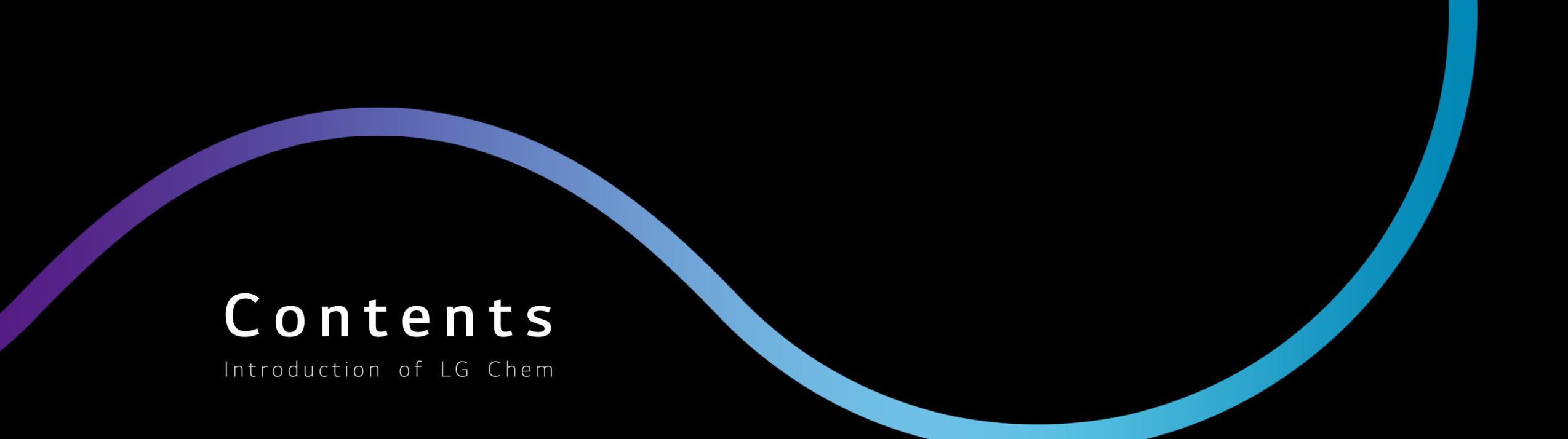




Leading with **Science**
for **Sustainability**

LG Chem

We **Connect** *Science*



Contents

Introduction of LG Chem

- 01 — Introduction of LG Group
- 02 — Introduction of LG Chem
- 03 — Business of LG Chem

LG Group | 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+)

2003



Established as
LG Corp.

2017



LG Group's 70th
Anniversary

2021



LG Group spined-off
LX Group

Chemicals



LG Chem
LG Energy Solution
LG Household & Healthcare
etc.

Electronics



LG Electronics
LG Display
LG Innotek
etc.

Telecommunications & services



LG U+
LG CNS
LG Sports
etc.



Affiliates

72 (Approx.)

*Overseas Corporations 350 (Approx.)



Workforce(Worldwide)

260,000 (Approx.)

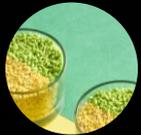


Annual Revenue

USD 148.5bn

Sustainable Innovation for a Better Life

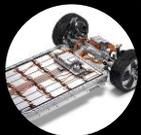
Chemicals



ABS Plastics
Global No.1



Life Sciences
Domestic 1st New Drugs
U.S FDA Approval



Battery for EV
Global No.1 (by Contract Size)



Cosmetics
Domestic No.1

Electronics



Large OLED TV Panel / Rollable TV
World's 1st Global No.1



Home Appliance
Domestic 1st (W/M, REF, A/C)



Automotive Display
Global No.1



Smartphone Camera
/3D Sensing Module
Global No.1

Telecommunications & services



5G Network
World's 1st



Home IoT
Domestic No.1

Platform Business



Since its founding, LG Chem is vigorously moving forward towards a sustainable future.



1947 - 1999

- 1947** Established as Lucky Chemical Industrial Corporation
- 1969** Listed on Korea Stock Exchange
- 1974** Renamed as Lucky Corporation
- 1976** Completed construction of Yeosu PVC Resin Plant
- 1979** Opened Daedeok Central R&D Center
- 1991** Developed the world's first 4th-generation cephalosporin antibiotics
- 1995** Renamed as LG Chem, Ltd.
Completed construction of Tianjin PVC plant in China

2000 - 2009

- 2001** Spinned off business entities (LGCI, LG Chem, LG Household & Healthcare)
- 2003** Acquired Hyundai Petrochemicals
Factive became first Korean new drug to receive U.S. FDA approval
- 2004** Developed the world's first nanotechnology-applied new EP material
- 2005** Established LG Chem (China) Investment Co., Ltd.
Established a sales subsidiary in Europe (in Germany)
- 2007** Merged with LG Petrochemicals Co., Ltd
- 2008** Developed Korea's first metallocene-based elastomer
- 2009** Spinned off Industrial Materials Business (now LX Hausys)

2010 - 2021

- 2016** Acquired Dongbu Farm Hannong (Farm Hannong)
- 2017** Merged with LG Life Sciences Co., Ltd.
- 2019** Completed construction of Korea's largest petrochemical tech center (in Osan)
Opened the Global Innovation Center in the bio sector (in Boston)
Spinned-off battery business (now LG Energy Solution)
- 2020** Acquired separator business
- 2021** Started construction of Cathode Material Plant for Gumi-type jobs (LG BCM)

2019 : First Korean
Chemical Company in

GLOBAL TOP 10

* Source: Chemical & Engineering News, American Chemical Society)



Top 10 Most Valuable Brands

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

Brand value of
chemical Companies

“Global No.4”

* Source: Brand Finance Group, U.K.

Prospering in the pandemic **TOP 100**

* Source: Financial Times, 2020



To achieve our vision, “We Connect Science to Life for a Better Future,”
LG Chem will become **Top Global Science Company** that leads with **Science for Sustainability**.

We *Connect* Science to life for a Better Future



Leading with Science for Sustainability.

