

LG Chem, Ltd. and Subsidiaries

Consolidated Financial Statements

December 31, 2017 and 2016

LG Chem, Ltd. and Subsidiaries
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December 31, 2017 and 2016

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Independent Auditor's Report



(English Translation of a Report Originally Issued in Korean)

To the Shareholders and Board of Directors of
LG Chem, Ltd.

We have audited the accompanying consolidated financial statements of LG Chem, Ltd. and its subsidiaries (collectively referred to as the "Group"), which comprise the consolidated statements of financial position as at December 31, 2017 and 2016, and the consolidated statements of profit or loss, consolidated statements of comprehensive income, consolidated statements of changes in equity and consolidated statements of cash flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies and other explanatory information.

Management's Responsibilities for the Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS), and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibilities

Our responsibility is to express an opinion on the consolidated financial statements based on our audits. We conducted our audits in accordance with Korean Standards on Auditing. Those standards require that we comply with ethical requirements, and plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.



Opinion

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of LG Chem, Ltd. and its subsidiaries as at December 31, 2017 and 2016, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with Korean IFRS.

Other Matter

Auditing standards and their application in practice vary among countries. The procedures and practices used in the Republic of Korea to audit such financial statements may differ from those generally accepted and applied in other countries.

Seoul, Korea
March 6, 2018

This report is effective as of March 6, 2018, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the accompanying consolidated financial statements and notes thereto. Accordingly, the readers of the audit report should understand that there is a possibility that the above audit report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2017 and 2016

<i>(in millions of Korean won)</i>	Notes	2017	2016
Assets			
Current assets			
Cash and cash equivalents	3, 5, 6	2,249,341	1,474,367
Trade receivables	3, 5, 7, 31	4,448,669	3,533,699
Other receivables	3, 5, 7, 31	770,776	979,027
Prepaid income taxes		932	5,753
Other current assets	13	376,814	260,793
Inventories	9	3,352,454	2,965,191
Assets held for sale	35	6,595	8,104
Total current assets		<u>11,205,581</u>	<u>9,226,934</u>
Non-current assets			
Other receivables	3, 5, 7	126,429	233,152
Other financial assets	3, 5, 8	23,782	23,448
Investments in associates and joint ventures	1, 10, 33	264,096	260,828
Deferred tax assets	28	281,506	170,177
Property, plant and equipment	11	11,211,482	9,680,133
Intangible assets	12	1,823,155	832,144
Investment properties		1,027	2,287
Other non-current assets	13	104,163	57,957
Total non-current assets		<u>13,835,640</u>	<u>11,260,126</u>
Total assets		<u>25,041,221</u>	<u>20,487,060</u>
Liabilities			
Current liabilities			
Trade payables	3, 5, 31	2,014,779	1,723,252
Other payables	3, 5, 31	1,847,222	971,605
Borrowings	3, 5, 14	1,451,324	2,212,641
Provisions	15	62,940	51,694
Income tax payables	28	414,110	217,973
Other current liabilities	3, 5, 17	854,283	269,644
Liabilities held for sale	35	31	42
Total current liabilities		<u>6,644,689</u>	<u>5,446,851</u>
Non-current liabilities			
Other payables	3, 5	8,646	14,307
Borrowings	3, 5, 14	1,593,625	678,000
Provisions	15	163,476	133,821
Net defined benefit liabilities	16	180,681	92,172
Deferred tax liabilities	28	42,627	40,675
Other non-current liabilities	17	68,900	30,267
Total non-current liabilities		<u>2,057,955</u>	<u>989,242</u>
Total liabilities		<u>8,702,644</u>	<u>6,436,093</u>

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2017 and 2016

<i>(in millions of Korean won)</i>	Notes	2017	2016
Equity			
Share capital	1, 19	391,406	369,500
Capital surplus		2,274,386	1,157,772
Other components of equity	21	(362,676)	(15,699)
Accumulated other comprehensive income		(173,839)	(36,993)
Retained earnings	20	14,039,250	12,462,772
Equity attributable to owners of the Parent Company		<u>16,168,527</u>	<u>13,937,352</u>
Non-controlling interest		170,050	113,615
Total equity		<u>16,338,577</u>	<u>14,050,967</u>
Total liabilities and equity		<u>25,041,221</u>	<u>20,487,060</u>

The above consolidated statements of financial position should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Profit or Loss
Years Ended December 31, 2017 and 2016

<i>(in millions of Korean won, except per share amounts)</i>	Notes	2017	2016
Revenue	31, 33	25,698,014	20,659,296
Cost of sales	23, 31	<u>(20,134,488)</u>	<u>(16,595,060)</u>
Gross profit		5,563,526	4,064,236
Selling and administrative expenses	22, 23, 31	<u>(2,635,069)</u>	<u>(2,072,316)</u>
Operating profit	33	2,928,457	1,991,920
Finance income	5, 25	240,434	179,940
Finance costs	5, 25	(319,835)	(300,243)
Share of net profit of associates and joint ventures accounted for using the equity method	10	6,620	(3,791)
Other non-operating income	5, 26	478,262	540,612
Other non-operating expenses	5, 27, 35	<u>(770,043)</u>	<u>(748,610)</u>
Profit before income tax	32	2,563,895	1,659,828
Income tax expense	28	<u>(541,922)</u>	<u>(378,834)</u>
Profit for the period		<u>2,021,973</u>	<u>1,280,994</u>
Profit is attributable to:			
Owners of the Parent Company		1,945,280	1,281,124
Non-controlling interests		76,693	(130)
Earnings per share attributable to the equity holders of the Parent Company (in won)	29		
Basic and diluted earnings per ordinary share		25,367	17,417
Basic and diluted earnings per preferred share		25,605	17,467

The above consolidated statements of profit or loss should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Comprehensive Income
Years Ended December 31, 2017 and 2016

(in millions of Korean won)

	Notes	2017	2016
Profit for the period		<u>2,021,973</u>	<u>1,280,994</u>
Other comprehensive income			
<i>Items that will not be reclassified to profit or loss</i>			
Remeasurements of net defined benefit liability	16	(700)	(24,766)
Shares of remeasurements of net defined benefit liabilities of associates		301	(26)
Income tax relating to these items		383	5,982
<i>Items that may be subsequently reclassified to profit or loss</i>			
Exchange differences on translation of foreign operations		(127,130)	(17,173)
Changes in valuation of available-for-sale financial instruments	8	(5,550)	2,392
Shares of other comprehensive income of joint ventures and associates	10	(9,724)	(2,330)
Reclassification from disposal of joint ventures		-	43,378
Income tax relating to these items		(3,657)	(13,267)
Other comprehensive income for the period, net of tax		<u>(146,077)</u>	<u>(5,810)</u>
Total comprehensive income for the period		<u>1,875,896</u>	<u>1,275,184</u>
Total comprehensive income for the period is attributable to:			
Owners of the Parent Company		1,808,415	1,277,921
Non-controlling interest		67,481	(2,737)

The above consolidated statements of comprehensive income should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Changes in Equity
Years Ended December 31, 2017 and 2016

(in millions of Korean won)

	Notes	Attributable to owners of the Parent Company					Non-controlling interests	Total equity
		Share capital	Capital surplus	Other components of equity	Accumulated other comprehensive income	Retained earnings		
Balance at January 1, 2016		369,500	1,157,772	(15,699)	(52,608)	11,532,500	112,057	13,103,522
Comprehensive income								
Profit for the period		-	-	-	-	1,281,124	(130)	1,280,994
Remeasurements of net defined benefit liability	16	-	-	-	-	(18,792)	8	(18,784)
Exchange differences on translation of foreign operations		-	-	-	(16,468)	-	(2,615)	(19,083)
Change in the fair value of available-for-sale financial instruments		-	-	-	1,813	-	-	1,813
Others		-	-	-	30,270	(26)	-	30,244
Total comprehensive income for the period		-	-	-	15,615	1,262,306	(2,737)	1,275,184
Transactions with owners:								
Dividends	30	-	-	-	-	(331,287)	(15,259)	(346,546)
Issuance of share by subsidiaries		-	-	-	-	-	13,343	13,343
Business combination	34	-	-	-	-	-	6,461	6,461
Others		-	-	-	-	(747)	(250)	(997)
Total transactions with owners		-	-	-	-	(332,034)	4,295	(327,739)
Balance at December 31, 2016		369,500	1,157,772	(15,699)	(36,993)	12,462,772	113,615	14,050,967
Balance at January 1, 2017		369,500	1,157,772	(15,699)	(36,993)	12,462,772	113,615	14,050,967
Comprehensive income								
Profit for the period		-	-	-	-	1,945,280	76,693	2,021,973
Remeasurements of net defined benefit liability	16	-	-	-	-	(320)	3	(317)
Exchange differences on translation of foreign operations		-	-	-	(123,098)	-	(9,215)	(132,313)
Change in the fair value of available-for-sale financial instruments		-	-	-	(4,024)	-	-	(4,024)
Others		-	-	-	(9,724)	301	-	(9,423)
Total comprehensive income for the period		-	-	-	(136,846)	1,945,261	67,481	1,875,896
Transactions with owners:								
Business combination	34	21,906	1,116,614	(337,211)	-	-	-	801,309
Purchase of treasury shares	34	-	-	(2,250)	-	-	-	(2,250)
Equity transactions within the Group		-	-	(7,516)	-	-	7,516	-
Dividends	30	-	-	-	-	(368,055)	(17,627)	(385,682)
Others		-	-	-	-	(728)	(935)	(1,663)
Total transactions with owners		21,906	1,116,614	(346,977)	-	(368,783)	(11,046)	411,714
Balance at December 31, 2017		391,406	2,274,386	(362,676)	(173,839)	14,039,250	170,050	16,338,577

The above consolidated statements of changes in equity should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Cash Flows
Years Ended December 31, 2017 and 2016

<i>(in millions of Korean won)</i>	Notes	2017	2016
Cash flows from operating activities			
Cash generated from operations	32	3,716,426	3,083,208
Interest received		28,983	44,349
Interest paid		(101,053)	(74,867)
Dividends received		11,154	18,426
Income taxes paid		(474,762)	(554,419)
Net cash inflow from operating activities		3,180,748	2,516,697
Cash flows from investing activities			
Decrease in other receivables		979,781	901,547
Decrease in other non-current receivables		83,259	58,706
Proceeds from disposal of investments in subsidiaries		343	-
Proceeds from disposal of investments in joint ventures		-	23,724
Proceeds from disposal of available-for-sale financial assets		-	62
Proceeds from disposal of property, plant and equipment		402,661	17,522
Proceeds from disposal of intangible assets		8,022	540
Government grants received		60,335	-
Business combination, net of cash acquired	34	43,759	(537,276)
Proceeds from disposal of business		2,022	-
Increase in other receivables		(769,618)	(610,722)
Increase in other non-current receivables		(68,605)	(97,272)
Acquisition of investments in associates and joint ventures		(28,720)	(17,555)
Acquisition of available-for-sale financial assets		(3,001)	(3,461)
Acquisition of property, plant and equipment		(2,252,616)	(1,398,503)
Acquisition of intangible assets		(97,978)	(74,111)
Net cash outflow from investing activities		(1,640,356)	(1,736,799)
Cash flows from financing activities			
Proceeds from borrowings		1,385,063	611,891
Capital contribution from non-controlling interests		-	12,969
Repayments of borrowings		(1,733,668)	(1,285,656)
Dividends paid		(385,682)	(346,485)
Purchase of treasury shares		(2,250)	-
Net cash outflow from financing activities		(736,537)	(1,007,281)
Net increase (decrease) in cash and cash equivalents		803,855	(227,383)
Cash and cash equivalents at the beginning of the financial year		1,474,367	1,704,918
Effects of exchange rate changes on cash and cash equivalents		(28,881)	(3,168)
Cash and cash equivalents at the end of the year in the consolidated statement of financial position		2,249,341	1,474,367

The above consolidated statements of cash flows should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

December 31, 2017 and 2016

1. General Information

General information about LG Chem, Ltd. (the Parent Company), the controlling company in accordance with Korean IFRS 1110 *Consolidated Financial Statements*, and its subsidiaries (collectively referred to as “the Group”) is as follows:

1.1 The Parent Company

The Parent Company was spun off on April 1, 2001, from LG Chem Investment Ltd. (now LG Corp., formerly LG Chemical Ltd.).

As at December 31, 2017, the Parent Company has its manufacturing facilities in Yeosu, Daesan, Ochang, Cheongju, Ulsan, Naju, Iksan, Paju, Osong, Onsan and Gimcheon.

The Parent Company is authorized to issue 292 million shares of ordinary shares with par value of ₩5,000 per share. As at December 31, 2017, the Parent Company has issued 70,592,343 ordinary shares (₩352,962 million) and 7,688,800 preferred shares (₩38,444 million). The largest shareholder of the Parent Company is LG Corp., which owns 33.34% of the Parent Company's ordinary shares. Preferred shareholders have no voting rights but are entitled to receive dividends at a rate 1% more than those paid to ordinary shareholders.

1.2 Business Overview

The Group is engaged in Basic materials & Chemicals business, Energy solutions, IT & Electronics materials and Advanced materials business, and also engaged in Life Sciences business acquired through a merger with LG Life Sciences, Ltd. in January 2017. In addition, the Parent Company acquired 100% shares of FarmHannong Co.,Ltd., in April 2016, which is engaged to manufacture crop protection products, seeds, fertilizers and others.

The Basic materials & Chemicals business includes production of olefin petrochemicals, such as ethylene, propylene, butadiene from Naphtha, and aromatic petrochemicals such as benzene. It also includes production of synthetic resin and synthetic components from olefin, and aromatic petrochemicals. This business bears characteristics of a large-volume process industry. The Group's major products are PE, PP, BPA, ABS, EP, PVC, plasticizers, acrylic, SAP, synthetic rubber, a special resin, and others.

The Energy solutions business manufactures and supplies batteries ranging from IT & New application batteries for mobile phones and laptop computers, to automotive batteries for electric vehicles and ESS batteries. Demand of small sized batteries for new applications such as electric tools and electric driving devices as well as traditional IT devices is increasing recently and the automotive battery business is also expected to expand rapidly due to an increasing demand of the batteries in associated with enhanced environment regulation in developed countries. Demand for ESS is expanding with an increasing importance of efficient usage of electricity and generation of renewable energy.

