LG Chem

Global advanced materials company

LG Chem

SolutionPartner

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- Introduction of LG Group
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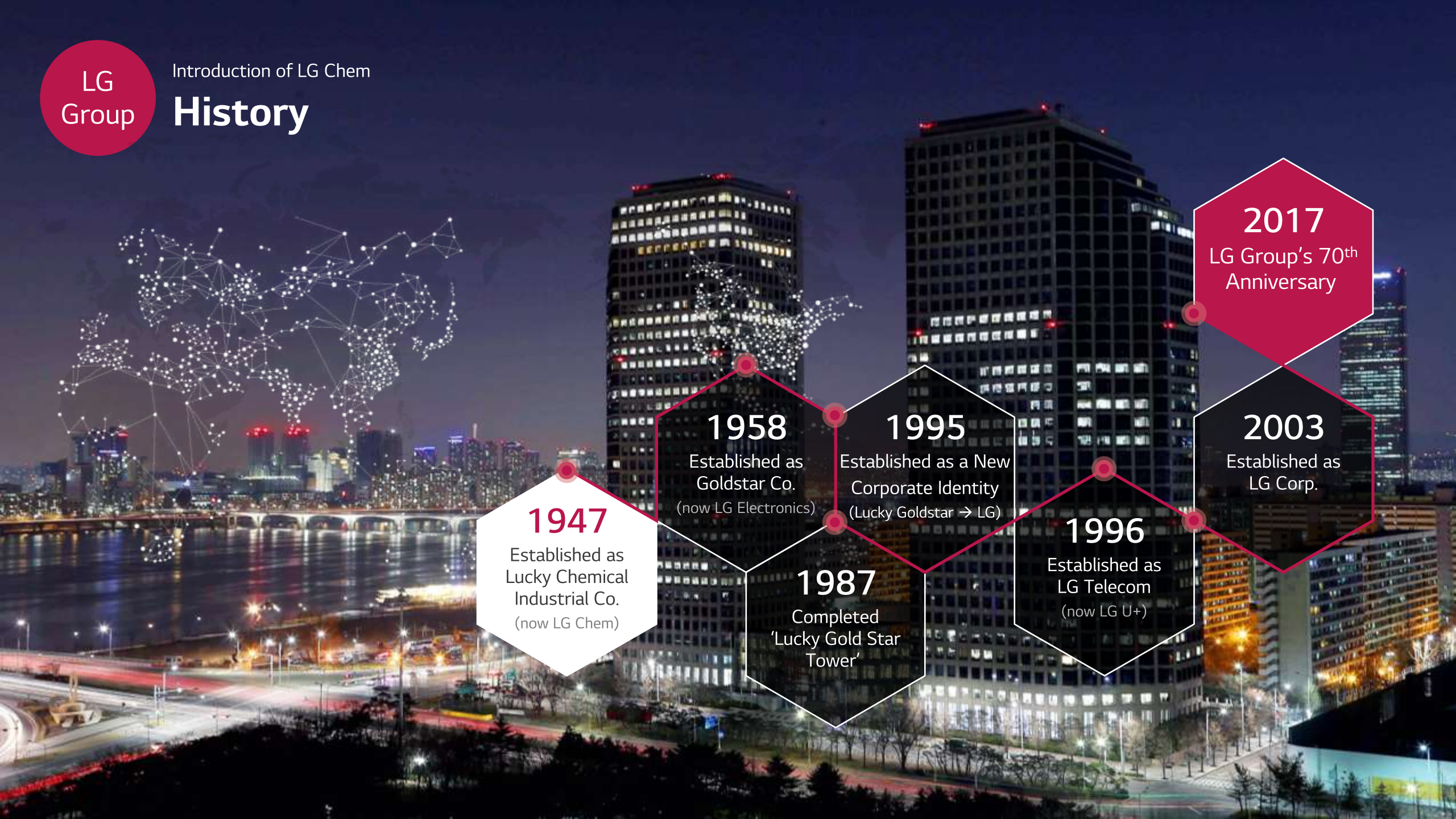
LG Group

Introduction of LG Chem

History



LG Group

Introduction of LG Chem

Subsidiary

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

Chemicals

LG Chem

LG Hausys

LG Household & Healthcare

Farm Hannong

etc.