LG Chem Sustainability Goals

We do Everything for Sustainable Growth



Carbon Neutral Growth by 2030 & Net-Zero by 2050



Renewable Energy 100% by 2050



Transition towards Circular Economy



Zero Waste to Landfill



Ethical and Sustainable supply chain

Carbon-neutral growth by 2030, Net-Zero by 2050



Accelerate decarbonization

Introduce innovative processes and convert to eco-friendly raw materials and fuels

Expand use of renewable energy

Offset carbon emissions



Strengthen competitiveness of low-carbon products through LCA

To be applied
To all Korean market products in 2022,
all Korean/overseas products in 2023



Become a global leader in climate response

The first and only Asian member of WEF Alliance of CEO Climate Leaders

*Alliance of CEO Climate Leaders : Climate alliance with over 30 corporate CEOs and government officials worldwide

Towards Top Global Science Company



Sustainable business centered around eco-friendly materials

Develop bio materials

Establish circular economy of waste plastics

Foster renewable energy material business



Battery material-oriented e-Mobility

Produce first-rate cathode materials in the world

Expand core material business for secondary batteries

Reinforce R&D for next-gen battery materials



World-class innovative drug development

Expand domestic top-level pipelines

Develop global clinical trials and accelerate business

Bolster investment in R&D for new drug development

...
Towards Top Global Science Company



Foster bioplastics and low-carbon technology

Mechanical/chemical recycling technologies

Develop and commercialize biodegradable plastics

CO2 capture/utilization technology

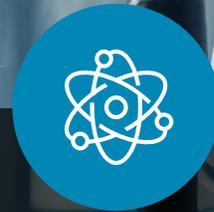


**Improve battery performance and safety
Develop next-gen battery materials**

Develop single-crystal cathode materials

Develop new materials for separators /pure silicon electrode materials

Material technology for all-solid-state batteries



Gain leadership in cancer /autoimmune diseases, diabetes /metabolic diseases

Accelerate global clinical development for new drug projects, e. g., gout, NASH, and obesity

Implement multi-modality strategies for cell/gene therapy

* Various approach to drugs





Eco-friendly Material Brand LETZero

A compound word of "Let" and "Zero," which means "to turn harmful substances to the environment and the net increase in carbon emissions into zero."

LETZero Product Line

Recycle



PCR ABS

Electrical/electronic products, automobiles, construction materials, etc.



PCR PC, PCR PC/ABS

Electrical/electronic products, automobiles, industrial materials, building materials



PCR PP

Packaging materials, medical instruments



PCR PE

Packaging materials, medical instruments

Bio materials



Bio balanced SAP

Diapers, menstrual pads



Bio balanced NPG

Paint, PET film, coating agents, adhesives, UPR



Bio IPA

Semiconductor/LCD manufacturing detergent, paint, pharmaceuticals, and cosmetics



Bio balanced Acrylates

Paints, adhesives, coating agents

⋮

Biodegradable



PLA

Packaging materials, film, 3d printing



PLH

Disposable bags and gloves



PBAT

Agricultural film, packaging materials

LETZero Certification



Royal Botanic Toothpaste by LG Household & Health Care with LETZero Certification



Bus stop built with PCR materials

LG Chem | Financial Results

* Included Subsidiaries



Sales in 2021

USD **37.3**bn
(Approx.)



Workforce

18,800 (Person)

Domestic 13,920

Overseas 4,880

(Approx.)

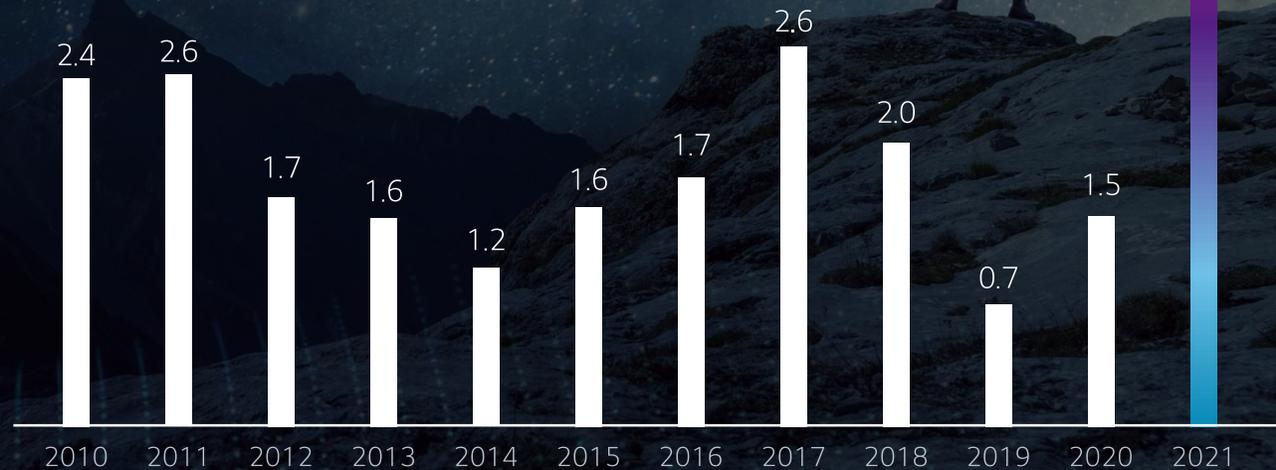
Sales

(Unit : Billion USD)