The IT & Electronics material business manufactures and supplies various kinds of IT materials such as polarizer, Glass Substrate, OLED film, semiconductor materials and RO membranes, which will be the next growth engine for future. Advanced materials business manufactures and supplies display and battery materials for LCD Photoresist, OLED materials, battery materials and others.

The Life Sciences business manufactures and supplies pharmaceutical products, such as quinolone antibiotics ‘Factive’, human growth hormone ‘Eutropin’, diabetes drug ‘Zemiglo’, bovine somatotropin ‘Boostin’, hyaluronic acid filler ‘YVOIRE’ and others, as well as fine chemical products, such as herbicide for rice farming and others.

LG Chem, Ltd. and Subsidiaries

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FarmHannong Co., Ltd., subsidiary of the Parent Company, manufactures and sells crop protection products, seeds, fertilizers and others. The crop protection business provides high value products such as environmentally-friendly pesticide. The fertilizer business leads developing a next generation fertilizers such as eco-friendly organic and functional fertilizers, and potting soil. The seed business puts priority on retaining various genetic resources and developing rare breeds with high profit in order to remain competitive in a future food industry.

1.3 Consolidated Subsidiaries, Associates and Joint Ventures

	December 31, 2017			
	Percentage of ownership (%)	Business location	Closing month	Business activities
Consolidated subsidiaries				
Ningbo LG Yongxing Chemical Co., Ltd. ¹	75	China	December	ABS/SBL manufacturing and sales
Ningbo Zhenhai LG Yongxing Trade Co., Ltd. ¹	75	China	December	ABS sales
LG Chem HK Ltd.	100	Hong Kong	December	Sales and trading
LG Chem America, Inc.	100	USA	December	Sales and trading
LG Chemical India Pvt. Ltd. ²	100	India	December	Synthetic resin manufacturing and sales
LG Polymers India Pvt. Ltd. ²	100	India	December	PS manufacturing
LG Chemical (Guangzhou) Engineering Plastics Co., Ltd.	100	China	December	EP manufacturing and sales
LG Chem (Nanjing) Information & Electronics Materials Co., Ltd. ³	100	China	December	Battery/ Polarizer Manufacturing and sales
LG Chem (Taiwan), Ltd.	100	Taiwan	December	Polarizer manufacturing and sales
LG Chem Display Materials (Beijing) Co., Ltd.	100	China	December	Polarizer manufacturing
Tianjin LG Bohai Chemical Co., Ltd. ⁴	75	China	December	PVC, VCM, EDC manufacturing and sales
Tianjin LG BOTIAN Chemical Co., Ltd. ⁴	56	China	December	SBS manufacturing and sales
LG Chem (China) Investment Co., Ltd. ⁵	100	China	December	China holding company
LG Chem (Tianjin) Engineering Plastics Co., Ltd.	100	China	December	ABS/EP manufacturing and sales
LG Chem Europe GmbH	100	Germany	December	Sales and trading
LG Chem Poland Sp. z o.o.	100	Poland	December	Polarizer manufacturing
LG Chem Michigan Inc.	100	USA	December	Automotive battery research and manufacturing
LG Chem Power Inc.	100	USA	December	Automotive battery research
LGC Petrochemical India Private Ltd.	100	India	December	Synthetic resin manufacturing and sales
HAENGBOKNURI CO.,LTD.	100	Korea	December	Facility management and general cleaning
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	100	Turkey	December	Sales and trading
LG Chem Japan Co., Ltd.	100	Japan	December	Sales and trading
LG NanoH2O, Inc. ⁶	100	USA	December	Water processing membrane research and manufacturing
NanoH2O (Jiangsu) Water Processing Technology Co. Ltd.	100	China	December	Water processing membrane research and manufacturing
Nanjing LG Chem New Energy Battery Co., Ltd. ⁷	50	China	December	Automotive battery manufacturing and sales
LG Chem (Chongqing) Engineering Plastics Co., Ltd.	100	China	December	EP manufacturing and sales
LG Chem Wroclaw Energy sp. z o.o. ⁸	100	Poland	December	Automotive battery research and manufacturing
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	70	China	December	ABS manufacturing and sales
FarmHannong Co.,Ltd. ⁹	100	Korea	December	Agricultural pesticide manufacturing
FarmHwaong Co.,Ltd. ^{9,10}	58	Korea	December	Vegetables and fruit farming
Farm Hannong (Heilongjiang) Chemical Co., Ltd. ⁹	100	China	December	Agricultural pesticide manufacturing

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LG Life Sciences India Pvt. Ltd. ¹¹	100	India	December	Pharmaceutical products sales
LG Life Sciences (Beijing) Co., Ltd. ¹¹	100	China	December	Pharmaceutical products sales
LG Life Sciences (Thailand) Ltd. ¹¹	100	Thailand	December	Pharmaceutical products sales
LG Life Sciences America Inc. ¹¹	100	USA	December	Agricultural pesticide sales
Sarangnuri Ltd. ¹¹	100	Korea	December	Pharmaceutical products packaging
LG Chem Hai Phong Vietnam Co.,Ltd. ¹²	100	Vietnam	December	Polarizer manufacturing and sales
LG Chem Australia Pty Ltd. ¹³	100	Australia	December	ESS sales
Associates				
LG Holdings (HK) Ltd.	26	Hong Kong	December	Sales and trading
TECWIN Co., Ltd.	21	Korea	December	Environment solution and Construction of chemical plant
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA. ¹⁴	100	Brazil	December	Sales and trading
LG Chem Malaysia SDN.BHD. ¹⁴	100	Malaysia	December	Sales and trading
LG Fuel Cell Systems Inc. ¹⁵	26	USA	December	Power fuel cell research
FJ Composite Material Co., Ltd. ¹⁶	33	Japan	May	Heat diffuser research and manufacturing
WUXI CL New Energy Technology Ltd. ¹⁷	30	China	December	ESS manufacturing and sales
LG Life Sciences Poland Ltd. ^{11,14}	100	Poland	December	Pharmaceutical products sales
Joint ventures				
LG VINA Chemical Co., Ltd.	40	Vietnam	December	DOP production and sales
HL Greenpower Co., Ltd.	49	Korea	December	Automotive battery manufacturing and sales
SEETEC Co., Ltd.	50	Korea	December	Plant utility and distribution, research assistance service

¹ As at December 31, 2017, Ningbo LG Yongxing Chemical Co.,Ltd. owns 100% of Ningbo Zhenhai LG Yongxing Trade Co.,Ltd.'s shares.

² As at December 31, 2017, LG Chemical India Pvt. Ltd. owns 100% of LG Polymer India Pvt. Ltd.'s shares.

³ During the year, the Parent Company acquired additional shares of LG Chem (Nanjing) Information & Electronics Materials Co., Ltd. for ₩238,162 million.

⁴ As at December 31, 2017, Tianjin LG Bohai Chemical Co., Ltd. owns 20.30% of Tianjin LG BOTIAN Chemical Co., Ltd.'s shares.

⁵ During the year, the Parent Company acquired additional shares of LG Chem (China) Investment Co., Ltd. for ₩53,441 million.

⁶ During the year, LG NanoH2O, Inc. liquidated NanoH2O Singapore Private Ltd.

⁷ Although the Parent Company owns less than 50% of the voting rights of LG Chem (Nanjing) New Energy Battery Co., Ltd., the Parent Company is considered to have control over the investee as the Parent Company can exercise the majority voting rights in its decision-making process in accordance with the shareholders' agreement. During the year, the Parent Company acquired additional shares of LG Chem (Nanjing) New Energy Battery Co., Ltd., for ₩56,082 million.

⁸ During the year, the Parent Company acquired shares of LG Chem Wroclaw Energy sp.z o.o. for ₩128,107 million.

⁹ As at December 31, 2017, FarmHannong Co., Ltd. owns 100% of Farm Hannong (Heilongjiang) Chemical Co., Ltd., and also holds 57.87% of FarmHwaong Co., Ltd. During the year, FarmHannong Co., Ltd. disposed of a subsidiary, FarmBiotec Co., Ltd. and liquidated Cecel.Co., Ltd. Further, Agrotech Co., Ltd. was merged into FarmHannong Co., Ltd.

¹⁰ As at December 31, 2017, FarmHwaong Co., Ltd.'s assets and liabilities are classified as assets and liabilities held for sale (Note 35).

¹¹ During the year, the Parent Company acquired subsidiaries of LG Life Sciences, Ltd. due to the merger with LG Life Sciences, Ltd.

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Notes to the Consolidated Financial Statements

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¹² LG Chem Hai Phong Vietnam Company Ltd. was established during the year, and the Parent Company newly acquired 100% shares of LG Chem Hai Phong Vietnam Company Ltd. for ₩3,079 million.

¹³ LG Chem Australia Pty Ltd. was established during the year, and the Parent Company newly acquired 100% shares of LG Chem Australia Pty Ltd. for ₩429 million.

¹⁴ Classified as an investment in associate due to its small size.

¹⁵ During the year, the Parent Company acquired additional shares of LG Fuel Cell Systems Inc. for ₩24,527 million.

¹⁶ During the year, the Parent Company newly acquired 33.25% shares of FJ Composite Material Co., Ltd. for ₩3,015 million.

¹⁷ During the year, the Parent Company newly acquired 30% shares of WUXI CL New Energy Technology Ltd. for ₩1,178 million.

1.4 Summarized Financial Information of Subsidiaries, Associates and Joint Ventures

Summarized financial information (before elimination of intercompany transactions and adjustments for differences in accounting policies) of subsidiaries, associates and joint ventures is as follows:

(in millions of Korean won)

	December 31, 2017				
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the year
Subsidiaries					
Ningbo LG Yongxing Chemical Co.,Ltd.	1,007,732	449,049	558,683	2,097,317	232,595
Ningbo Zhenhai LG Yongxing Trade Co.,Ltd.	10,420	6,927	3,493	43,385	890
LG Chem HK Ltd.	96,752	79,690	17,062	487,636	396
LG Chem America, Inc.	191,011	171,566	19,445	781,113	1,920
LG Chemical India Pvt. Ltd.	32,716	5	32,711	-	34
LG Polymers India Pvt. Ltd.	93,999	15,651	78,348	238,797	11,943
LG Chemical (Guangzhou) Engineering Plastics Co.,Ltd.	109,443	44,342	65,101	201,482	2,071
LG Chem (Nanjing) Information & Electronics Materials Co.,Ltd.	2,410,548	1,301,136	1,109,412	2,817,288	102,289
LG Chem (Taiwan), Ltd.	122,310	60,462	61,848	192,555	2,969
LG Chem Display Materials (Beijing) Co.,Ltd.	40,158	14,196	25,962	72,867	1,377
Tianjin LG Bohai Chemical Co.,Ltd.	349,416	255,165	94,251	528,610	48,575
Tianjin LG BOTIAN Chemical Co.,Ltd.	48,438	46,298	2,140	165,257	4,553
LG Chem (China) Investment Co.,Ltd.	324,605	153,146	171,459	60,401	4,688
LG Chem (Tianjin) Engineering Plastics Co.,Ltd.	64,708	19,057	45,651	95,533	98
LG Chem Europe GmbH	231,237	202,012	29,225	528,759	5,674
LG Chem Poland Sp. z o.o.	64,841	30,877	33,964	98,519	2,038
LG Chem Michigan Inc.	232,301	138,085	94,216	223,182	21,011
LG Chem Power Inc.	18,640	6,013	12,627	41,423	1,468
LGC Petrochemical India Private Ltd.	2,502	390	2,112	4,510	478
HAENGBOKNURI CO.,LTD.	2,292	939	1,353	7,075	194
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	6,618	5,113	1,505	24,737	399
LG Chem Japan Co.,Ltd.	3,462	470	2,992	5,604	511
LG NanoH2O, Inc. ¹	10,269	971	9,298	14,360	2,569
NanoH2O (Jiangsu) Water Processing Technology Co. Ltd.	4,103	1,173	2,930	-	(2,022)
Nanjing LG Chem New Energy Battery Co.,Ltd.	478,421	375,998	102,423	244,319	6,252
LG Chem (Chongqing) Engineering Plastics Co.,Ltd.	35,028	5,559	29,469	27,157	(2,734)
LG Chem Wroclaw Energy sp. z o.o.	330,033	202,131	127,902	14,998	(8,394)
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	290,840	208,170	82,670	372,867	15,961

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FarmHannong Co.,Ltd. ¹	1,152,122	621,754	530,368	603,851	8,982
LG Life Sciences India Pvt. Ltd.	7,143	4,923	2,220	12,961	19
LG Life Sciences (Beijing) Co., Ltd.	1,191	20	1,171	851	6
LG Life Sciences (Thailand) Ltd.	10,008	6,595	3,413	21,340	1,909
Sarangnuri Ltd.	227	60	167	275	48
LG Chem Hai Phong Vietnam Company Ltd.	4,480	1,266	3,214	996	217
LG Chem Austrailia Pty Ltd.	559	12	547	162	112

Associates

LG Holdings (HK) Ltd.	249,896	60,681	189,215	23,770	16,467
TECWIN Co., Ltd.	79,106	32,206	46,900	106,404	8,619
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	164	123	41	1,977	67
LG Chem Malaysia SDN.BHD.	252	19	233	558	32
LG Fuel Cell Systems Inc.	48,444	4,701	43,743	2,477	(42,551)
FJ Composite Material Co., Ltd.	7,052	2,858	4,194	881	(481)
WUXI CL New Energy Technology Ltd.	4,521	1,180	3,341	-	(587)
LG Life Sciences Poland Ltd.	124	72	52	139	(17)

Joint ventures

LG VINA Chemical Co., Ltd.	17,539	9,242	8,297	39,349	1,900
HL Greenpower Co., Ltd.	190,881	151,728	39,153	419,696	6,172
SEETEC Co., Ltd.	344,189	43,751	300,438	494,510	14,347

¹ Included its subsidiaries' financial information from an intermediate parent perspective and not applied adjustments of a fair value evaluation due to the business combination in the consolidated financial statements.