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Electronics

LG Electronics

LG Display

LG Innotek

etc.

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Telecommunications & services

LG U+

LG CNS

LG International

LG Sports

etc.

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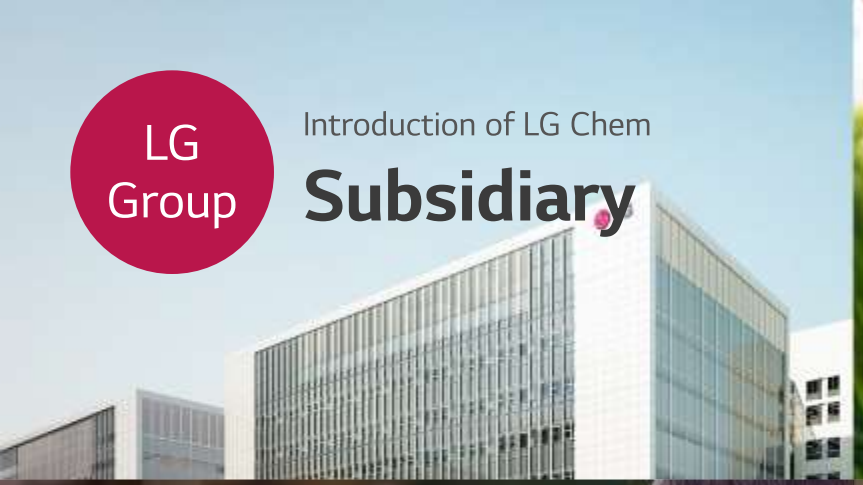
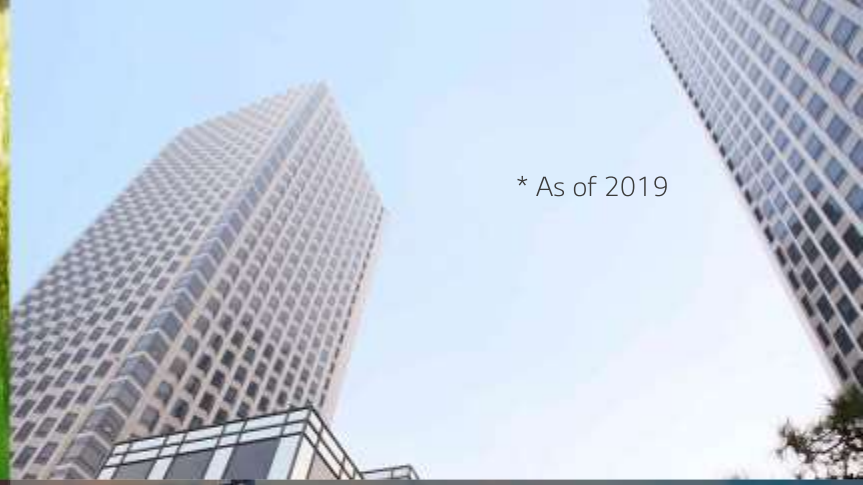
LG Group

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

LG Chem | Vision

To Be a Global Leader

Growing with customers by providing innovative materials and solutions

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	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	AsahiKASEI	▲3	2020 : $2,368m 2019 : $2,246m	+5.4%
8	MITSUBISHI CHEMICAL	—	2020 : $2,287m 2019 : $2,535m	-9.8%
9	DUPONT	▼4	2020 : $2,200m 2019 : $3,261m	-32.5%
10	Air Liquide	▼3	2020 : $1,982m 2019 : $2,594m	-23.6%