Operating profit

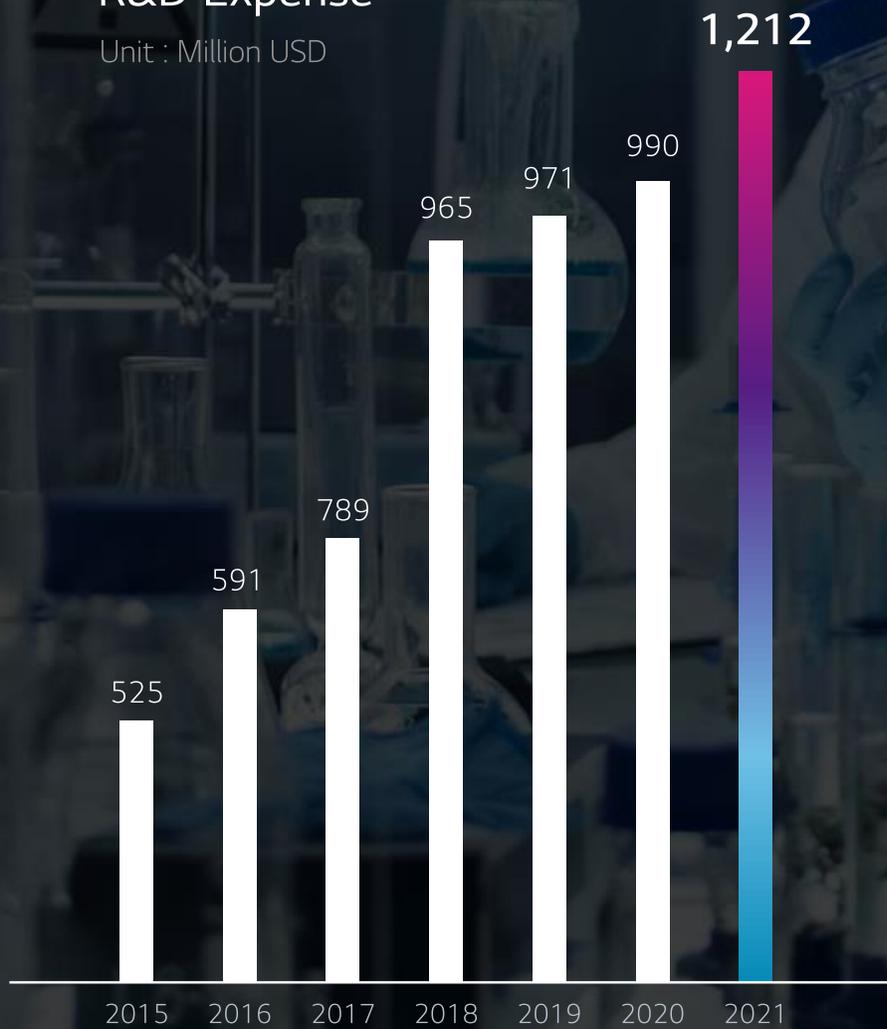
(Unit : Billion USD)



* Included Subsidiaries

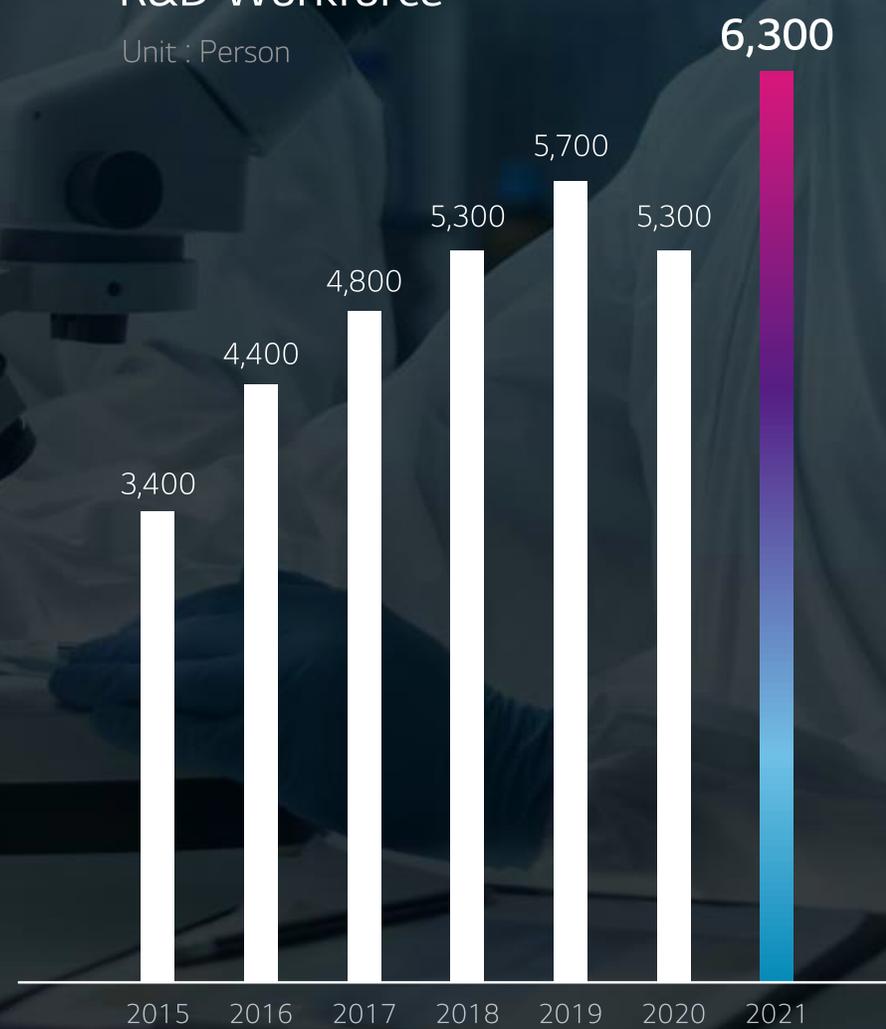
R&D Expense

Unit : Million USD



R&D Workforce

Unit : Person



LG Chem | Domestic Sites



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



Leadership Center / CS Center
(Est.1991/Est.2019)



R&D Campus Daejeon
(Est.1979)