(in millions of Korean won)

	December 31, 2016				
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the year
Subsidiaries					
Ningbo LG Yongxing Chemical Co.,Ltd.	676,217	249,084	427,133	1,528,940	77,200
Ningbo Zhenhai LG Yongxing Trade Co.,Ltd.	8,464	5,687	2,777	32,158	677
LG Chem HK Ltd.	108,970	90,142	18,828	493,682	561
LG Chem America, Inc.	176,522	156,627	19,895	639,788	2,559
LG Chemical India Pvt. Ltd.	32,761	6	32,755	-	16
LG Polymers India Pvt. Ltd.	89,187	18,073	71,114	199,043	11,082
LG Chemical (Guangzhou) Engineering Plastics Co.,Ltd.	112,309	45,195	67,114	155,333	5,240
LG Chem (Nanjing) Information & Electronics Materials Co.,Ltd.	2,357,476	1,593,091	764,385	2,316,666	(29,160)
LG Chem (Taiwan), Ltd.	133,777	66,712	67,065	195,361	5,909
LG Chem Display Materials (Beijing) Co.,Ltd.	37,473	9,910	27,563	56,893	1,758
Tianjin LG Bohai Chemical Co.,Ltd.	311,868	262,247	49,621	449,390	(48,051)
Tianjin LG BOTIAN Chemical Co.,Ltd.	54,947	57,176	(2,229)	131,343	7,032
LG Chem (China) Investment Co.,Ltd.	243,675	129,390	114,285	49,394	3,730
LG Chem (Tianjin) Engineering Plastics Co.,Ltd.	65,316	17,080	48,236	96,062	3,645
LG Chem Europe GmbH	177,371	154,464	22,907	429,444	5,025
LG Chem Poland Sp. z o.o.	50,133	20,220	29,913	75,698	2,979
LG Chem Michigan Inc.	245,278	161,224	84,054	195,733	44,920
LG Chem Power Inc.	20,042	7,253	12,789	37,173	10,013
LGC Petrochemical India Private Ltd.	2,153	398	1,755	4,229	484
HAENGBOKNURI CO.,LTD.	1,950	790	1,160	5,965	5
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	4,139	2,757	1,382	21,437	410

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LG Chem Japan Co.,Ltd.	3,115	368	2,747	5,259	502
LG NanoH2O, Inc. ¹	11,318	3,565	7,753	17,713	1,413
NanoH2O (Jiangsu) Water Processing Technology Co. Ltd.	6,463	1,242	5,221	-	(1,110)
Nanjing LG Chem New Energy Battery Co.,Ltd.	298,201	254,678	43,523	100,003	(17,562)
LG Chem (Chongqing) Engineering Plastics Co.,Ltd.	41,390	35,957	5,433	10,302	(2,812)
LG Chem Wroclaw Energy sp. z o.o.	18,009	9,725	8,284	-	(2,059)
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	334,007	262,755	71,252	-	-
FarmHannong Co.,Ltd. ¹	1,129,257	601,749	527,508	325,327	(133,178)

Associates

LG Holdings (HK) Ltd.	379,243	98,434	280,809	51,421	13,671
TECWIN Co., Ltd.	64,015	25,735	38,280	83,975	4,065
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	89	112	(23)	1,801	(23)
LG Chem Malaysia SDN.BHD.	226	17	209	578	47
LG Fuel Cell Systems Inc.	59,468	74,366	(14,898)	2,998	(47,508)

Joint ventures

LG VINA Chemical Co., Ltd.	19,786	10,121	9,665	51,609	2,266
HL Greenpower Co., Ltd.	151,411	116,896	34,515	219,496	723
SEETEC Co., Ltd.	351,603	45,529	306,074	467,225	17,053

¹ Included its subsidiaries' financial information from an intermediate parent perspective and not applied adjustments of a fair value evaluation due to the business combination in the consolidated financial statements.

1.5 Changes in Scope for Consolidation

Subsidiaries newly included in the consolidation for the year ended December 31, 2017, are as follows:

Subsidiary	Reason
LG Life Sciences India Pvt. Ltd.	Business combination
LG Life Sciences (Beijing) Co., Ltd.	Business combination
LG Life Sciences (Thailand) Ltd.	Business combination
LG Life Sciences America Inc.	Business combination
Sarangnuri Ltd.	Business combination
LG Chem Hai Phong Vietnam Company Ltd.	Newly established
LG Chem Australia Pty Ltd.	Newly established

Subsidiaries excluded from the consolidation for the year ended December 31, 2017, are as follows:

Subsidiary	Reason
NanoH2O Singapore Private Ltd.	Liquidated
Cecel.Co., Ltd	Liquidated
Agrotech Co., Ltd.	Merged with FarmHannong Co.,Ltd.
FarmBiotec Co., Ltd.	Disposed interests of subsidiary

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2. Summary of Significant Accounting Policies

The principal accounting policies applied in the preparation of these consolidated financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

2.1 Basis of Preparation

The Group maintains its accounting records in Korean won and prepares statutory financial statements in the Korean language (Hangul) in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS). The accompanying consolidated financial statements have been condensed, restructured and translated into English from the Korean language financial statements.

Certain information attached to the Korean language financial statements, but not required for a fair presentation of the Group's financial position, financial performance or cash flows, is not presented in the accompanying consolidated financial statements.

The consolidated financial statements of the Group have been prepared in accordance with Korean IFRS. These are the standards, subsequent amendments and related interpretations issued by the International Accounting Standards Board (IASB) that have been adopted by the Republic of Korea.

The preparation of financial statements requires the use of critical accounting estimates. Management also needs to exercise judgement in applying the Group's accounting policies. The areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to the consolidated financial statements are disclosed in Note 4.

2.2 Changes in Accounting Policy and Disclosures

(a) New and amended standards adopted by the Group

The Group has applied the following standards and amendments for the first time for their annual reporting period commencing January 1, 2017. The adoption of these amendments did not have any material impacts on the financial statements.

- Amendments to Korean IFRS 1007 *Statement of Cash Flows*
- Amendments to Korean IFRS 1012 *Income Tax*
- Amendments to Korean IFRS 1112 *Disclosures of Interests in Other Entities*

(b) New standards and interpretations not yet adopted by the Group

Certain new accounting standards and interpretations that have been published that are not mandatory for annual reporting period commencing January 1, 2017 and have not been early adopted by the Group are set out below.

- Korean IFRS 1109 *Financial Instruments*

The new standard for financial instruments issued on September 25, 2015 is effective for annual periods beginning on or after January 1, 2018 with early application permitted. This standard will replace Korean IFRS 1039 Financial Instruments: Recognition and Measurement. The Group will apply the standards for annual periods beginning on or after January 1, 2018.

The standard requires retrospective application with some exceptions. For example, an entity is

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not required to restate prior period in relation to classification and measurement (including impairment) of financial instruments. The standard requires prospective application of its hedge accounting requirements for all hedging relationships except the accounting for time value of options and other exceptions.

Korean IFRS 1109 Financial Instruments requires three main areas including: (a) classification and measurement of financial assets on the basis of the entity's business model for managing financial assets and the contractual cash flow characteristics of the financial assets, (b) a new impairment model of financial instruments based on the expected credit losses, and (c) hedge accounting including expansion of the range of eligible hedging instruments and hedged items that qualify for hedge accounting or change of a method of hedge effectiveness assessment.

An effective implementation of Korean IFRS 1109 requires preparation processes including financial impact assessment, accounting policy establishment, accounting system development and the system stabilization. The impact on the Group's financial statements due to the application of the standard is dependent on judgements made in applying the standard, financial instruments held by the Group and macroeconomic variables.

With the implementation of Korean IFRS 1109 the Group preparing for updates of internal management process and accounting systems related to financial instruments reporting. Also, the Group is analyzing the financial effects of applying the standard. The Group does not expect the amendments to have a significant impact on the financial statements.

- Korean IFRS 1115 *Revenue from Contracts with Customers*

The Company will apply Korean IFRS 1115 *Revenue from Contracts with Customers* issued on November 6, 2015 for annual reporting periods beginning on or after January 1, 2018. Earlier adoption is permitted under Korean IFRS. This standard replaces Korean IFRS 1018 *Revenue*, Korean IFRS 1011 *Construction Contracts*, Interpretation 2031 *Revenue-Barter Transactions Involving Advertising Services*, Interpretation 2113 *Customer Loyalty Programs*, Interpretation 2115 *Agreements for the Construction of Real Estate* and Interpretation 2118 *Transfers of assets from customers*. The Company must apply Korean IFRS 1115 *Revenue from Contracts with Customers* within annual reporting periods beginning on or after January 1, 2018, and will elect the modified retrospective approach which will recognize the cumulative impact of initially applying the revenue standard as an adjustment to retained earnings as at January 1 2018, the period of initial application.

Korean IFRS 1018 and other current revenue standards identify revenue as income that arises in the course of ordinary activities of an entity and provides guidance on a variety of different types of revenue, such as, sale of goods, rendering of services, interest, dividends, royalties and construction contracts. However, the new standard is based on the principle that revenue is recognized when control of a good or service transfers to a customer so the notion of control replaces the existing notion of risks and rewards. A new five-step process must be applied before revenue from contract with customers can be recognized:

- Identify contracts with customers
- Identify the separate performance obligation
- Determine the transaction price of the contract
- Allocate the transaction price to each of the separate performance obligations, and
- Recognize the revenue as each performance obligation is satisfied.

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As at December 31, 2017, the Group is preparing for updates of internal management process and accounting system in relation to implementation of Korean IFRS 1115. The Group does not expect the amendments to have a significant impact on the financial statements.

- Amendments to Korean IFRS 1028 *Investments in Associates and Joint Ventures*
- Amendment to Korean IFRS 1040 *Transfers of Investment Property*
- Amendments to Korean IFRS 1102 *Share-based Payment*
- Enactment of Korean IFRS 1116 *Leases*
- Enactments to Interpretation 2122 *Foreign Currency Transaction and Advance Consideration*

2.3 Consolidation

The Group has prepared the consolidated financial statements in accordance with Korean IFRS 1110 *Consolidated Financial Statements*.

(1) Subsidiaries

Subsidiaries are all entities over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power to direct the activities of the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Group. They are deconsolidated from the date that control ceases.

The acquisition method of accounting is used to account for business combinations by the Group. The consideration transferred is measured at the fair values of the assets transferred, and identifiable assets acquired and liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date. The Group recognizes any non-controlling interest in the acquired entity on an acquisition-by-acquisition basis either at fair value or at the non-controlling interest's proportionate share of the acquired entity's net identifiable assets. All other non-controlling interests are measured at fair values, unless otherwise required by other standards. Acquisition-related costs are expensed as incurred.

The excess of consideration transferred, amount of any non-controlling interest in the acquired entity and acquisition-date fair value of any previous equity interest in the acquired entity over the fair value of the net identifiable assets acquired is recorded as goodwill. If those amounts are less than the fair value of the net identifiable assets of the business acquired, the difference is recognized directly in the profit or loss as a bargain purchase.

Intercompany transactions, balances and unrealized gains on transactions between group companies are eliminated. Unrealized losses are also eliminated unless the transaction provides evidence of an impairment of the transferred asset. Accounting policies of subsidiaries have been changed where necessary to ensure consistency with the policies adopted by the Group.

(2) Associates

Associates are entities over which the Group has significant influence but not control or joint control. Investments in associates are accounted for using the equity method of accounting, after initially being recognized at cost. Unrealized gains on transactions between the Group and its associates are eliminated to the extent of the Group's interest in the associates. If there is objective evidence of impairment for the investment in the associate, the Group recognizes the difference between the recoverable amount of the associate and its carrying amount as impairment loss.

(3) Joint Arrangements

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A joint arrangement, wherein two or more parties have joint control, is classified as either a joint operation or a joint venture. A joint operator recognizes its direct right to the assets, liabilities, revenues and expenses of joint operations and its share of any jointly held or incurred assets, liabilities, revenues and expenses. Interests in joint ventures are accounted for using the equity method, after initially being recognized at cost in the consolidated statement of financial position.

2.4 Segment Reporting

Information of each operating segment is reported in a manner consistent with the business segment reporting provided to the chief operating decision-maker (Note 33). The chief operating decision-maker, who is responsible for allocating resources and assessing performance of the operating segments, has been identified as the Corporate Management Committee that makes strategic decisions.

2.5 Foreign Currency Translation

(1) Functional and presentation currency

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which each entity operates (the "functional currency"). The consolidated financial statements are presented in Korean won, which is the Parent Company's functional and presentation currency.

(2) Transactions and balances

Foreign currency transactions are translated into the functional currency using the exchange rates at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies at year end exchange rates are generally recognized in profit or loss.

Non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined. Translation differences on assets and liabilities carried at fair value are reported as part of the fair value gain or loss. For example, translation differences on non-monetary assets and liabilities such as equities held at fair value through profit or loss are recognized in profit or loss as part of the fair value gain or loss and translation differences on non-monetary assets such as equities classified as available-for-sale financial assets are recognized in other comprehensive income.

(3) Translation into the presentation currency

The results and financial position of foreign operations that have a functional currency different from the presentation currency are translated into the presentation currency as follows:

- i) assets and liabilities for each statement of financial position presented are translated at the closing rate at the end of the reporting period;
- ii) income and expenses for each statement of income are translated at monthly average exchange rates; and
- iii) equity is translated at the historical exchange rate; and
- iv) all resulting exchange differences are recognized in other comprehensive income.

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2.6 Cash and Cash Equivalents

Cash and cash equivalents include cash in hand, deposits held at call with banks, other short-term highly liquid investments with original maturities of three months or less.

2.7 Financial Assets

(a) Classification and measurement

The Group classifies its financial assets into the following categories: financial assets at fair value through profit or loss, available-for-sale financial assets, loans and receivables, and held-to-maturity financial assets. Regular way purchases and sales of financial assets are recognized on trade-date, the date on which the Group commits to purchase or sell the asset.

At initial recognition, the Group measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed in profit or loss. Available-for-sale financial assets and financial assets at fair value through profit or loss are subsequently carried at fair value. And, loans and receivables and held-to-maturity investments are subsequently carried at amortized cost using the effective interest method.

Gains or losses arising from changes in the fair value of financial assets at fair value through profit or loss are recognized in profit or loss within other income or other expenses. Gains or losses arising from changes in the available-for-sale financial assets are recognized in other comprehensive income, and amounts are reclassified to profit or loss when the associated assets are sold or impaired.

(b) Impairment

The Group assesses at the end of each reporting period whether there is objective evidence that a financial asset or a group of financial assets is impaired. A financial asset or a group of financial assets is impaired and impairment losses are incurred only if there is objective evidence of impairment as a result of one or more events that occurred after the initial recognition of the asset (a 'loss event') and that loss event (or events) has an impact on the estimated future cash flows of the financial asset or a group of financial assets that can be reliably estimated.