LG Chem | History

1980's Earlier

- 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

1990's

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

2000's

- 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)

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

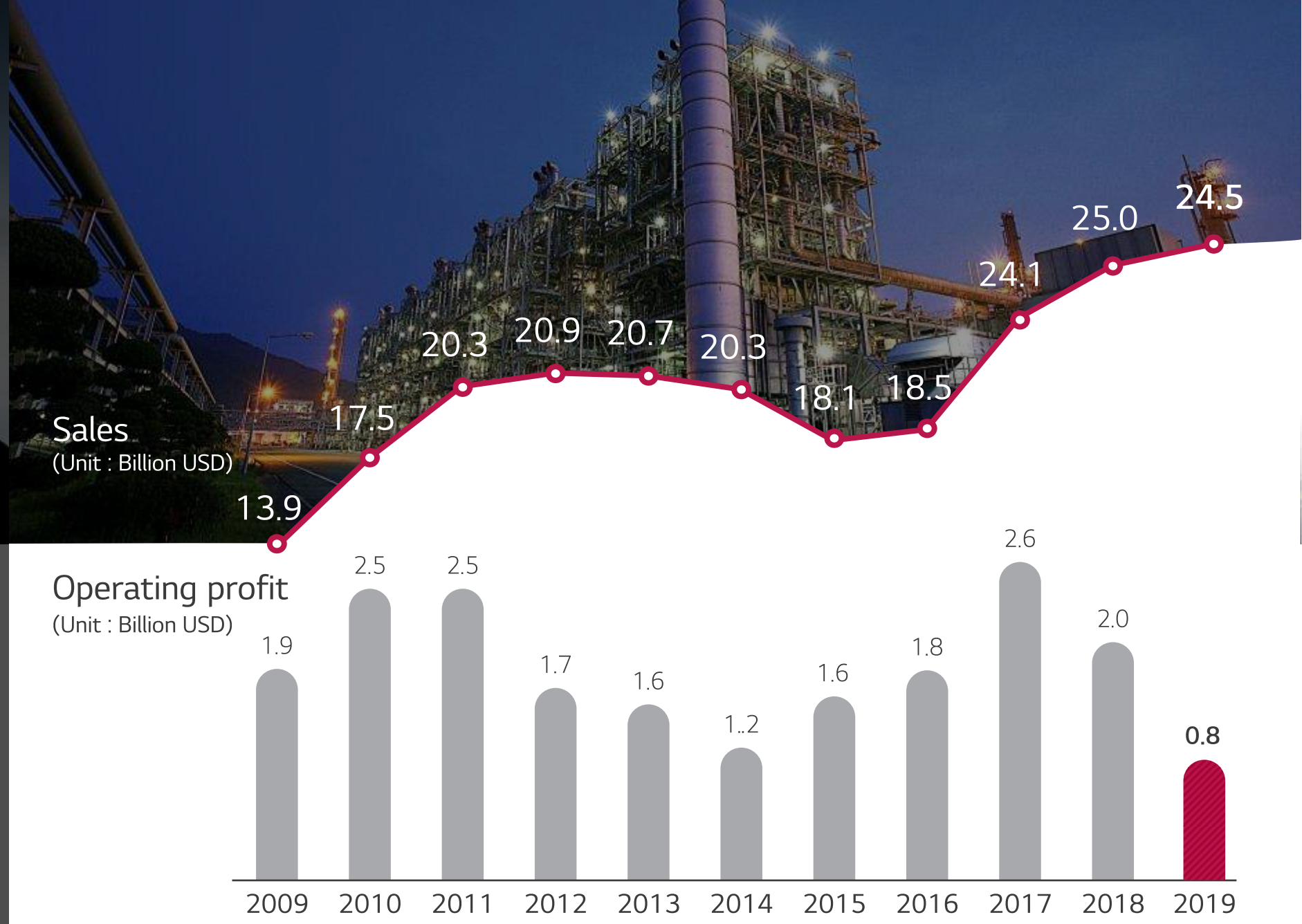
LG Chem | **Financial Results**

Sales in 2019

USD **24.5** Billion

Operating profit in 2019

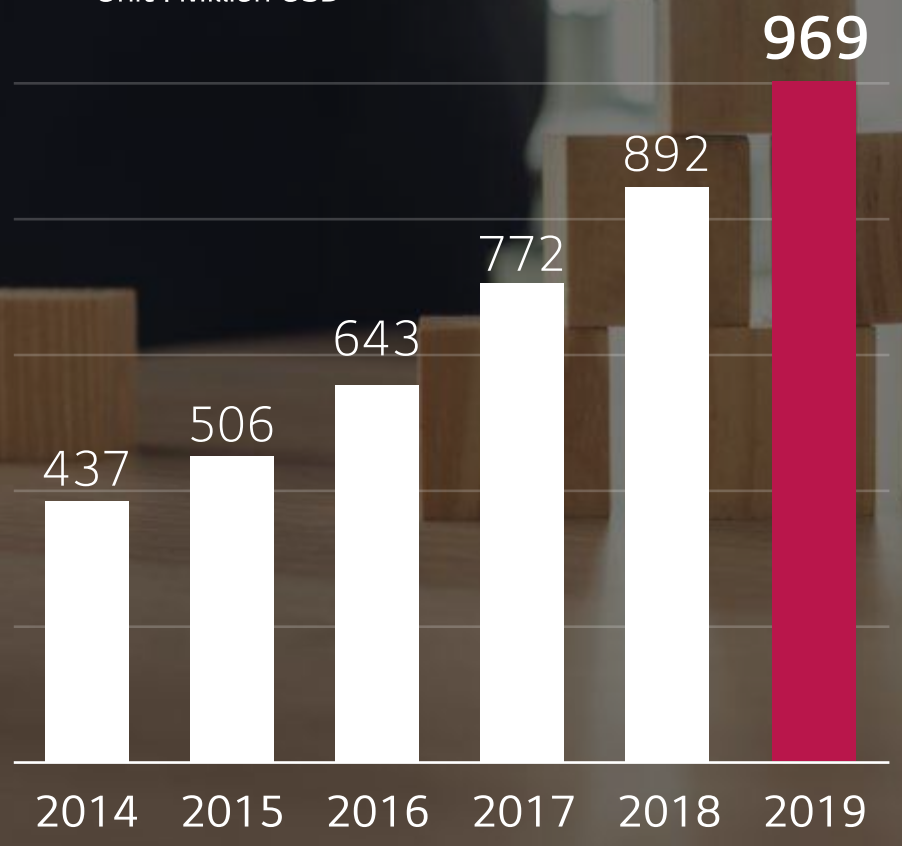
USD **0.8** Billion



LG Chem | **R&D Status**

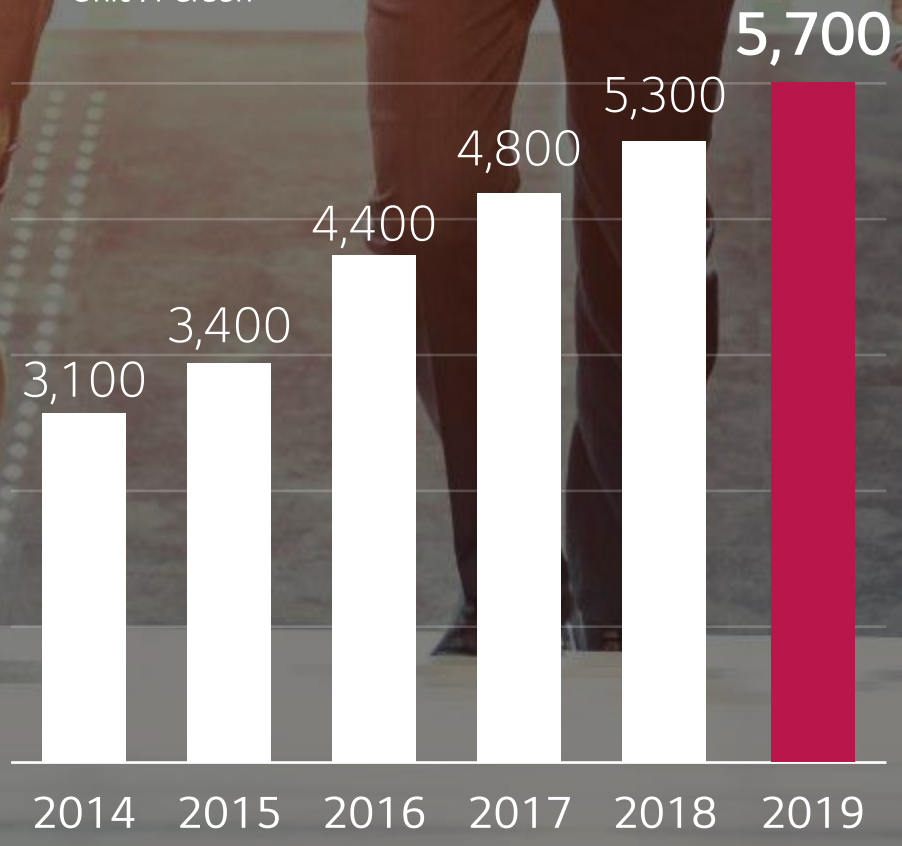
R&D Expense