Osong Plant (Est.2009)
Bio Similar, Vaccine



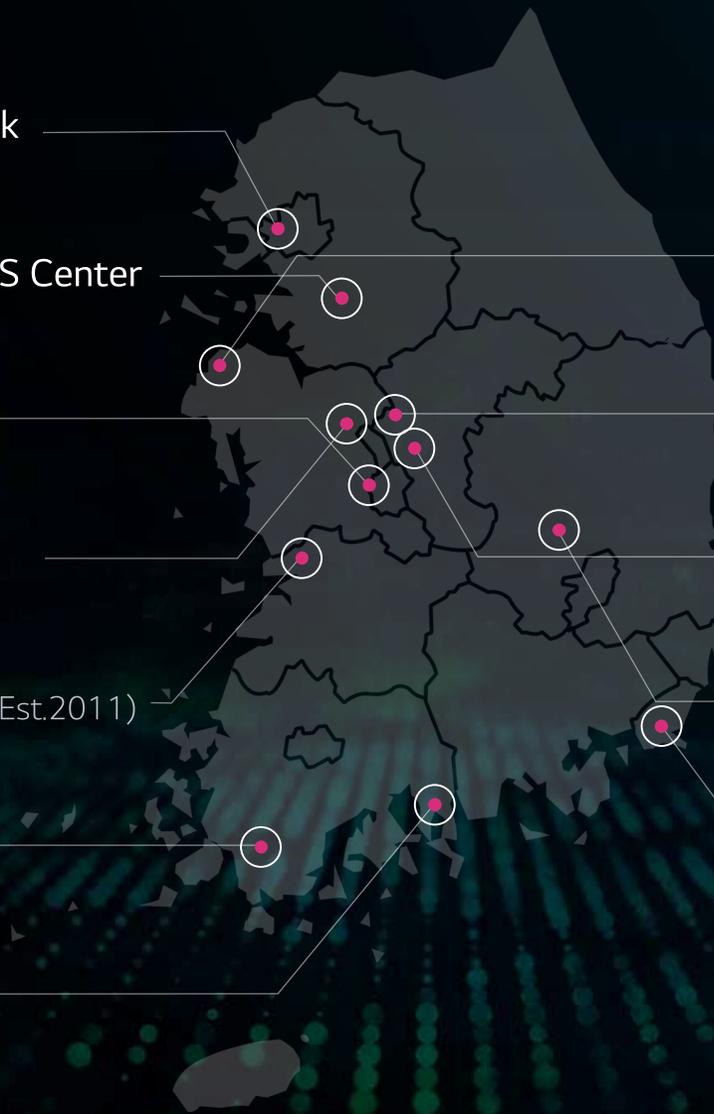
Iksan Plant(3)(Est.1991 / Est.1995/Est.2011)
EP, ABS / Pharmaceutical / Battery Materials



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



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



Daesan Complex (Est.2005)
NCC, SSB, PVC



Ochang Plant (Est.2005)
Stripper



Cheongju Complex(2)(Est.1980 / Est.2009)
OLED Material, Photoresist, Cathode Material,
RO membrane / Battery Separator



Gimcheon Plant (Est.2008)
SAP



Onsan Plant(Est.1979)
Fine Chemical



LG Chem | Overseas Sites



● Manufacturing Subsidiaries (20)
 ● Sales Subsidiaries (13)
 ● Regional Branch Offices (5)
 ● R&D Center (2)
 ○ Etc. (6)

- ### Europe
- Wroclaw (Est.2005) - EP
 - Warsaw
 - Moscow
 - Frankfurt
 - Istanbul

- ### Asia
- Beijing (Est.2004)
 - Tianjin (Est.2004) - EP
(Est.2005) - PVC,VCM,EDC
(Est.2009) - SBS
 - Guangzhou (Est.2002) - EP
(Est. 2018) - FSPM
 - Chongqing (Est.2015) - EP
 - Ningbo (Est.1996) - ABS, SBL, EP
 - Huizhou (Est.2009) - ABS
 - Wuxi (Est.2018) - Cathode Material
 - Quzhou (Est.2018) - Precursor
 - Hangzhou (Est.2021) - Display materials
 - Taipei (Est.2004) - Polarizer
 - Tokyo
 - Singapore

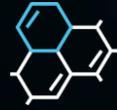
- ### India
- India (Est.1996)
 - Haiphong (Est.2017) - Polarizer
(Est.2018) - EP
 - Ho Chi Minh (Est.1995) - Plasticizers
 - Bangkok
 - Jakarta
 - Kuala Lumpur
 - Pengerang
 - Amman

- ### America
- Atlanta
 - Boston
 - Evansville (Est.2018) - Sealant
 - Ohio
 - LA
 - Sao Paulo
 - Mexico City



Petrochemicals

- NCC
- Polyolefins
- PVC/Plasticizers
- ABS
- Acrylates/SAP
- HPM(High Performance Materials)
- Catalyst
- CNT



Advanced Materials

- Battery Separator
- Cathode Materials
- Engineering Material
- IT Materials
- Semiconductor Materials
- RO Filter



Life Sciences

- Primary Care
- Specialty Care
- Aesthetic

01

Introduction of LG Chem

Petrochemicals Company



Petrochemicals Company

Establishment (Year)

1976

Sales (\$) *As of 2021

18.1bn

Workforce (Person)

Domestic 6,388 / Overseas 2,150

Business Area

Petrochemical Products

- **2021** Acquired *ISCC for Korea's first eco-friendly bio-balanced product
* ISCC (International Sustainability and Carbon Certification)
Launched digital CRM system LG Chem On
- **2019** Established the largest petrochemical tech center in Korea (Osan CS Center)
- **2015** Launched Hwanam Tech Center in Nanjing, China
- **2010** Acquired Dow Polycarbonate business
- **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 construction of Yecheon PVC resin factory
Entry into the petrochemical business

Leading Business Sustainability with Eco-Friendly Materials

Promoting bio materials, recycling, and energy transition as future growth engines



Bio Materials

- About 40 bio products certified by ISCC Plus
- World's first mass production of bio-balanced SAP
- Internalize bio materials production, strengthen partnerships for development



Establish circular economy of waste plastics

- Produce PCR products
- Partner with waste plastic suppliers
- Establish an eco platform



Discover new renewable energy materials

- Produce high value-added products for solar panels
- POE, EVA, EP

Production Capacity (As of 2021)