Impairment of loans and receivables is presented as a deduction in an allowance account, and that of other financial assets is directly deducted from their carrying amount. The Group writes off financial assets when the assets are determined to be no longer recoverable.

The Group considers that there is objective evidence of impairment if significant financial difficulties of the debtor, or delinquency in interest or principal payments for more than three months is indicated. Moreover, in the case of equity investments classified as available-for-sale, a significant decline in the fair value of the security below its cost significantly or prolonged decline is considered an objective evidence of impairment.

(c) Derecognition

If a transfer does not result in derecognition because the Group has retained substantially all the

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risks and rewards of ownership of the transferred asset, the Group continues to recognize the transferred asset in its entirety and recognizes a financial liability for the consideration received. The Group classified the financial liability as 'borrowings' in the statement of financial position (Note 14).

2.8 Derivative Financial Instruments

Derivatives are initially recognized at fair value on the date when a derivative contract is entered into and are subsequently re-measured at their fair value at the end of each reporting period. Changes in the fair value of any derivative instrument that does not qualify for hedge accounting are recognized immediately in profit or loss within 'other non-operating income (expenses)' or 'finance income (costs)' based on the nature of transactions.

2.9 Inventories

Inventories are stated at the lower of cost and net realizable value. Cost is determined using weighted average cost method, except for goods in transit which is determined using the specific identification method.

2.10 Biological Assets

Biological assets are measured at its fair value less estimated costs to sell and a change in fair value less estimated costs to sell of biological assets is included in profit or loss for the year in which it arises.

2.11 Assets Held for sale

Assets are classified as held for sale when their carrying amount will be recovered principally through a sale transaction rather than through continuing use and a sale is considered highly probable. The assets are measured at the lower amount between their carrying amount and the fair value less costs to sell.

2.12 Property, Plant and Equipment

Property, plant and equipment are stated at historical cost less accumulated depreciation and accumulated impairment losses. Historical cost includes expenditure that is directly attributable to the acquisition of the items.

Depreciation of all property, plant and equipment, except for land, is calculated using the straight-line method to allocate their cost or revalued amounts, net of their residual values, over their estimated useful lives as follows:

	Useful lives
Buildings	25 - 50 years
Structures	5 - 50 years
Machinery	4 - 19 years
Others	1 - 6 years

The assets' depreciation method, residual values and useful lives are reviewed, and adjusted if appropriate, at the end of each reporting period.

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2.13 Investment Property

Investment property is property held to earn rentals or for capital appreciation or both. An investment property is measured initially at its cost. An investment property is measured after initial measurement at depreciated cost (less any accumulated impairment losses). The Group depreciates investment properties, except for land, using the straight-line method over their useful lives of 25 ~ 50 years.

2.14 Borrowing Costs

General and specific borrowing costs that are directly attributable to the acquisition, construction or production of a qualifying asset are capitalized during the period of time that is required to complete and prepare the asset for its intended use or sale. Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying assets is deducted from the borrowing costs eligible for capitalization. Other borrowing costs are expensed in the period in which they are incurred.

2.15 Government Grants

Grants from the government are recognized at their fair value where there is a reasonable assurance that the grant will be received and the Group will comply with all attached conditions. Government grants related to assets are presented in the statement of financial position by deducting the grant in arriving at the carrying amount of the asset, and government grants related to income are deferred and later deducted from the related expense.

2.16 Intangible Assets

The excess of consideration transferred and amount of acquisition-date fair value of any previous equity interest in the acquired entity over the fair value of the net identifiable assets acquired is recorded as goodwill. Goodwill is carried at its cost less accumulated impairment losses. Impairment losses on goodwill are not reversed.

Intangible assets, except for goodwill, are initially recognized at its historical cost and carried at its cost less accumulated amortization and accumulated impairment losses.

Development costs that are directly attributable to internally generated by the Group are recognized when the criteria; such as, technically feasible, generate probable future economic benefits and other, are met. Membership rights that have an indefinite useful life are not subject to amortization because there is no foreseeable limit to the period over which the assets are expected to be utilized. The Group amortizes intangible assets with a limited useful life using the straight-line method over the following periods:

	Useful lives
Development costs	3 - 15 years
Industrial property rights	5 - 15 years
Others	6 - 20 years

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2.17 Research and Development

Costs associated with research are recognized as an expense as incurred. Costs that are identifiable, controllable and directly attributable to development projects are recognized as intangible asset when the following criteria are met:

- It is technically feasible to complete the development project so that it will be available for use;
- Management intends to complete the development project for its own use or selling;
- There is an ability to use or sell the development project;
- It can be demonstrated how the development project will generate probable future economic benefits;
- Adequate technical, financial resources and other resources to complete the development and to use or sell the development project are available; and
- The expenditure attributable to the development project during its development can be reliably measured.

Generally, internally generated development projects have the following stages; formulation and selection of a project, verification of idea and technology, development and testing, decision of commercialization, test of final application. Expenditures can be capitalized as intangible assets only after the decision of commercialization. Expenditures incurred in other stages are recognized as expenses on the research phase.

Internally generated development projects in the Life Sciences business have the following stages; formulation of potential candidates, preclinical research, clinical researches such as phase 1, 2 and 3 trials, approval of regulatory body and new product launch. Expenditures incurred from new drug development project are recognized as expensed on the research phase. However, expenditures incurred during clinical phase 1~3 trials from development projects for generic drugs or biosimilars are recognized as intangible assets depending on the nature of the products.

Expenditures incurred from technology license agreement with the third parties are recognized as intangible assets.

Development costs previously recognized as an expense are not recognized as an asset in a subsequent period. Capitalized development costs that are recognized as intangible assets are amortized using the straight-line method over their estimated useful lives when the assets are available for use and are tested for impairment.

2.18 Impairment of Non-financial Assets

Goodwill and intangible assets that have an indefinite useful life are not subject to amortization and are tested annually for impairment, or more frequently if events or changes in circumstances indicate that they might be impaired. Other assets are tested for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognized for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. Non-financial assets other than goodwill that suffered an impairment are reviewed for possible reversal of the impairment at the end of each reporting period.

2.19 Financial Liabilities

(a) Classification and measurement

The Group's financial liabilities at fair value through profit or loss are financial instruments held for trading. A financial liability is held for trading if it is incurred principally for the purpose of

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repurchasing in the near term. A derivative that is not a designated as hedging instruments and an embedded derivative that is separated are also classified as held for trading.

The Group classifies non-derivative financial liabilities, except for financial liabilities at fair value through profit or loss, financial guarantee contracts and financial liabilities that arise when a transfer of financial assets does not qualify for derecognition, as financial liabilities carried at amortized cost and present as 'trade payables', 'borrowings', and 'other payables' in the statement of financial position.

(b) Derecognition

Financial liabilities are removed from the statement of financial position when it is extinguished; for example, when the obligation specified in the contract is discharged or cancelled or expired or when the terms of an existing financial liability are substantially modified.

2.20 Current and Deferred Tax

The tax expense for the year consists of current and deferred tax. Current and deferred tax is recognized in profit or loss, except to the extent that it relates to items recognized in other comprehensive income or directly in equity. In this case, the tax is also recognized in other comprehensive income or directly in equity, respectively. The tax expense is measured at the amount expected to be paid to the taxation authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Deferred income tax is provided in full, using the liability method, on temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the consolidated financial statements. However, deferred income tax is not accounted for if it arises from initial recognition of an asset or liability in a transaction other than a business combination that at the time of the transaction affects neither accounting nor taxable profit or loss.

Deferred tax assets are recognized only if it is probable that future taxable amounts will be available to utilize those temporary differences and losses.

The Group recognizes a deferred tax liability all taxable temporary differences associated with investments in subsidiaries, associates, and interests in joint arrangements, except to the extent that the Group is able to control the timing of the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. In addition, The Group recognizes a deferred tax asset for all deductible temporary differences arising from such investments to the extent that it is probable the temporary difference will reverse in the foreseeable future and taxable profit will be available against which the temporary difference can be utilized.

Deferred tax assets and liabilities are offset when there is a legally enforceable right to offset current tax assets and liabilities and when the deferred tax balances relate to the same taxation authority. Current tax assets and tax liabilities are offset where the entity has a legally enforceable right to offset and intends either to settle on a net basis.

2.21 Provisions

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation and the increase in the provision due to passage of time is recognized as interest expense.

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2.22 Greenhouse Gas Emissions Permits and Obligations

With enforcement of *The Act on the Allocation and Trading of Greenhouse Gas Emission Permits*, the permits that are received free of charge from the government are measured at zero while permits purchased are measured at acquisition cost and stated net of accumulated impairment loss. Emissions obligations are measured as the sum of the carrying amount of the allocated permits that will be submitted to the government and the best estimate of expenditure required to settle the obligation at the end of reporting period for any excess emission. The permits and emissions obligations are classified as intangible assets and provisions, respectively, in the consolidated statement of financial position.

2.23 Employee Benefits

(a) Post-employment benefits

The Group operates both defined contribution and defined benefit pension plans. For defined contribution plans, the Group pays contribution to publicly or privately administered pension insurance plans on mandatory, contractual or voluntary basis. The Group has no further payment obligation once the contribution have been paid. The contribution are recognized as employee benefit expense when they are due.

A defined benefit plan is a pension plan that is not a defined contribution plan. Generally, post-employment benefits are payable after the completion of employment, and the benefit amount depended on the employee's age, periods of service or salary levels. The liability recognized in the statement of financial position in respect of defined benefit pension plans is the present value of the defined benefit obligation at the end of the reporting period less the fair value of plan assets. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds that are denominated in the currency in which the benefits will be paid, and that have terms approximating to the terms of the related obligation. Remeasurement gains and losses arising from experience adjustments and changes in actuarial assumptions are recognized in the period in which they occur, directly in other comprehensive income.

Changes in the present value of the defined benefit obligation resulting from plan amendments or curtailments are recognized immediately in profit or loss as past service costs.

(b) Other long-term employee benefits

Certain entities within the Group provide long-term employee benefits that are entitled to employees with service period for ten years and above. The expected costs of these benefits are accrued over the period of employment using the same accounting methodology as used for defined benefit pension plans. The Group recognizes service cost, net interest on other long-term employee benefits and remeasurements as profit or loss for the years. These liabilities are valued annually by an independent qualified actuary.

2.24 Revenue Recognition

Revenue is measured at the fair value of the consideration received or receivable for the sale of goods or rendering of services arising from the normal course of the business. Amounts disclosed as revenue are net of value added taxes, returns, rebates and discounts and after elimination of inter-company transactions.

The Group recognizes revenue when the amount of revenue can be reliably measured, it is

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probable that future economic benefits will flow to the Group and when specific criteria have been met for each of the Group's activities as described below. The Group bases its estimate on historical results, taking into consideration the type of customer, the type of transaction and the specifics of each arrangement.

(a) Sales of goods

Sales of goods are recognized upon delivery of products to customers. The Group recognizes provisions for product warranties and sales returns based on reasonable expectation reflecting warranty obligation and sales return rates incurred historically.

(b) Interest income

Interest income is recognized using the effective interest method according to the time passed. When a loan and receivable is impaired, the Group reduces the carrying amount to its recoverable amount and continues unwinding the discount as interest income. Interest income on impaired loans and receivables is recognized using the original effective interest rate.

(c) Dividend income

Dividend income is recognized when the right to receive payment is established.

(d) Royalty income

Royalty income is recognized on an accrual basis in accordance with the substance of the relevant agreements.

2.25 Lease

A lease is an agreement, whereby the lessor conveys to the lessee, in return for a payment or series of payments, the right to use an asset for an agreed period of time. Leases in which a significant portion of the risks and rewards of ownership are not transferred to the Group are classified as operating leases. Payments made under operating leases are charge to profit or loss on a straight-line basis over the period of lease.

Leases where the Group, as lessee, has substantially all the risks and rewards of ownership are classified as finance leases. Finance leases are capitalized at the lease's inception at the fair value of the leased property or, if lower, the present value of the minimum lease payments. The corresponding rental obligations, net of finance charges, are included in other short-term and long-term payables. Each lease payment is allocated between the liability and finance cost.

If the Group is a lessor, a lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership at the inception of the lease. A lease other than a finance lease is classified as an operating lease. Lease income from operating leases is recognized in income on a straight-line basis over the lease term. Initial direct costs incurred by the lessor in negotiating and arranging an operating lease is added to the carrying amount of the leased asset and recognized as an expense over the lease term on the same basis as the lease income.

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3. Financial Risk Management

3.1 Financial Risk Factors

The Group's activities expose it to a variety of financial risks: market risk, credit risk and liquidity risk. The Group's overall risk management program focuses on the unpredictability of financial markets and seeks to minimize potential adverse effects on the financial performance of the Group. The Group uses derivative financial instruments to hedge certain risk exposures.

Risk management is carried out by the Group's finance team under policies approved by the Corporate Management Committee. The finance team identifies, evaluates and hedges financial risks in close co-operation with the Group's operating units. The Corporate Management Committee reviews and approves written principles for overall risk management, as well as written policies covering specific areas, such as foreign exchange risk, interest rate risk, and credit risk, use of derivative financial instruments and non-derivative financial instruments, investment of excess liquidity.

(1) Market risk

1) Foreign exchange risk

The Group operates internationally and is exposed to foreign exchange risk arising from foreign currency exposures, primarily with respect to the US dollar. Foreign exchange risk arises from future commercial transactions, recognized assets and liabilities.

Management has set up a policy to require group companies to manage their foreign exchange risk against their functional currency. The Group manages maximum loss for currency risk exposures within acceptable range by using currency risk management model and hires employees who are exclusively responsible for currency risk management.

The Group has certain investments in foreign operations, whose net assets are exposed to foreign currency translation risk. Currency exposure arising from the net assets of the Group's foreign operations is managed primarily through borrowings denominated in the relevant foreign currencies.

As at December 31, 2017 and 2016, the Group's monetary assets and liabilities denominated in currencies other than its functional currency, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017		December 31, 2016	
	Assets	Liabilities	Assets	Liabilities
USD	2,337,448	1,561,175	1,667,146	2,263,717
EUR	174,464	21,226	78,532	90,506
JPY	36,304	109,162	29,169	113,351
CNY and others	60,616	1,512	33,534	2,187

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As at December 31, 2017 and 2016, if the Group's functional currency had weakened / strengthened by 10% against the US dollar with all other variables held constant, profit before income tax would have been affected as follows:

<i>(in millions of Korean won)</i>	December 31, 2017		December 31, 2016	
	10% Increase	10% Decrease	10% Increase	10% Decrease
USD	77,627	(77,627)	(59,657)	59,657

The above sensitivity analysis has been performed for monetary assets and liabilities denominated in foreign currencies other than the Group's functional currency at the reporting date.