Unit : Million USD

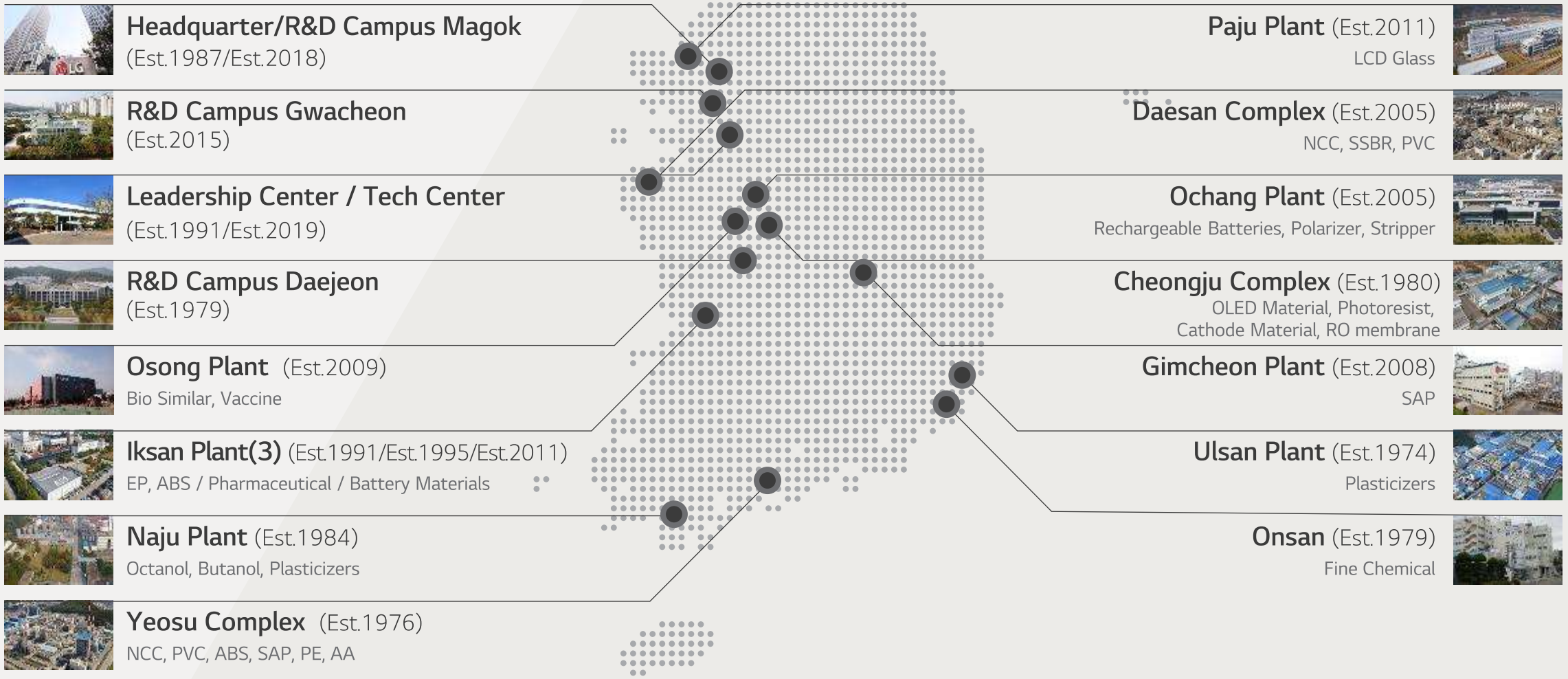


R&D Workforce

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

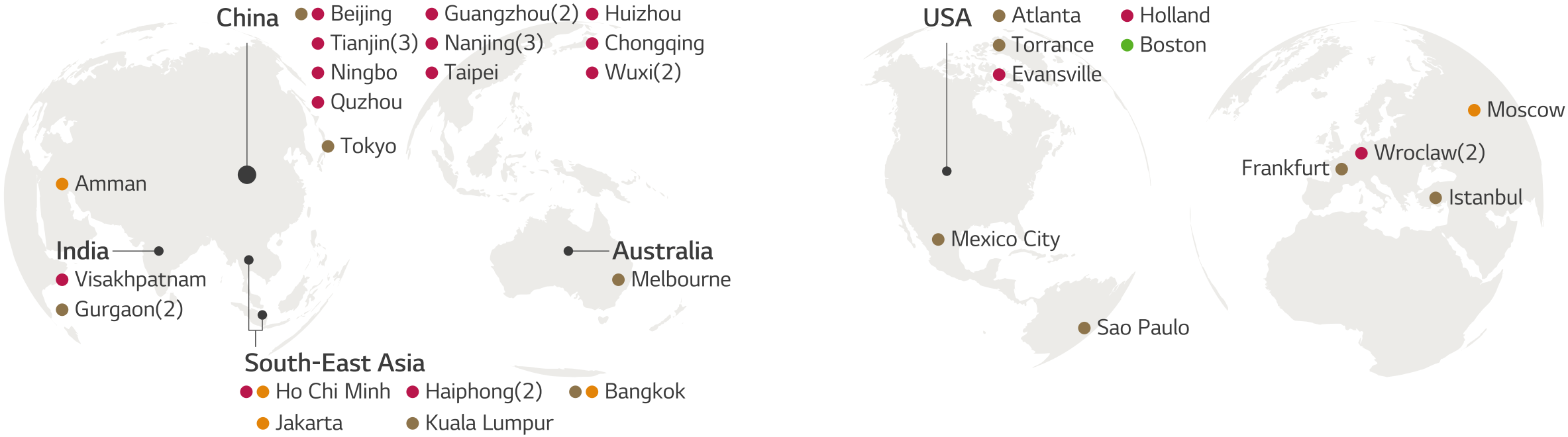
Gimcheon Plant (Est.2008)
SAP

Ulsan Plant (Est.1974)
Plasticizers

Onsan (Est.1979)
Fine Chemical

LG Chem | Overseas Sites

● Manufacturing Subsidiaries (24) ● Sales Subsidiaries (13) ● 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** (Est1996) - PS, EPS, Pharmaceuticals
- **Haiphong** (Est.2017) - Polarizer
  (Est.2018) - EP
- **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