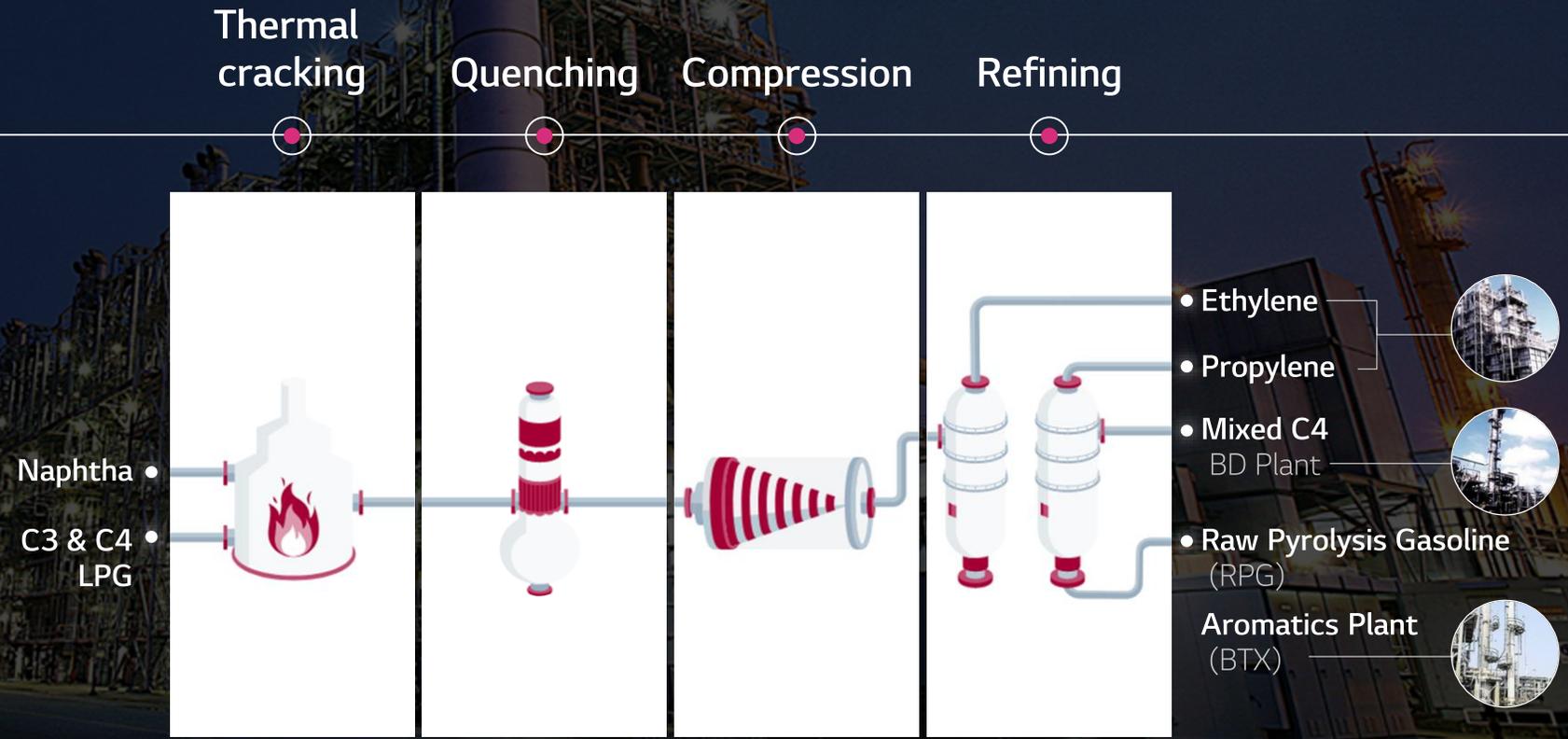
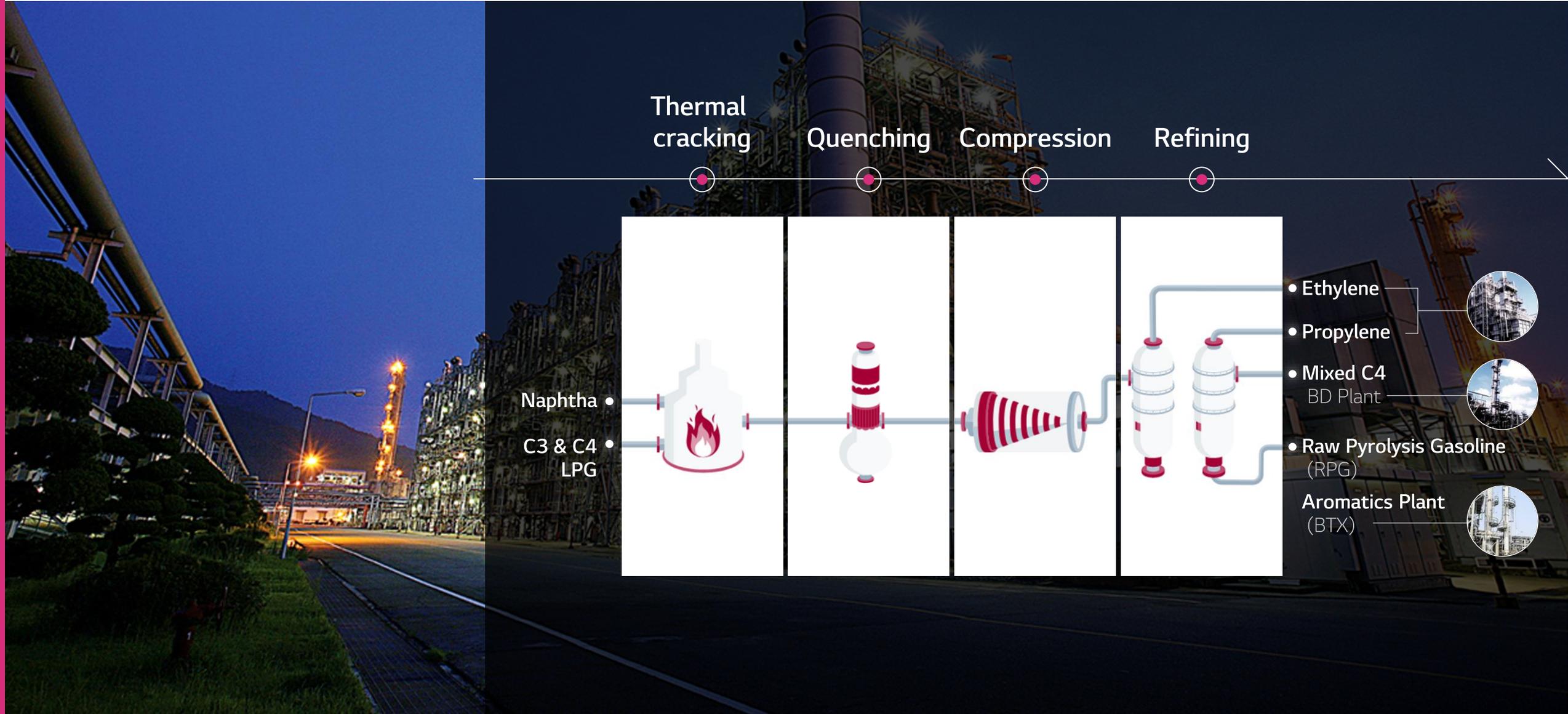
Unit : KTA