2) Price risk

The Group is exposed to equity securities price risk arises from investments held by the Group and classified in the separate statement of financial position either as available-for-sale or at fair value through profit or loss. The Group's equity investments are publicly traded and are related to the KOSPI index.

The table below summarizes the impact of increases/decreases of the listed stock price index on the Group's equity before tax effects as at December 31, 2017 and 2016. The analysis is based on the assumption that the equity index has increased/decreased by 10% with all other variables held constant, and that all the Group's equity instruments moved in line with the index.

<i>(in millions of Korean won)</i>	December 31, 2017		December 31, 2016	
	10% Increase	10% Decrease	10% Increase	10% Decrease
KOSPI	553	(553)	1,134	(1,134)

3) Interest rate risk

Interest rate risk is defined as the risk that the interest income or expenses arising from deposits and borrowings will fluctuate because of changes in future market interest rate. The interest rate risk mainly arises through floating rate deposits and borrowings. The objective of interest rate risk management lies in maximizing corporate value by minimizing uncertainty in interest rates fluctuations and net interest expense.

The Group adequately minimizes risks from interest rate fluctuations through various policies, such as sharing excess cash within the Group (internal cash sharing) to minimize external borrowings, avoiding high rate borrowings, reforming capital structure, managing an appropriate ratio of fixed rate borrowings and floating rate borrowings, monitoring a fluctuation of domestic and foreign interest rates daily, weekly and monthly, establishing alternatives, and balancing floating rate short-term borrowings with floating rate deposits.

The table below summarizes the impact of increases/decreases of interest rate on the Group's equity and post-tax profit for the year. The analysis is based on the assumption that the interest rate has increased/decreased by 1% (100 basis points) with all other variables held constant.

<i>(in millions of Korean won)</i>	Impact on post-tax profit		Impact on equity	
	2017	2016	2017	2016
Increase	(13,017)	(17,451)	(13,017)	(17,451)
Decrease	13,017	17,451	13,017	17,451

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(2) Credit risk

Credit risk is managed on the Group basis. Credit risk arises from cash and cash equivalents, derivative financial instruments and deposits with banks and financial institutions, as well as credit exposures to customers, including outstanding receivables and committed transactions.

The maximum exposure to credit risk as at December 31, 2017 and 2016, is as follows:

(in millions of Korean won)

	December 31, 2017		
	Amount before provision	Provision for impairment	Book amount (maximum exposure)
Loans and receivables (excluding cash on hand)	7,603,679	(8,511)	7,595,168
Total	7,603,679	(8,511)	7,595,168

(in millions of Korean won)

	December 31, 2016		
	Amount before provision	Provision for impairment	Book amount (maximum exposure)
Loans and receivables (excluding cash on hand)	6,233,784	(13,594)	6,220,190
Total	6,233,784	(13,594)	6,220,190

The Group has established the following policies and procedures to manage credit risks.

To manage credit risks relating to trade receivables, the Group evaluates the credit rating of customers and determines credit limit for each customer based on the information provided by credit rating agencies and other available financial information before commencing business with customers. The credit risks relating to trade receivables are also mitigated by insurance contracts, collateral as well as payment guarantees.

The Group has entered into export insurance contracts with Korea Trade Insurance Corporation to mitigate credit risks relating to export trade receivables to overseas customers. The Group is also provided with collateral by customers depending on their credit rating or payment guarantees from the customers' financial institutions as necessary.

The Group has deposited its cash and cash equivalents, and other long-term deposits in several financial institutions, such as Woori Bank and others. The Group maintains business relationship with those financial institutions with high credit ratings evaluated by independent credit rating agencies and accordingly, credit risks associated with these financial institutions are limited.

(3) Liquidity risk

Finance team of the Group monitors rolling forecasts of the Group's liquidity requirements to ensure it has sufficient cash to meet operational needs while maintaining sufficient headroom on its undrawn committed borrowing facilities at all times so that the Group does not breach borrowing limits or covenants (where applicable) on any of its borrowing facilities. The Group's liquidity management policy involves projecting cash flows in major currencies and considering the level of liquid assets necessary to meet these, monitoring balance sheet liquidity ratios against internal and external regulatory requirements and maintaining debt financing plans.

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- 1) The table below analyzes the Group's non-derivative financial liabilities into relevant maturity groupings based on the remaining period at the reporting period to the contractual maturity date. Cash flows presented below are gross cash flows before discount, and includes cash flows for interests.

(in millions of Korean won)

	December 31, 2017			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Borrowings (excluding financial lease liabilities)	1,472,881	333,734	1,076,000	327,225
Finance lease liabilities	5,253	5,177	15,532	10,532
Trade and other payables	3,862,001	6,927	1,576	142
Total	5,340,135	345,838	1,093,108	337,899

(in millions of Korean won)

	December 31, 2016			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Borrowings (excluding financial lease liabilities)	2,239,782	373,198	258,839	84,402
Finance lease liabilities	5,000	5,000	15,000	15,000
Trade and other payables	2,694,857	12,307	1,784	216
Total	4,939,639	390,505	275,623	99,618

- 2) The Group has no derivatives contracts as at December 31, 2017 and 2016.
- 3) The Group has no financial guarantee contracts provided for third parties as at December 31, 2017 and 2016.

3.2 Capital Risk Management

The Group's objectives when managing capital are to safeguard the Group's ability to continue as a going concern, so the Group can continue to provide returns for shareholders and benefits for other stakeholders, and to maintain an optimal capital structure to reduce the cost of capital.

Consistent with others in the industry, the Group monitors capital on the basis of the gearing ratio. This ratio is calculated as net debt divided by total capital. Net debt is calculated as total borrowings less cash and cash equivalents. Total capital is calculated as 'equity' as shown in the consolidated statement of financial position plus net debt.

The gearing ratio and debt-to-equity ratio as at December 31, 2017 and 2016, were as follows:

(in millions of Korean won, except for ratios)

	December 31, 2017	December 31, 2016
Total borrowings (Note 14) (A)	3,044,949	2,890,641
Less: cash and cash equivalents (B)	(2,249,341)	(1,474,367)
Net debt (C=A+B)	795,608	1,416,274
Total liabilities (D)	8,702,644	6,436,093
Total equity (E)	16,338,577	14,050,967
Total capital (F=C+E)	17,134,185	15,467,241
Gearing ratio (C/F)	4.6%	9.2%
Debt-to-equity ratio (D/E)	53.3%	45.8%

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3.3 Fair Value

(1) Carrying amount and fair value of financial instruments by category as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	December 31, 2017		December 31, 2016	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets (current)				
Cash and cash equivalents	2,249,341	1	1,474,367	1
Deposits held by financial institutions	529,701	1	732,871	1
Trade receivables	4,448,669	1	3,533,699	1
Other receivables (excluding deposits held by financial institutions)	241,075	1	246,156	1
Financial assets (non-current)				
Deposits held by financial institutions	64,308	1	64,485	1
Other receivables (excluding deposits held by financial institutions)	62,121	1	168,667	1
Other non-current financial assets (carried at cost)	17,718	2	11,829	2
Other non-current financial assets (carried at fair value)	6,064	6,064	11,619	11,619
Financial liabilities (current)				
Trade and other payables	3,862,001	1	2,694,857	1
Current borrowings (excluding finance lease liabilities)	1,446,187	1	2,207,755	1
Current finance lease liabilities	5,137	1	4,886	1
Other current liabilities (dividends payable)	-	1	12	1
Financial liabilities (non-current)				
Non-current borrowings (excluding finance lease liabilities)	1,566,258	1,560,147	647,728	1
Non-current finance lease liabilities	27,367	28,776	30,272	31,411
Other non-current payables	8,646	1	14,307	1

¹ These financial assets and liabilities are not included in the disclosure above as their carrying amount is a reasonable approximation of the fair value.

² All other non-current financial assets of the Group consist of available-for-sale equity securities. Certain equity securities are measured at cost (2017: ₩17,718 million, 2016: ₩11,829 million) as the range of reasonable fair value estimates is significant and the probabilities of the various estimates cannot be reasonably assessed. These are not included in the disclosure above (Note 8). The Group does not have any plans to dispose of these available-for-sale equity securities in the near future.

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(2) Fair value for measurement and disclosure are determined based on the following method:

Fair values of financial liabilities(non-current) are based on cash outflows discounted using Korean won currency note yield in the same credit grade with the Parent Company (AA+), and the applied discount rates as at December 31, 2017 and 2016, are as follows:

<i>(in percentage)</i>	December 31, 2017	December 31, 2016
Discount rate	1.95%~2.90%	1.63%~2.57%

(3) Fair value hierarchy

Items that are measured at fair value or for which the fair value is disclosed are categorized by the fair value hierarchy levels, and the defined levels are as follows:

- Quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1).
- Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (that is, prices) or indirectly (that is, derived from prices) (Level 2).
- Inputs for the asset or liability that are not based on observable market data (that is, unobservable inputs) (Level 3).

Fair value hierarchy classifications of the financial instruments that are measured at fair value or its fair value is disclosed as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (carried at fair value)	6,064	-	-	6,064
Financial assets/liabilities not measured at fair value				
Non-current borrowings (excluding finance lease liabilities)	-	1,560,147	-	1,560,147
Non-current finance lease liabilities	-	28,776	-	28,776

<i>(in millions of Korean won)</i>	December 31, 2016			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (carried at fair value)	11,619	-	-	11,619
Financial assets/liabilities not measured at fair value				
Non-current finance lease liabilities	-	31,411	-	31,411

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4. Critical Accounting Estimates and Assumptions

The preparation of financial statements requires the Group makes estimates and assumptions concerning the future. The estimates and judgements are continuously evaluated with consideration to factors such as events reasonably predictable in the foreseeable future within the present circumstance according to historical experience. The resulting accounting estimates will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are addressed below.

(1) Estimated impairment of goodwill

The Group tests whether goodwill has suffered any impairment on an annual basis. The recoverable amount of a cash generating unit (CGU) is determined based on value-in-use calculations (Note 12).

(2) Income taxes

The Company recorded, based on its best estimate, current taxes and deferred taxes that the Company will be liable in the future for the operating results as at the financial year end. However, the final tax outcome in the future may be different from the amounts that were initially recorded. Such differences will impact the current and deferred tax assets and liabilities in the period in which such determination is made (Note 28).

If certain portion of the taxable income is not used for investments or increase in wages or dividends in accordance with the *Tax System For Recirculation of Corporate Income*, the Group is liable to pay additional income tax calculated based on the tax laws. The new tax system is effective for three years from 2015. Accordingly, the measurement of current and deferred income tax is affected by the tax effects from the new tax system. As the Group's income tax is dependent on the investments, increase in wages and dividends, there is an uncertainty measuring the final tax effects.

(3) Provisions

The Group recognizes provisions for product warranties and estimated returns as explained in Note 15. These provisions are estimated based on past experience.

(4) Net defined benefit liability

The present value of net defined benefit liability depends on a number of factors that are determined on an actuarial basis using a number of assumptions including the discount rate (Note 16).

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5. Financial Instruments by Category

Categorizations of financial instruments as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

Financial assets	December 31, 2017			
	Loans and receivables	Financial assets at fair value through profit or loss	Available-for-sale financial assets	Total
Cash and cash equivalents	2,249,341	-	-	2,249,341
Trade receivables	4,448,669	-	-	4,448,669
Other receivables	770,776	-	-	770,776
Other non-current receivables	126,429	-	-	126,429
Other non-current financial assets	-	-	23,782	23,782
Total	7,595,215	-	23,782	7,618,997

(in millions of Korean won)

Financial liabilities	December 31, 2017			
	Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Other financial liabilities ¹	Total
Trade payables	-	2,014,779	-	2,014,779
Other payables	-	1,847,222	-	1,847,222
Borrowings (current)	-	1,443,683	7,641	1,451,324
Other non-current payables	-	8,646	-	8,646
Borrowings (non-current)	-	1,566,258	27,367	1,593,625
Total	-	6,880,588	35,008	6,915,596

(in millions of Korean won)

Financial assets	December 31, 2016			
	Loans and receivables	Financial assets at fair value through profit or loss	Available-for-sale financial assets	Total
Cash and cash equivalents	1,474,367	-	-	1,474,367
Trade receivables	3,533,699	-	-	3,533,699
Other receivables	979,027	-	-	979,027
Other non-current receivables	233,152	-	-	233,152
Other non-current financial assets	-	-	23,448	23,448
Total	6,220,245	-	23,448	6,243,693

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Financial liabilities	December 31, 2016			
	Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Other financial liabilities ¹	Total
Trade payables	-	1,723,252	-	1,723,252
Other payables	-	971,605	-	971,605
Borrowings (current)	-	1,759,033	453,608	2,212,641
Other current liabilities (dividends payable)	-	12	-	12
Other non-current payables	-	14,307	-	14,307
Borrowings (non-current)	-	647,728	30,272	678,000
Total	-	5,115,937	483,880	5,599,817

¹ Other financial liabilities are financial liabilities that are not subject to the categorizations such as finance lease liabilities, financial liabilities related to transfer transactions not qualified for derecognition.