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 Yeocheon 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

BPA

Applications

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



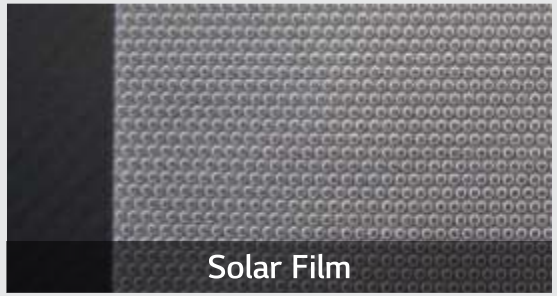
Applications


Medical Appliances


Korean Floor Heating System

Packing Materials


Cable Insulator


Solar Film


Interior & Exterior Decoration of a Car

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

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

Acrylates / SAP

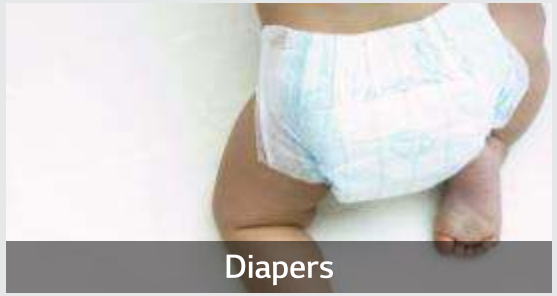
LG Chem's acrylate processes produce raw materials used for paint, adhesives, and SAP.
SAP effectively absorbs fluids in diapers and items for sanitary purposes.

Acrylates / SAP



Applications


Plasticizer/ SAP Resin


Diapers


Paint


Adhesives


Cleaning agent for Semiconductors


Acrylic Fibers

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

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

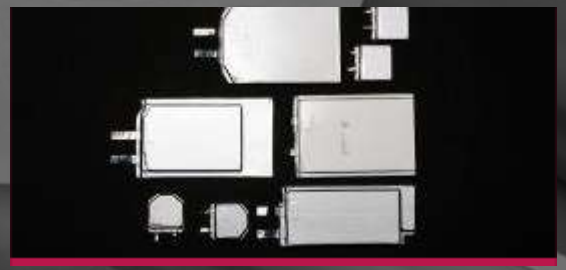
2009
Supplied the world's first lithium-ion batteries for HEV

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 · HUAWEI · BOSCH · TTI · ASUS · lenovo · StanleyBlack&Decker

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

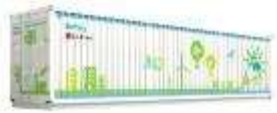
Major Customers

VOLKSWAGEN · GM · HYUNDAI MOTOR GROUP · Ford · Mercedes-Benz · PORSCHE · RENAULT NISSAN MITSUBISHI · JAGUAR · VOLVO · BMW

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

kepco · SMA · SoftBank · AES · BayWa r.e. renewable energy · NEXTera ENERGY RESOURCES · SIEMENS · EDISON INTERNATIONAL · DUKE ENERGY · ABB

03

Advanced Materials Company

Advanced Materials Company

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

GM
HYUNDAI MOTOR GROUP
CHRYSLER
Mercedes-Benz
RENAULT NISSAN MITSUBISHI
Ford

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 DISPLAY
CSOT

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

LG Chem Energy Solution Company

HITACHI

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 1st Korean diabetes medicine, ‘Zemiglo’

2003
1st Korean NCE approved by US 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

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.

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.

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.

Representative Products

Hyaluronic Filler
(Y-SOLUTION)

Hyaluronic Filler
(YVOIRE)

Hyaluronic Filler
(伊婉 in China)

Farm Hannong

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.

Crop Protection Products

Domestic
Market Share No.1

Fertilizer

Domestic
Market Share No.2

Seed

Domestic
Market Share No.2


A Company
That Enriches
Human Life

LG Chem

Thank you

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SolutionPartner