Ethylene	3,400	HDPE	650	Oxo- Alcohol	299
Propylene	1,733	LDPE/EVA	460	Acrylic Acid	715
BD	414	POE	280	SAP	499
BZ	851	PP	380	ABS/SAN	2,160
SM	692	PVC	1,265	PS	40
EG	180	VCM	1,363	EPS	90
Phenol	709	CA/EDC	1,120	Specialty Resin	495
BPA	505	Plasticizer	225	Synthetic Rubber	445



Naphtha Cracking Center (NCC)

NCC (Naphtha Cracking Center) produces base chemicals such as ethylene and propylene for petrochemical products. They are supplied as raw materials for various products such as PO, synthetic rubber, and ABS. LG Chem is achieving the world's highest energy efficiency and developing a wide range of technologies from hydrogen energy to carbon capture.



Polyolefin (PO)

PE (polyethylene) and PP (polypropylene) are general-purpose plastics often used to make containers, packaging materials, film, and encapsulant for solar modules, which produces green energy. PCR PE and PCR PP are used in packaging materials and medical devices.



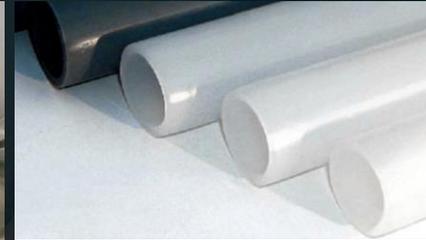
LD, LLD, HD,
POE, EVA, PP,
PCR-PE
PCR-PP



Applications



Medical devices



Ondol pipes



Packaging materials/
product containers



Cable insulators



Photovoltaic encapsulant film



Automotive interior
and exterior parts

PVC / plasticizers

PVC (polyvinyl chloride) is used as a raw material for flooring, sashes, and pipes, and plasticizers are used for PVC to provide flexibility. Caustic soda is widely used, from basic industries such as wastewater neutralization and textile dyeing, to high-tech sectors including cathode material manufacturing. PC (polycarbonate) has excellent impact resistance and heat resistance, and is used in home appliance housings and automobile materials.

PVC,
Caustic Soda,
Plasticizers,
Alcohol, PC



Applications



Sashes



Flooring



Pipes



Cable sheath



Cathode materials



Car headlamps

Acrylonitrile Butadiene Styrene (ABS)

Acrylonitrile butadiene styrene (ABS) has excellent heat resistance, impact resistance, and processability. It is a high-performance material used in automobiles, home appliances, and IT devices. LG Chem is the first in the chemical industry to mass-produce white PCR ABS, providing differentiated solutions to customers.



ABS,
PCR-ABS,
SAN, PS, EPS



Applications



Electronics housing



Automotive interior/
exterior materials



Building materials



Toys



Product containers



Building insulation

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.

In 2021, we mass-produced and exported the world's first ISCC Plus certified bio-balanced SAP.

Acrylates,
SAP



Applications



Plasticizer/ SAP Resin



Diapers



Paint



Adhesives



Cleaning agent for
Semiconductors



Acrylic Fibers

High Performance Materials (HPM)

NBR latex is used to make medical and industrial gloves, and MBS and SBS serve as special additives that perform various functions.

Synthetic Rubber is used as a raw material for tires and golf balls.

NBR Latex,
SBS, MBS,
Synthetic
Rubber



Applications



Medical gloves



Impact modifiers



Asphalt modifiers



Tires



Golf balls



Shoes

Catalyst

Catalysts are the core technology for various petrochemical processes. We were the first in Korea and the fourth in the world to independently develop catalysts for acrylic acid production. Polymer catalysts are used to manufacture metallocene polyolefins and functional chemical materials.

We provide tailored solutions to customers with exceptional technology.

Process
Catalyst,
Polymer
Catalyst



Applications



Acrylic acid



CNT



BD



mPO(PE/PP)



POE



Synthetic rubber

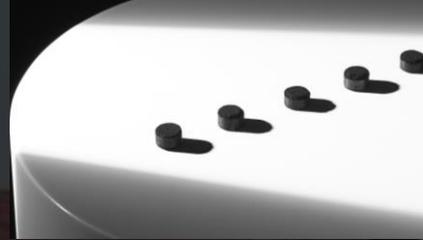
Carbon Nanotube (CNT)

Carbon Nanotube (CNT) is a tube-shaped carbon allotrope with a nanometer-sized diameter. It has excellent electrical, thermal, and mechanical properties and is used to make conductive agents for cathode materials in lithium-ion batteries, conductive plastic compounds, and plate heaters.

LG Chem is producing the largest capacity of high-quality CNTs in Korea.



CNT



Applications



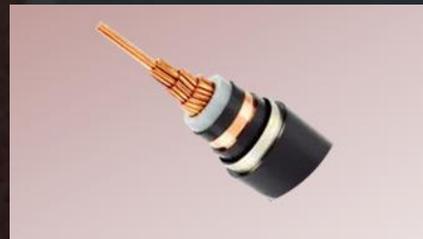
Lithium ion batteries



Conductive plastic



Plate heaters



High-voltage cable



Conductive paint

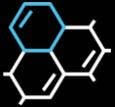


Vehicular rear radar shield

02

Introduction of LG Chem

Advanced Materials Company



Advanced Materials Company

Establishment (Year)

1999

Sales (\$) * As of 2021

5.2bn

Workforce (Person)

Domestic 4,044 / Overseas 1,991

Business Area

Battery Materials,
Engineering Materials,
IT Materials

- **2021** Commercialized battery separators
(Acquired separator business from LG Electronics, established LG-Toray J/V in Hungary)
- **2019** Reorganized Advanced Materials Company
(to provide customized solutions in high-performance materials)
- **2018** Established Chinese joint venture for manufacturing
Precursor and cathode material
- **2016** Acquired GS E&M, a renowned cathode manufacturer
- **2006** Commercialization of battery materials (cathode material, electrolyte)
- **2003** Established IT&E Manufacturing Subsidiary in Nanjing, China
- **2000 ~ 2004** Commercialized LCD, OLED, Process materials
- **2000** First to develop PDP fluorescent substance in Korea.