Net gains or losses on each category of financial instruments for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017	2016
Financial instruments at fair value through profit or loss		
Loss on valuation/disposal (profit or loss)	-	(1,501)
Hedging derivatives		
Gain on disposal	170	-
Available-for-sale financial assets		
Interest income	5	-
Gain on disposal	-	18
Dividend income	331	-
Loans and receivables		
Interest income	30,211	40,274
Gain (loss) on foreign currency translation	(85,697)	67,900
Loss on foreign exchange	(225,897)	(10,898)
Financial liabilities measured at amortized cost		
Interest expense	(101,546)	(70,050)
Gain (loss) on foreign currency translation	74,330	(83,441)
Gain (loss) on foreign exchange	112,045	(59,699)
Loss on redemption of debentures	-	(3,031)
Other financial liabilities		
Interest expense	(5,413)	(11,795)
Loss on foreign currency translation	-	(20,277)
Gain on foreign exchange	64,653	5,046

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6. Cash and Cash Equivalents

Details of cash and cash equivalents as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Bank deposits and cash on hand	598,712	478,058
Deposits held by financial institutions and others	1,650,629	996,309
Total	2,249,341	1,474,367

7. Trade and Other Receivables

Trade and other receivables and its provisions for impairment, as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables ¹	4,456,221	(7,552)	4,448,669
Other current receivables	771,735	(959)	770,776
Other non-current receivables ²	126,429	-	126,429
Total	5,354,385	(8,511)	5,345,874

<i>(in millions of Korean won)</i>	December 31, 2016		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables ¹	3,545,918	(12,219)	3,533,699
Other current receivables	979,412	(385)	979,027
Other non-current receivables ²	234,142	(990)	233,152
Total	4,759,472	(13,594)	4,745,878

¹ As at December 31, 2017 and 2016, trade receivables transferred to financial institutions have been accounted for as a collateralized borrowing and financial assets not fully derecognized are as follows (Note 14):

<i>(in millions of Korean won)</i>	Loans and receivables (trade receivables collateralized borrowings)	
	December 31, 2017	December 31, 2016
Carrying amount of transferred assets	2,504	448,722
Carrying amount of related liabilities	(2,504)	(448,722)

² As at December 31, 2017, ₩550 million of other non-current receivables represents deposits which are restricted from withdrawal in connection with maintaining checking accounts (2016: ₩482 million).

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Details of other receivables as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Current		
Non-trade receivables	187,314	195,087
Deposits held by financial institutions ¹	529,701	732,871
Accrued income	5,126	4,230
Loans	-	21,127
Guarantee deposits provided	48,635	25,712
	<u>770,776</u>	<u>979,027</u>
Non-current		
Non-trade receivables	4,246	16
Deposits held by financial institutions ²	64,308	64,485
Loans	291	291
Guarantee deposits provided	57,584	168,360
	<u>126,429</u>	<u>233,152</u>
Total	<u>897,205</u>	<u>1,212,179</u>

¹ As at December 31, 2017, ₩1,338 million (2016: ₩1,338 million) is pledged as a collateral for borrowings and others.

² As at December 31, 2017, ₩63,400 million (2016: ₩63,400 million) is restricted from being withdrawn in relation to large, small and medium-sized companies cooperation agreement and others.

The aging analysis of trade and other receivables as at December 31, 2017 and 2016, is as follows:

<i>(in millions of Korean won)</i>	December 31, 2017		December 31, 2016	
	Trade receivables	Other receivables	Trade receivables	Other receivables
Receivables not past due	4,302,204	834,882	3,451,627	1,200,755
Past due but not impaired				
Up to 3 months	148,043	59,070	79,103	7,297
Between 3-6 months	311	2,078	1,984	1,178
Over 6 months	554	1,175	3,504	2,949
	<u>148,908</u>	<u>62,323</u>	<u>84,591</u>	<u>11,424</u>
Impaired receivables	5,109	959	9,700	1,375
	<u>4,456,221</u>	<u>898,164</u>	<u>3,545,918</u>	<u>1,213,554</u>

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Movements on the provision for impairment of trade and other receivables for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	12,219	-	385	990
Business combination (Note 34)	2,018	-	-	-
Additions	-	-	796	-
Write-off	(644)	-	(221)	(990)
Reversals	(4,464)	-	(1)	-
Exchange differences	(1,577)	-	-	-
Ending balance	7,552	-	959	-

(in millions of Korean won)

	2016			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	12,939	-	331	-
Business combination (Note 34)	1,237	-	21,644	990
Additions	1,388	-	116	-
Write-off	(2,052)	-	(21,131)	-
Reversals	-	-	(486)	-
Exchange differences	(1,293)	-	(89)	-
Ending balance	12,219	-	385	990

As at December 31, 2017 and 2016, the carrying amounts of trade and other receivables are approximation of their fair values.

8. Other Financial Assets

Details of other financial assets as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	December 31, 2017	December 31, 2016
Other financial assets		
Available-for-sale financial assets	23,782	23,448
	23,782	23,448

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Changes in available-for-sale financial assets for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Beginning balance	23,448	15,301
Business combination (Note 34)	2,652	2,270
Acquisitions / Transfer	3,001	3,463
Disposals	(195)	(44)
Impairment	(209)	-
Gain (loss) on valuation (before income tax effects)	(5,550)	2,392
Exchange differences	635	66
Ending balance	23,782	23,448

Available-for-sale financial assets consist of equity securities. The certain unlisted equity securities are measured at cost as the range of reasonable fair value estimates is wide and the probabilities of the various estimates cannot be reasonably assessed.

9. Inventories

Details of inventories as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017		
	Gross Amount	Valuation allowance	Carrying amount
Merchandise	141,567	(3,320)	138,247
Finished / Semi-finished products	1,956,436	(95,369)	1,861,067
Work-in-process	9,852	-	9,852
Raw materials	897,227	(14,459)	882,768
Supplies	136,251	-	136,251
Materials-in-transit	324,269	-	324,269
Total	3,465,602	(113,148)	3,352,454

<i>(in millions of Korean won)</i>	December 31, 2016		
	Gross Amount	Valuation allowance	Carrying amount
Merchandise	111,742	(2,438)	109,304
Finished / Semi-finished products	1,699,252	(84,326)	1,614,926
Work-in-process	785	-	785
Raw materials	822,044	(11,088)	810,956
Supplies	114,525	-	114,525
Materials-in-transit	314,695	-	314,695
Total	3,063,043	(97,852)	2,965,191

During the year, the cost of inventories recognized as expense and included in 'cost of sales' amounted to ₩15,436,415 million (2016: ₩12,200,672 million).

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10. Investments in Associates and Joint Ventures

Changes in investments in associates and joint ventures for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017								Ending balance
	Beginning balance	Business combination	Acquisitions / transfer	Dividends	Share of profit (loss) of associates and joint ventures	Share of other comprehensive income of associates and joint ventures	Changes in ownership of associates	Others	
LG VINA Chemical Co., Ltd.	3,874	-	-	(846)	753	(454)	-	-	3,327
HL Greenpower Co., Ltd.	16,927	-	-	-	3,010	-	-	303	20,240
LG Holdings (HK) Ltd.	74,843	-	-	-	4,281	(8,596)	-	(19,499)	51,029
TECWIN Co., Ltd.	7,214	-	-	-	794	-	-	-	8,008
SEETEC Co., Ltd.	148,333	-	-	(10,000)	8,408	-	-	-	146,741
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	-	-	579
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	-	-	150
LG Fuel Cell Systems Inc.	8,908	-	24,527	-	(10,191)	(587)	7,680	(3)	30,334
FJ Composite Materials Co., Ltd.	-	-	3,015	-	(259)	(87)	-	-	2,669
WUXI CL New Energy Technology Ltd.	-	-	1,178	-	(176)	-	-	-	1,002
LG Life Sciences Poland Ltd.	-	17	-	-	-	-	-	-	17
	<u>260,828</u>	<u>17</u>	<u>28,720</u>	<u>(10,846)</u>	<u>6,620</u>	<u>(9,724)</u>	<u>7,680</u>	<u>(19,199)</u>	<u>264,096</u>

(in millions of Korean won)

(in millions of Korean won)

	2016							
	Beginning balance	Acquisitions / transfer	Dividends	Share of profit (loss) of associates and joint ventures	Share of other comprehensive income of associates and joint ventures	Disposal	Others	Ending balance
LG VINA Chemical Co., Ltd.	3,742	-	(926)	907	151	-	-	3,874
HL Greenpower Co., Ltd.	16,559	-	-	369	-	-	(1)	16,927
LG Holdings (HK) Ltd.	73,012	-	-	3,555	(1,724)	-	-	74,843
TECWIN Co., Ltd.	6,535	-	-	679	-	-	-	7,214
SEETEC Co., Ltd.	155,539	-	(17,500)	10,263	-	-	31	148,333
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	-	579
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	-	150
CNOOC & LG Petrochemicals Co., Ltd.	14,287	-	-	(7,780)	(367)	(6,140)	-	-
KLPE Limited Liability Partnership ¹	20,079	-	-	264	(582)	(19,761)	-	-
LG Fuel Cell Systems Inc.	3,265	17,555	-	(12,048)	192	-	(56)	8,908
	293,747	17,555	(18,426)	(3,791)	(2,330)	(25,901)	(26)	260,828

¹ During 2016, the Group decided to discontinue the business of KLPE Limited Liability Partnership and completed the disposal by collecting ₩23,724 million of the investments.

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11. Property, Plant and Equipment

Changes in property, plant and equipment for the years ended December 31, 2017 and 2016, are as follows:

(in millions of
Korean won)

2017										
Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Construction -in-progress	Machinery -in-transit	Total
1,470,226	2,181,396	651,061	4,288,509	8,594	384,777	95,905	100,360	473,111	26,194	9,680,133
1,507,154	2,796,650	1,145,962	12,656,297	41,183	1,005,567	323,646	238,906	484,950	26,194	20,226,509
-	(575,932)	(479,210)	(8,305,213)	(32,439)	(611,202)	(225,767)	(138,098)	-	-	(10,367,861)
(36,928)	(39,322)	(15,691)	(62,575)	(150)	(9,588)	(1,974)	(448)	(11,839)	-	(178,515)
62,738	81,497	6,590	109,011	197	8,256	2,918	-	164,722	57,392	493,321
38,594	607,656	51,272	955,563	9,761	180,809	45,578	41,658	2,535,725	133,175	4,599,791
(2,972)	(9,888)	(787)	(53,527)	(49)	(31,254)	(1,242)	-	(1,820,436)	(74,475)	(1,994,630)
(291)	(28,426)	(5,133)	(77,319)	(121)	(6,971)	(1,821)	-	(2,854)	-	(122,936)
-	(75,093)	(46,529)	(955,324)	(4,691)	(125,354)	(35,001)	(66,915)	-	-	(1,308,907)
-	(1,390)	(3,039)	(98,125)	(39)	(6,142)	(652)	(1,704)	(32,391)	-	(143,482)
-	6,836	1,194	3,721	2	797	91	-	-	-	12,641
-	-	-	(3,036)	-	(1,396)	(17)	-	-	-	(4,449)
1,568,295	2,762,588	654,629	4,169,473	13,654	403,522	105,759	73,399	1,317,877	142,286	11,211,482
1,605,247	3,438,000	1,190,383	13,157,481	39,945	1,085,752	352,106	211,585	1,361,431	142,286	22,584,216
-	(637,025)	(521,806)	(8,840,809)	(26,143)	(669,189)	(243,973)	(136,034)	-	-	(11,074,979)
(36,952)	(38,387)	(13,948)	(147,199)	(148)	(13,041)	(2,374)	(2,152)	(43,554)	-	(297,755)

(in millions of
Korean won)

2016										
Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Construction -in-progress	Machinery -in-transit	Total
910,241	2,010,009	606,497	4,228,274	9,524	349,835	82,541	135,437	524,314	10,537	8,867,209
912,108	2,539,113	1,053,036	11,705,377	38,599	863,085	282,407	281,556	565,061	10,537	18,250,879
-	(505,157)	(434,206)	(7,437,847)	(28,933)	(504,276)	(198,119)	(146,119)	-	-	(9,254,657)
(1,867)	(23,947)	(12,333)	(39,256)	(142)	(8,974)	(1,747)	-	(40,747)	-	(129,013)
414,123	77,141	43,795	266,818	1,019	4,737	3,631	-	3,109	-	814,373
147,464	187,602	49,349	840,388	1,821	167,536	42,775	30,982	1,319,406	55,261	2,842,584
(1,441)	(5,607)	(150)	(17,518)	(34)	(8,475)	(650)	-	(1,391,481)	(39,604)	(1,464,960)
(161)	(5,427)	(346)	(57,826)	1	(1,834)	(474)	-	23,871	-	(42,196)
-	(66,347)	(46,139)	(943,927)	(3,729)	(126,050)	(30,985)	(65,611)	-	-	(1,282,788)
-	(15,975)	(1,945)	(26,015)	(8)	(810)	(474)	(448)	(6,108)	-	(51,783)
-	-	-	(1,685)	-	(162)	(459)	-	-	-	(2,306)
1,470,226	2,181,396	651,061	4,288,509	8,594	384,777	95,905	100,360	473,111	26,194	9,680,133
1,507,154	2,796,650	1,145,962	12,656,297	41,183	1,005,567	323,646	238,906	484,950	26,194	20,226,509
-	(575,932)	(479,210)	(8,305,213)	(32,439)	(611,202)	(225,767)	(138,098)	-	-	(10,367,861)
(36,928)	(39,322)	(15,691)	(62,575)	(150)	(9,588)	(1,974)	(448)	(11,839)	-	(178,515)

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During the year, the Group capitalized ₩7,081 million of borrowing costs (2016: ₩4,932 million), which recognized from borrowings in relation to acquisition of property, plant and equipment, on property, plant and equipment. The capitalization rate of borrowings used to determine the amount of borrowing costs eligible for capitalization is 2.44% (2016: 1.89%).

As at December 31, 2017, certain property, plant and equipment have been pledged as collateral for borrowings and credit line agreements (Note 18).

Line items including depreciation in the consolidated statements of profit or loss for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Cost of sales	1,206,469	1,196,548
Selling and administrative expenses	98,825	85,722
Others	3,613	518
Total	1,308,907	1,282,788

Details of machinery classified as a finance lease as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017		December 31, 2016	
	Machinery	Construction-in-progress	Machinery	Construction-in-progress
Cost- capitalized finance leases	43,274	1,275	42,669	-
Accumulated depreciation	(12,952)	-	(8,534)	-
Net book amount	30,322	1,275	34,135	-

The Group leases machinery and construction-in-progress under non-cancellable finance lease agreements. The lease terms are 3~10 years and the contracts include an agreement that the ownership of the assets is transferred by the end of the lease term.

The Group reviews annually whether there is any indication that an asset may be impaired. During 2017 and 2016, Glass Substrate business, a CGU in IT & Electronic materials and Advanced materials segment, was tested for impairment as its economic performance was lower than expected. During 2017, certain equipment in LED Encap business, a CGU in IT & Electronic materials and Advanced materials segment, were tested for reversal of impairment as the future economic performance of OLED material division was estimated to exceed the previous expectation due to a transfer of LED Encap business to OLED material compound process.

