales** (\$)  
4.2 Billion \* As of 2019

**Workforce** (Person)  
Domestic 3,924 / Overseas 2,934

**Business Area**  
Automotive Materials / IT Materials /  
Industrial Materials

**2019**

Launched the Advanced Materials Company

**2018**

Established Chinese joint venture for manufacturing  
Precursor and cathode material

**2016**

Acquired GS E&M, a renowned cathode manufacturer

**2006**

Commercialized Battery Materials (Cathode, Electrolyte)

**2003**

Established IT&E Manufacturing Subsidiary in Nanjing, China

**2000 ~ 2004**

Commercialized LCD, OLED, Process materials

**2000**

Developed PDP phosphor for the first time in Korea  
and started production of polarizers





## Automotive Materials

LG Chem is striving to provide the number one product in the automotive industry through stronger and lighter materials.

EPC / TPE / Specialty Compound / PC



### Applications



Exterior & Interior Decoration of a Car/ Engine Parts

### Major Customers



Mercedes-Benz



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- 01 Petrochemicals Company
- 02 Energy Solution Company
- 03 Advanced Materials Company**
- 04 Life Sciences Company



# IT Materials

LG Chem produces unique solutions  
For IT devices with products  
such as OLED materials, display  
materials And various high-functional  
films and semiconductors.

## OLED Materials / Display Materials / Advanced Functional Film



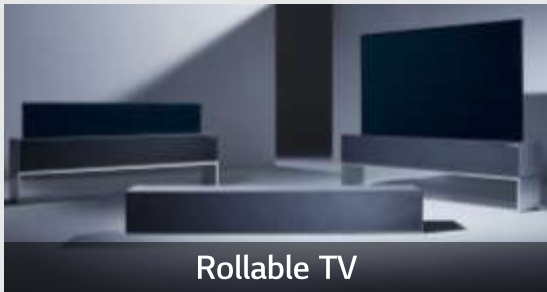
### Applications



OLED Display Materials



Semiconductor Materials



Rollable TV

### Major Customers

LG Display

BOE

INNOLUX

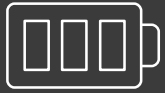
AUO

SAMSUNG SAMSUNG DISPLAY

华星光电 CSOT

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- 04 Life Sciences Company





## Industrial Materials

LG Chem produces one of the key materials for secondary batteries, namely the material for positive electrodes, and concentrates on the development of high-capacity cathode material for mobile battery, electric vehicle, and energy storage battery markets as well.

## Cathode Material



## Applications



Mobile Battery



Automotive Battery



ESS Battery

Major  
Customers



HITACHI

- 01 Petrochemicals Company
- 02 Energy Solution Company
- 03 Advanced Materials Company**
- 04 Life Sciences Company

04

# Life Sciences Company



# Life Sciences Company

## Establishment (Year)

1984

## Sales (\$)

0.5 Billion \* As of 2019

## Workforce (Person)

Domestic 1,665 / Overseas 136

## Business Area

Pharmaceuticals, Vaccines, Aesthetic

**2019**

Established Life Sciences Innovation Center in Boston, USA

**2012**

Developed 1<sup>st</sup> Korean diabetes medicine, 'Zemiglo'

**2003**

1<sup>st</sup> Korean NCE approved by US FDA(Factive)

**1996**

1<sup>st</sup> Korean hepatitis B vaccine 'Euvox' approved by WHO PQ

**1991**

Developed World's first 4<sup>th</sup> generation Cephalosporin

**1984**

Start of pharmaceutical business  
(Established Pharmaceuticals business division)

**1961**

Acquire of manufacturing license pharmaceuticals products





## Primary Drug

LG Chem has developed Korea's first diabetes medicine, Zemiglo, and arthritis medicine, Synovian, increasing its competitiveness in Korea as well as overseas, and has expanded its efforts to develop new drugs and to cooperate with other companies through partnership in the fields of diabetes and cardiovascular, musculoskeletal, and autoimmune diseases.

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- 03 Advanced Materials Company
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## Representative Products



**Diabetes**  
(Zemiglo, Zemimet SR)



**Cardiovascular Disease**  
(Rovatitan)



**Musculoskeletal Disease**  
(Hyruan One)



**Autoimmune Disease**  
(Eucept)



# Specialty Drug

LG Chem is the first company in Korea that has successfully developed a drug for growth hormones and is also concentrating on the R&D of drugs for special diseases.

Throughout the hepatitis B and pentavalent combination(5-in-1) vaccine that has been approved by the World Health Organization(WHO), LG Chem has been strengthening competitiveness in the global market.

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- 03 Advanced Materials Company
- 04 Life Sciences Company



## Representative Products



Grow Hormone  
(Eutropin)



Ovulation Induction  
(Follitrope)



Hepatitis B  
(Euvax)



Pentavalent Combination  
(Eupenta)



## Aesthetic

YVOIRE, the first hyaluronic acid filler developed by LG Chem with authentic in-house technology in Korea, is expanding its market shares with the recognition of superior product quality.

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### Representative Products



Hyaluronic Filler  
(Y-SOLUTION)



Hyaluronic Filler  
(YVOIRE)



Hyaluronic Filler  
(伊婉 in China)





## Farm Hannong

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Farm Hannong, LG Chem's affiliate company, is the top domestic agricultural company holding the first place in the agricultural chemicals and the second place in the fertilizer & seed in market shares, and aims to be the leading green company in the international market through agriculture and ICT industry technologies.

# Farm Hannong



### Crop Protection Products

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Domestic  
Market Share No.1



### Fertilizer

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Domestic  
Market Share No.2



### Seed

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Domestic  
Market Share No.2



A group of people, including a woman, a man, and several children, are running and playing happily in a sunlit park. The scene is filled with green trees and bright sunlight. A large, dark circular graphic with concentric lines is overlaid on the right side of the image, containing the text.

A Company  
That Enriches  
Human Life



# Thank you

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