Towards World's Top Comprehensive Battery Materials Company



Global Top Tier Cathode Materials

- Began construction of Gumi Plant in December 2021
- Signed JV with a mining company
- Reinforced competitiveness for metal sourcing



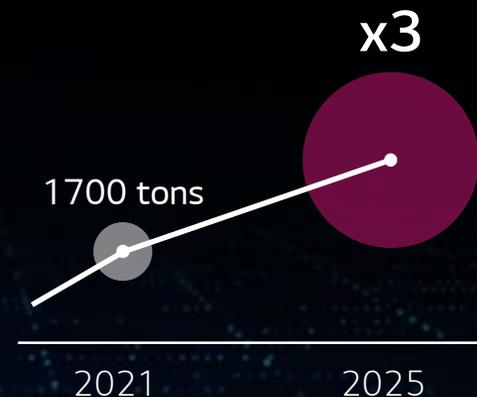
Separator Business

- Rapid market entry through M&A and JV
- Established global production sites in 2021 (China, Hungary, Poland)



CNT Capacity Expanded Over 3x

*CNT: Conductive agents for cathode materials (under Petrochemicals Company)



Focused Resources for R&D

Differentiate e-mobility technologies and acquire market leadership through intensive focusing of resources in cathode materials, anode binders, and thermal adhesives

Battery Materials

In addition to cathode binders and dispersants, LG Chem is producing over 10 types of battery materials, including cathode materials and separators, which are core materials for secondary batteries. We are also bolstering R&D across a wide range of fields, such as developing new materials for the technological advances in the next-generation batteries. LG Chem will continue to strive to become the world's No. 1 comprehensive battery materials company with the highest level of safety and competitiveness.

Cathode materials,
separators,
anode binders,
and anode
dispersants



Applications



Mobility & IT batteries



Automotive batteries



ESS batteries

Major
Customers



Engineering materials

In mega trends such as e-mobility and sustainability, LG Chem is striving to create world no. 1 products by producing high-strength, lightweight automotive materials and eco-friendly PCR materials that are optimized for customer products and processes.

EPC, TPE,
Specialty
Compound
PC



Applications



Automotive interior and exterior materials / Engine parts

Eco-friendly PCR materials

Major
Customers



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



OLED TV



OLED Mobile

Major
Customers



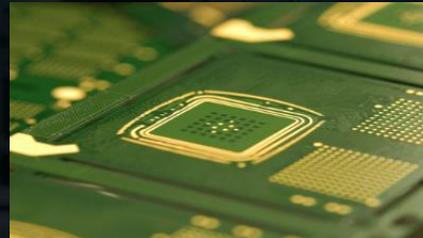
Semiconductor Materials

LG Chem produces semiconductor substrate materials and films for post-processing, the core components for manufacturing semiconductors.

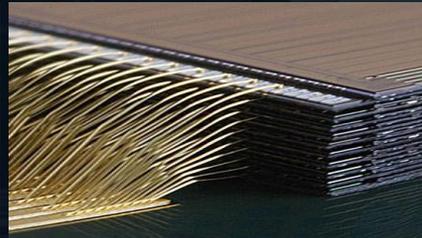
CCL, PPG,
BGT, DAF



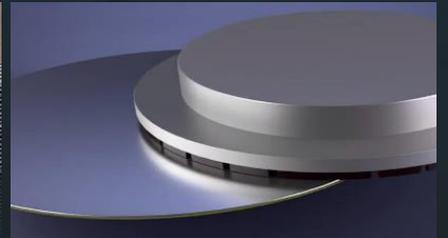
Applications



Board for Semiconductor Packages



Memory Layers



Wafer Processing

Major Customers



RO Filiter

LG Chem's seawater desalination and industrial RO filter is a water treatment filter that utilizes our proprietary Thin-Film Nanocomposite (TFN) nanotechnology. This product is leading the global market with an unrivaled removal efficiency of 99.89%.

SW R/ES/
GR/SR



Applications



Seawater Desalination



Industrial Water



Wastewater Reuse

Major
Customers

MERITO

GS Inima

acciona

suez

03

Introduction of LG Chem

Life Sciences Company



Life Sciences Company

Establishment (Year)

1984

Sales (\$) As of 2021

0.7bn

Workforce (Person)

Domestic 1,833 / Overseas 226

Business Area

Pharmaceuticals, Vaccines, Aesthetic

- **2021** Established LG-Jiansheng Life Science in China
Successfully completed Phase II clinical trial for new gout drug in the US
- **2019** Established Life Sciences Innovation Center in Boston, USA
- **2012** Developed 1st Korean diabetes medicine, 'Zemiglo'
- **2003** 1st Korean new chemical entity (NCE) approved by U.S. FDA (Factive)
- **1996** 1st Korean hepatitis B vaccine 'Euvox' approved by WHO PQ
- **1991** Developed World's first 4th generation Cephalosporin
- **1984** Start of pharmaceutical business
(Established Pharmaceuticals business division)
- **1961** Acquire of manufacturing license pharmaceuticals products

Toward a World-Class Innovative Drug Developer



2 or more innovative new drugs by 2030

- First-rate pipelines in Korea
- Invested over USD 250mil in annual R&D
- Open innovation



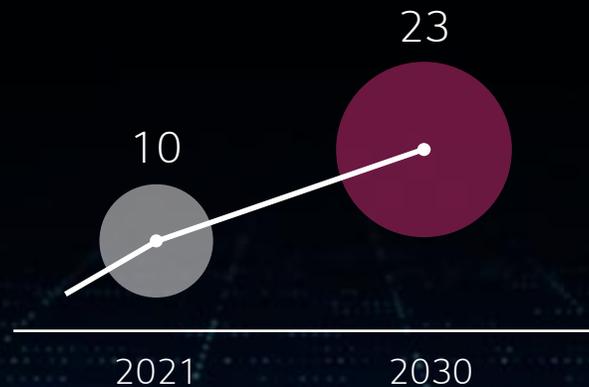
Diabetes, metabolic diseases, cancer, autoimmune diseases

Expand new drug pipelines in clinical development stage



Accelerate clinical developments and business growth worldwide

- Reinforcing talent pool of clinical/regulatory specialists
- Increase overseas sales by 50%



Primary Care

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

Representative Products



Diabetes (Zemiglo, Zemimet SR)



Cardiovascular Disease (Rovatitan)



Musculoskeletal Disease (Hyruan One)



Autoimmune Disease (Eucept)

Specialty Care

LG Chem is the first company in Korea that has successfully developed a growth hormone stimulator, and is also concentrating its R&D capabilities on treatments for special diseases. LG Chem has been strengthening competitiveness in the global market with its WHO-approved hepatitis B and pentavalent combination (5-in-1) vaccine..