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The amount of impairment loss (reversal) recognized as other non-operating (income) expenses and key assumptions used for calculation of value in use for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017		2016
	Glass Substrate¹	LED Encap	Glass Substrate
(Reversal of) Impaired amount			
Property, plant and equipment	124,138	(11,320)	47,699
Intangible assets	2,345	(6)	535
Key assumptions			
Pre-tax discount rate	N/A	12.3%	9.5%
Growth rate for subsequent years exceeding five years	N/A	-	-

¹The recoverable amount is calculated based on fair value less costs to sell and it is a non-recurring fair value measured by an observable transaction price. It is categorized as level 2 of the fair value hierarchy.

The Group decided to dispose of certain non-current assets during 2017 and 2016. The differences between the fair value and carrying amount were recognized as impairment losses (Note 35).

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12. Intangible Assets

Changes in intangible assets for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017					
	Development costs	Industrial property rights	Goodwill	Memberships	Others	Total
Beginning balance	102,853	344,882	252,253	52,793	79,363	832,144
Business combination (Note 34)	53,913	12,770	686,229	3,723	203,144	959,779
Separate acquisitions/ Transfer	66,432	47,005	-	1,538	34,921	149,896
Additions – internal development	20,843	-	-	-	-	20,843
Disposals/ Transfer	(8,066)	(55)	-	(6,080)	(308)	(14,509)
Exchange differences	(1,107)	(1,985)	(12,889)	(35)	(349)	(16,365)
Amortization	(33,764)	(30,010)	-	-	(32,944)	(96,718)
Impairment	(9,064)	(868)	-	(1,133)	(498)	(11,563)
Reversal of impairment	6	-	-	-	-	6
Transfer to assets held for sale (Note 35)	-	(358)	-	-	-	(358)
Ending balance	192,046	371,381	925,593	50,806	283,329	1,823,155

(in millions of Korean won)

	2016					
	Development costs	Industrial property rights	Goodwill	Memberships	Others	Total
Beginning balance	61,670	200,779	143,599	49,642	46,196	501,886
Business combination (Note 34)	17,500	123,364	105,223	1,674	32,855	280,616
Separate acquisitions/ Transfer	48,507	38,956	-	2,309	14,591	104,363
Additions – internal development	9,979	-	-	-	-	9,979
Disposals/ Transfer	(10,087)	(804)	-	(826)	(57)	(11,774)
Exchange differences	(212)	1,104	3,431	(6)	(384)	3,933
Amortization	(22,151)	(18,362)	-	-	(13,801)	(54,314)
Impairment	(2,353)	(155)	-	-	(37)	(2,545)
Ending balance	102,853	344,882	252,253	52,793	79,363	832,144

Line items including amortization of intangible assets for the years ended December 31, 2017 and 2016, as follows:

(in millions of Korean won)

	2017	2016
Cost of sales	24,106	11,454
Selling and administrative expenses	72,612	42,860
Total	96,718	54,314

The Group recognized total research and development costs of ₩870,128 million (2016: ₩678,027 million) as expenses.

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Goodwill is allocated to the Group's CGUs identified for each operating segment. The carrying amounts of goodwill allocation by CGUs as at December 31, 2017 and 2016, are as follows:

(in millions of
Korean won)

	December 31, 2017							
	Acquisition of LG Petrochemical Co., Ltd.	Acquisition of SAP business	Acquisition of LG NanoH2O, Inc.	Acquisition of FarmHannong Co.,Ltd.	Acquisition of PSAA business	Acquisition of LG Chem (HUIZHOU) Petrochemical Co., Ltd.	Merger of LG Life Sciences, Ltd.	Total
Basic materials & Chemicals								
NCC	2,639	-	-	-	-	-	-	2,639
ABS	1,472	-	-	-	-	14,253	-	15,725
PO	1,054	-	-	-	-	-	-	1,054
PVC	808	-	-	-	-	-	-	808
Acrylic	350	25,222	-	-	-	-	-	25,572
Plasticizer	53	-	-	-	-	-	-	53
BPA	467	-	-	-	-	-	-	467
Others	1,350	-	-	-	-	-	-	1,350
IT & Electronic materials and Advanced materials								
RO	-	-	100,726	-	-	-	-	100,726
PSAA	-	-	-	-	4,112	-	-	4,112
Life Sciences								
Life sciences	-	-	-	-	-	-	686,229	686,229
Common and others								
FarmHannong Co.,Ltd.	-	-	-	86,858	-	-	-	86,858
Total	8,193	25,222	100,726	86,858	4,112	14,253	686,229	925,593

(in millions of Korean won)

(in millions of Korean won)

	December 31, 2016						
	Acquisition of LG Petrochemical Co., Ltd.	Acquisition of SAP business	Acquisition of LG NanoH2O, Inc.	Acquisition of FarmHannong Co.,Ltd.	Acquisition of PSAA business	Acquisition of LG Chem(HUIZHOU) Petrochemical Co., Ltd.	Total
Basic materials & Chemicals							
NCC	3,020	-	-	-	-	-	3,020
ABS	1,484	-	-	-	-	14,253	15,737
PO	1,059	-	-	-	-	-	1,059
PVC	502	-	-	-	-	-	502
Acrylic	493	25,222	-	-	-	-	25,715
Plasticizer	95	-	-	-	-	-	95
BPA	162	-	-	-	-	-	162
Others	1,378	-	-	-	-	-	1,378
IT & Electronic materials and Advanced materials							
RO	-	-	113,615	-	-	-	113,615
PSAA	-	-	-	-	4,112	-	4,112
Common and others							
FarmHannong Co.,Ltd.	-	-	-	86,858	-	-	86,858
Total	8,193	25,222	113,615	86,858	4,112	14,253	252,253

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The recoverable amounts of CGU have been determined based on value-in-use calculations. These calculations use pre-tax cash flow projections based on financial budgets approved by management covering a five-year period. Management determined the estimated pre-tax cash flow based on past performance and its expectations of market development. Value-in-use is measured by applying the pre-tax discount rates reflecting specific risks relating to the relevant operating segments.

During 2017, key assumptions used for calculation of value in use are as follows:

(in millions of Korean won)

	2017	
	Pre-tax discount rate	Growth rate for subsequent years after five years
Acquisition of LG Petrochemical Co., Ltd.	10.1%	0.0%
Acquisition of SAP business	10.0%	0.0%
Acquisition of LG NanoH2O, Inc.	9.0%	1.0%
Acquisition of FarmHannong Co.,Ltd.	7.5%	1.0%
Acquisition of PSAA business	10.8%	0.0%
Merger of LG Life Sciences, Ltd.	10.0%	3.0%
Acquisition of LG Chem(HUIZHOU) Petrochemical Co., Ltd.	10.1%	0.0%

The Group did not recognize impairment loss on goodwill as the carrying amounts of the cash generating units did not exceed the recoverable amounts.

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Changes in greenhouse gas emission permits for the years ended December 31, 2017 and 2016, are as follows:

<i>(in thousands of tons and millions of Korean won)</i>	2017					
	2016		2017		Total	
	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance	6,191	-	6,475	-	12,666	-
Allocation with nil consideration	350	-	799	-	1,149	-
Purchase	250	5,133	873	18,635	1,123	23,768
Business combination	62	-	58	-	120	-
Borrowings/ Carry forwards between years	685	-	(685)	-	-	-
Surrendered to the government	(7,538)	(5,133)	-	-	(7,538)	(5,133)
Ending balance	-	-	7,520	18,635	7,520	18,635

<i>(in thousands of tons and millions of Korean won)</i>	2016							
	2015		2016		2017		Total	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance	6,842	-	6,650	-	6,508	-	20,000	-
Allocation with nil consideration	(7)	-	10	-	-	-	3	-
Purchase	-	-	-	-	-	-	-	-
Business combination/ disposal	(35)	-	(34)	-	(33)	-	(102)	-
Borrowings/ Carry forwards between years	435	-	(435)	-	-	-	-	-
Surrendered to the government	(7,235)	-	-	-	-	-	(7,235)	-
Ending balance	-	-	6,191	-	6,475	-	12,666	-

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13. Other Current and Non-Current Assets

Details of other current and non-current assets as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Current		
Prepayments to suppliers and prepaid expenses	129,387	139,005
Prepaid value added tax	225,790	111,787
Others	21,637	10,001
Total	376,814	260,793
Non-current		
Long-term prepayments and long-term prepaid expenses	104,072	47,037
Others	91	10,920
Total	104,163	57,957

14. Borrowings

Borrowings as at December 31, 2017 and 2016, consist of:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Current		
Short-term borrowings	957,868	1,633,898
Current-portion of long-term borrowings of bank loans	318,441	343,935
Current-portion of debentures	169,878	229,922
Finance lease liabilities	5,137	4,886
	1,451,324	2,212,641
Non-current		
Long-term borrowings	518,955	607,996
Debentures	1,047,303	39,732
Finance lease liabilities	27,367	30,272
	1,593,625	678,000
Total	3,044,949	2,890,641

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Details of short-term borrowings as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	Bank	Latest maturity date	Interest rate(%) as at December 31, 2016	December 31, 2017	December 31, 2016
Notes discounted ¹ (Negotiable notes)	Woori Bank, others	Jan. 08, 2018	Libor + 0.52 and others	2,504	448,722
Bank loans	Nonghyup Bank, others	Nov. 24, 2018	2.35 and others	955,364	1,185,176
Total				<u>957,868</u>	<u>1,633,898</u>

¹ As at December 31, 2017, trade receivables transferred to financial institutions but not derecognized are accounted for as collateralized borrowing transaction (Note 7).

Details of long-term borrowings as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	Bank	December 31, 2017			
		Annual interest rate (%)	Amount in Korean won	Current	Non-current
Borrowings in Korean won	KEB Hana Bank ¹	1.75	706	353	353
Borrowings in foreign currencies	Sumitomo Mitsui Banking Corporation	Libor + 1.05	53,463	5,346	48,117
	Standard Chartered Bank	Libor + 1.60	25,095	-	25,095
	Construction Bank of China	PBOC × 0.90	27,791	3,770	24,021
	Communications Bank of China	PBOC	12,896	1,841	11,055
	Agricultural Bank of China	USD: Libor + 0.80 CNY: PBOC × 0.90	51,637	9,496	42,141
	Bank of America	Libor + 0.90~1.50	69,579	32,080	37,499
	Bank of China	Libor + 0.95	34,246	5,775	28,471
	BNP PARIBAS	EUR:EURIBOR + 0.99 PLN: WIBOR + 0.55	19,151	-	19,151
	CNOOC Finance	PBOC × 0.90	71,515	16,365	55,150
	HSBC	Libor + 1.00~1.05	236,320	198,894	37,426
	JP Morgan	Libor + 0.85~1.05	42,765	42,765	-
	Mizuho Banking Corporation	Libor + 1.02	42,773	-	42,773
	CITI	EURIBOR + 0.90	38,298	-	38,298
	United Overseas Bank	Libor + 1.55	15,255	152	15,103
	Hangseng	Libor + 1.00	32,077	1,604	30,473
	ING	EURIBOR + 0.83	63,829	-	63,829
Total			<u>837,396</u>	<u>318,441</u>	<u>518,955</u>

¹ Other receivables are pledged as collateral for the above long-term borrowings (Note 18).

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(in millions of Korean won)	December 31, 2016				
	Bank	Annual interest rate (%)	Amount in Korean won	Current	Non-current
Borrowings in Korean won	KEB Hana Bank ¹	1.75	1,058	353	705
Borrowings in foreign currencies	Sumitomo Mitsui Banking Corporation	Libor + 0.60~1.05	61,074	24,170	36,904
	Standard Chartered Bank	Libor + 1.00	48,313	48,313	-
	Construction Bank of China	PBOC ×0.90	32,476	2,915	29,561
	Communications Bank of China	PBOC	27,721	3,465	24,256
	Agricultural Bank of China	USD: Libor + 0.80 CNY: PBOC ×0.90	63,824	5,889	57,935
	Bank of America	Libor + 1.50~1.60	72,114	36,057	36,057
	Bank of China	Libor + 0.95	32,195	3,606	28,589
	BNP PARIBAS	EUR: EURIBOR + 0.99 PLN: WIBOR + 0.55	6,650	-	6,650
	CITI	Libor + 2.00	18,029	18,029	-
	CNOOC Finance	PBOC ×0.90	80,914	7,263	73,651
	HSBC	Libor + 1.00~1.05	272,837	7,217	265,620
	JP Morgan	Libor + 0.85~1.05	48,068	-	48,068
	Mizuho Banking Corporation	Libor + 0.75~1.02	114,544	114,544	-
	United Overseas Bank	3Libor + 0.85	72,114	72,114	-
Total			<u>951,931</u>	<u>343,935</u>	<u>607,996</u>

¹ Other receivables are pledged as collateral for the above long-term borrowings (Note 18).

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Details of debentures as at December 31, 2017 and 2016, are as follows:

		December 31, 2017				
		Financial institution	Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current Non-current
47th Debenture (non-guaranteed/private)	Government Employees Pension Service and others	3.20	2018.04.30	30,000	30,000	-
48th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.77	2019.02.21	50,000	-	50,000
49th Debenture (non-guaranteed/private)	KB Asset Management Co., Ltd and others	2.82	2018.12.12	100,000	100,000	-
50-1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.95	2020.05.19	120,000	-	120,000
50-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.28	2022.05.19	400,000	-	400,000
50-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.53	2024.05.19	280,000	-	280,000
Debentures in Korean won (collateralized)¹	IBK Securities Co., Ltd. and others	4.70	2018.03.05	40,000	40,000	-
Debentures in Korean won (non-guaranteed)	NH Investment & Securities Co., Ltd. and others	1.93	2020.02.16	100,000	-	100,000
	NH Investment & Securities Co., Ltd. and others	2.26	2022.02.16	100,000	-	100,000
Less: discount on debentures				(2,819)	(122)	(2,697)
Total				1,217,181	169,878	1,047,303

¹ Certain property, plant and equipment are pledged as collateral for the above debentures (Note 18).

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(in millions of Korean won)

		December 31, 2016				
	Financial institution	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Debentures in Korean won (non-guaranteed)	Woori Security and others	4.11	Mar. 29, 2017	200,000	200,000	-
	Ebest Investment & securities Co., Ltd. and others	4.75	Oct. 24, 2017	30,000	30,000	-
Debentures in Korean won (collateralized)¹	IBK Securities Co., Ltd. and others	4.70	Mar. 05, 2018	40,000	-	40,000
Less: discount on debentures				(346)	(78)	(268)
Total				<u>269,654</u>	<u>229,922</u>	<u>39,732</u>

¹ Certain property, plant and equipment are pledged as collateral for the above debentures (Note 18).