Representative Products



Grow Hormone (Eutropin)



Ovulation Induction (Follitrope)



Pentavalent Combination (Eupenta)



Polio Vaccine (Eupolio)

Aesthetic

YVOIRE, the first hyaluronic acid filler developed with LG Chem's proprietary technology in Korea, is receiving attention for its superior product quality leading to expanding market share.

Representative Products



Y-SOLUTION, Global



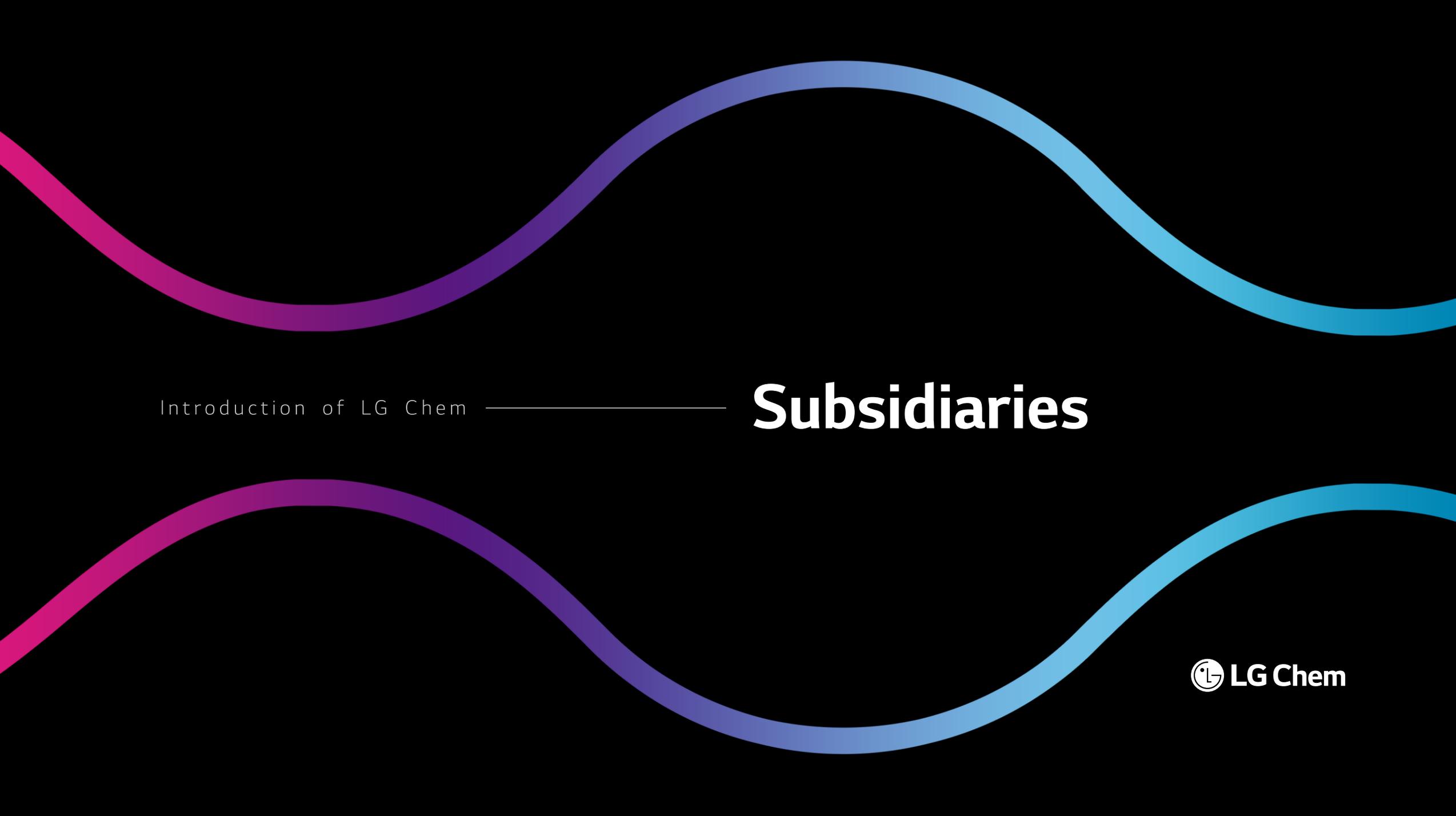
YVOIRE, Global



YVOIRE, China



Y-SOLUTION, China



Introduction of LG Chem

Subsidiaries



LG Energy Solution

LG Energy Solution embarked on a new journey as a global battery company when we became a separate entity from LG Chem's battery business in 2020.

We were the first to mass-produce lithium-ion batteries and supply them for electric vehicles, and have been offering a comprehensive portfolio of products related to automotive batteries.

LG Energy Solution also provides battery systems for ESS batteries in various applications, including power grids, residential and commercial use, and uninterruptible power supplies (UPS).



Automobile Battery



No. 1 in automotive battery global market

Mobility & IT Battery



1st in Korea to successfully mass produce small lithium-ion batteries

ESS Battery



No. 1 in ESS batteries globally



Farm Hannong

Farm Hannong, an LG Chem's affiliate, is the top domestic agricultural company —No. 1 in agricultural chemicals and No. 2 in the fertilizer and seed in the Korean Market—and aims to be a global leader in green agriculture and ICT industry technologies.

Farm Hannong

Crop Protection Products



No.1
domestic
market share

Fertilizer



No.2
domestic
market share

Seed



No. 2
domestic
market share

Leading with science
to sustain
our valuable life



THANK YOU

*We*ConnectScience



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