Details of finance lease liabilities as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

		December 31, 2017			
Leaser	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Hyundai Oil Bank and others	3.12~4.13	Dec. 31, 2024	35,504	5,137	27,367
Total			<u>35,504</u>	<u>5,137</u>	<u>27,367</u>

(in millions of Korean won)

		December 31, 2016			
Leaser	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Hyundai Oil Bank	3.12	Dec. 31, 2024	35,158	4,886	30,272
Total			<u>35,158</u>	<u>4,886</u>	<u>30,272</u>

The present value of finance lease liabilities as at December 31, 2017 and 2016, is as follows:

(in millions of Korean won)

	December 31, 2017			December 31, 2016		
	Minimum lease payments	Future finance costs	Present value	Minimum lease payments	Future finance costs	Present value
Within 1 year	5,253	116	5,137	5,000	114	4,886
Between 1-5 years	20,710	2,006	18,704	20,000	1,902	18,098
Over 5 years	10,532	1,869	8,663	15,000	2,826	12,174

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15. Provisions

Changes in provisions for other liabilities and charges for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>						
	2017					
	Sales returns¹	Warranty²	Greenhouse gas emission³	Legal Claims⁴	Restoration⁵	Total
Beginning balance	10,362	41,476	27,801	10,102	95,774	185,515
Business combination (Note 34)	5,994	-	59	-	-	6,053
Additions	49,683	44,920	342	72,787	1,641	169,373
Used	(50,453)	(9,320)	(5,133)	(62,260)	(7,359)	(134,525)
Ending balance	15,586	77,076	23,069	20,629	90,056	226,416
Less : current portion	(15,586)	(3,935)	(23,069)	-	(20,350)	(62,940)
Total	-	73,141	-	20,629	69,706	163,476

<i>(in millions of Korean won)</i>						
	2016					
	Sales returns¹	Warranty²	Greenhouse gas emission³	Legal Claims⁴	Restoration⁵	Total
Beginning balance	5,214	27,578	3,720	-	-	36,512
Business combination (Note 34)	5,026	-	-	2,685	91,665	99,376
Additions	32,320	19,778	31,498	29,891	4,109	117,596
Used	(32,198)	(5,880)	(7,417)	(22,474)	-	(67,969)
Ending balance	10,362	41,476	27,801	10,102	95,774	185,515
Less : current portion	(6,279)	(1,224)	(27,801)	-	(16,390)	(51,694)
Total	4,083	40,252	-	10,102	79,384	133,821

¹ Sales return provisions have been accrued for the estimated sales return determined based on historical experience.

² Warranty provisions have been accrued for the estimated warranty service costs to be incurred based on the terms of warranty and historical experience.

³ Greenhouse gas emission provisions have been accrued for estimated expenditures to be obligated for any excess emission. The estimated emission for year ended December 31, 2017 amounts to 7,707 thousand tons (2016: 7,616 thousand tons).

⁴ Lawsuit provisions have been accrued for certain pending cases.

⁵ As at December 31, 2017, restoration provisions have been accrued based on the estimated expenses to restore land pollutions and others.

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16. Net Defined Benefit Liabilities

Details of net defined benefit liabilities recognized in the statements of financial position as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Present value of defined benefit obligations ¹	1,049,511	885,259
Fair value of plan assets	(868,830)	(793,087)
Liabilities in the consolidated statement of financial position	180,681	92,172

¹ The present value of retirement benefit obligations is net of existing contributions to the National Pension Plan of ₩862 million as at December 31, 2017 (2016: ₩821 million).

The amounts recognized in the consolidated statements of profit or loss for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Current service cost ¹	136,529	119,108
Past service cost	656	-
Interest cost	2,968	2,944
Total, included in employee benefit expenses	140,153	122,052

¹ The above amounts excluded ₩826 million (2016: ₩71 million) of expenses capitalized to construction in progress and development costs.

Post-employment benefits recognized for defined contribution plan for the year ended December 31, 2017, amounted to ₩3,400 million (2016: ₩2,643 million).

Post-employment benefits recognized in the consolidated statements of profit or loss for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Cost of sales	96,570	85,059
Selling and administrative expenses	46,983	39,636
Total	143,553	124,695

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Movements in the present value of defined benefit obligations for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Beginning balance	885,259	717,770
Business combination (Note 34)	69,693	52,191
Transfer in	7,452	11,390
Transfer out	(2,278)	(5,764)
Current service cost	137,355	119,179
Past service cost	656	-
Interest expense	26,572	20,419
Remeasurements:		
Actuarial loss from change in demographic assumptions	4,100	3,731
Actuarial loss (gain) from change in financial assumptions	(41,917)	(11,225)
Actuarial loss (gain) from experience adjustments	30,059	24,400
Others	1,060	3,453
Exchange differences	(437)	234
Payments from plans	(68,018)	(50,519)
Changes in consolidation scope	(45)	-
Ending balance	1,049,511	885,259

Movements in the fair value of plan assets for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Beginning balance	793,087	636,578
Business combination (Note 34)	57,771	13,080
Transfer in	-	1,384
Transfer out	(504)	-
Interest income	23,604	17,475
Remeasurements:		
Return on plan assets (excluding amounts included in interest income)	(7,398)	(4,407)
Contributions:		
Employers	59,288	160,421
Payments from plans	(56,106)	(30,509)
Administrative costs	(912)	(935)
Ending balance	868,830	793,087

The actual return on plan assets for the year ended December 31, 2017, was ₩16,206 million (2016: ₩13,068 million).

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The significant actuarial assumptions as at December 31, 2017 and 2016, are as follows:

	December 31, 2017	December 31, 2016
Discount rate	3.1% ~ 3.5%	2.2% ~ 2.9%
Salary growth rate	2.2% ~ 5.0%	2.5% ~ 5.1%

The sensitivity analysis for changes in key actuarial assumptions as at December 31, 2017, is as follows:

<i>(in millions of Korean won)</i>	Increase by 1%	Decrease by 1%
Discount rate:		
Increase (decrease) in defined benefit obligations	(106,007)	126,939
Salary growth rate:		
Increase (decrease) in defined benefit obligations	123,531	(105,459)

A decrease in corporate bond yields may lead most significantly to an increase in defined benefit liabilities.

The above sensitivity analyses are based on a change in an assumption while holding all other assumptions constant. In practice, this is unlikely to occur, and changes in some of the assumptions may be correlated. The sensitivity of the defined benefit obligation to changes in principal actuarial assumptions is calculated using the projected unit credit method, the same method applied when calculating the defined benefit obligations recognized on the statement of financial position.

The methods and types of assumptions used in preparing the sensitivity analysis did not change compared to the prior period.

Plan assets as at December 31, 2017 and 2016, consist of:

<i>(in millions of Korean won)</i>	December 31, 2017				December 31, 2016			
	Quoted price	Unquoted price	Total	Composition	Quoted price	Unquoted price	Total	Composition
Insurance contracts with guaranteed yield	854,368	-	854,368	98%	793,087	-	793,087	100%
Equity linked bonds	11,286	-	11,286	1%	-	-	-	-
Time deposits	3,176	-	3,176	1%	-	-	-	-
	<u>868,830</u>	<u>-</u>	<u>868,830</u>	<u>100%</u>	<u>793,087</u>	<u>-</u>	<u>793,087</u>	<u>100%</u>

As at December 31, 2017, the weighted average duration of defined benefit obligations is 11.73 years.

The Group reviews the funding level on an annual basis and has a policy of eliminating deficit from the fund. Expected contributions to post-employment benefit plans for the year ending December 31, 2018, are ₩306,779 million.

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17. Other Current and Non-Current Liabilities

Details of other current and non-current liabilities as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Current		
Advances from customers	493,595	70,590
Dividends payable	-	12
Withholdings	91,589	68,946
Unearned revenues	9,842	6,201
Accrued expenses	259,257	123,895
Total	854,283	269,644
Non-current		
Long-term accrued expenses	44,663	30,267
Long-term unearned revenues	14,737	-
Long-term advances from customers	9,500	-
	68,900	30,267

18. Commitments and Contingencies

(1) As at December 31, 2017, the Parent Company and certain subsidiaries have been guaranteed from the Seoul Guarantee Insurance Company for the execution of contracts and others.

(2) As at December 31, 2017, the Parent Company has provided one blank promissory note to the Korea National Oil Corporation as a collateral in relation to petroleum import surcharges.

(3) As at December 31, 2017, the Parent Company and certain subsidiaries have various specific line of credit agreements with several financial institutions, as follows:

(unit: Korean won in millions, foreign currencies in millions)

Classification	The Parent Company		Certain Overseas Subsidiaries					
	KRW	USD	KRW	USD	CNY	EUR	INR	PLN
Limit of bank overdraft	69,100	50	-	100	499	40	-	32
Limit of the letter of credit	32,000	384	-	305	172	3	-	-
Limit of discount of notes from export	-	1,475	-	-	-	-	-	-
Limit of guaranteed payments in other foreign currency	-	60	-	-	-	-	-	-
Limit of loan arrangements	-	-	83,405	1,735	7,772	105	3,200	-

The Group also entered into credit line agreements with other financial institutions relating to trade finance and import/export amounting to ₩20,000 million and US\$ 55 million.

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- (4) As at December 31, 2017, the Parent Company and certain subsidiaries have B2B purchase arrangements with several financial institutions with limit of ₩349,000 million and ₩101,000 million, respectively.
- (5) As at December 31, 2017, in relation to price fixing of mobile batteries, the consumers in U.S., Canada and Israel have filed three class actions claims and the customers have filed four separate actions against the Parent Company and certain overseas subsidiaries. However, the ultimate outcome of these cases cannot be determined at the reporting date.
- (6) In addition, as at December 31, 2016, the Parent Company and certain subsidiaries have been named as a plaintiff in 14 and 20 legal actions, respectively, involving ₩22,516 million and ₩3,456 million in claims, respectively. They have been named as a defendant in 11 and 12 legal actions, respectively, with ₩57,447 million and ₩13,119 million in claims, respectively. The ultimate outcome of these cases cannot be determined at the reporting date.
- (7) As at December 31, 2017, the Parent Company has technology license agreements with STYRON EUROPE GmbH and other companies for the production of Polycarbonate products. Further, the Parent Company has entered into manufacture and production technical contracts with Exxon Mobile and others.
- (8) The Parent Company has entered into a license agreement with LG Corp. to use trademarks on the products that the Group manufactures and sells, and on the services the Group provides in relation to its business.
- (9) As at December 31, 2017, the Parent Company has entered into payment guarantee contract of US\$ 1 million and EUR 5 million with financial institutions to guarantee the warrant of certain installed products. Also, certain subsidiaries have entered into payment guarantee contract of CNY 505 million with financial institutions in relation to custom of imported raw materials.
- (10) As at December 31, 2017 and 2016, assets pledged as collateral for the borrowings are as follows:

(in millions of Korean won)

December 31, 2017				
	Secured amount	Borrowings / Loan	Limit	Secured party
Other receivables	300	Non-current borrowings (Won currency borrowings)	705	KEB Hana Bank
Gumi facility, Anseong facility, Genetics institute	52,000	Won currency debentures (Collateralized)	40,000	Creditors
	<u>52,300</u>		<u>40,706</u>	

(in millions of Korean won)

December 31, 2016				
	Secured amount	Borrowings / Loan	Limit	Secured party
Other receivables	300	Non-current borrowings (Won currency borrowings)	1,058	KEB Hana Bank
Gumi facility, Anseong facility, Genetics institute	52,000	Won currency debentures (Collateralized)	40,000	Creditors
	<u>52,300</u>		<u>41,058</u>	

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(11) Capital expenditure arrangement that has not incur at the end of the reporting period is as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Property, plant and equipment	1,734,663	399,562

(1) The Group has entered into operating lease agreements for offices, equipment, ports and others. Most of the agreements will be terminated within a year.

19. Share Capital

Changes in share capital and share premium for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won and in shares)</i>	Ordinary shares		Preferred shares		Share premium
	Number of shares	Share capital	Number of shares	Share capital	
January 1, 2016	66,271,100	331,356	7,628,921	38,144	897,424
December 31, 2016	66,271,100	331,356	7,628,921	38,144	897,424
Share issuance due to business combination	4,321,243	21,606	59,879	300	1,116,614
December 31, 2017	<u>70,592,343</u>	<u>352,962</u>	<u>7,688,800</u>	<u>38,444</u>	<u>2,014,038</u>

Changes in treasury shares for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	Number of shares		Carrying amount	Gain on disposal of treasury shares
	Ordinary shares	Preferred shares		
January 1, 2016	359,795	5,519	15,484	13,855
December 31, 2016	359,795	5,519	15,484	13,855
Purchase of treasury shares due to business combination	1,284,891	10,328	337,211	-
Acquisition of fractional shares due to business combination	7,730	520	2,250	-
December 31, 2017	<u>1,652,416</u>	<u>16,367</u>	<u>354,945</u>	<u>13,855</u>

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20. Retained Earnings

Retained earnings as at December 31, 2017 and 2016, consist of:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Legal reserve ¹	312,894	300,294
Discretionary reserve ²	11,410,610	10,408,789
Retained earnings before appropriation	2,315,746	1,753,689
Total	14,039,250	12,462,772

¹ The Commercial Code of the Republic of Korea requires the Parent Company to appropriate for each financial period, as a legal reserve, an amount equal to a minimum of 10% of cash dividends paid until such reserve equals 50% of its issued share capital. The reserve is not available for cash dividends payment, but may be transferred to share capital or used to reduce accumulated deficit. When the accumulated legal reserves (the sum of capital reserves and earned profit reserves) are greater than 1.5 times the paid-in capital amount, the excess legal reserves may be distributed in accordance with a resolution of the shareholders' meeting.

² The Group separately accumulates a discretionary reserve for research and human resource development through appropriation of retained earnings, which has been included as deductible expense for the corporate income tax return according to the Special Tax Treatment Law. The reserve could be reversed in accordance with the terms of related tax laws.

21. Other Components of Equity

Details of other components of equity as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Treasury shares (Note 19)	(354,945)	(15,484)
Capital transactions within the Group ¹	(7,731)	(215)
Total	(362,676)	(15,699)

¹ Includes gain or loss on disposal of investments and investment differences due to changes in equity, net of deferred tax.

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22. Selling and Administrative Expenses

Selling and administrative expenses for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Wages and salaries	720,628	524,188
Post-employment benefits (Note 16)	46,983	39,636
Employee benefits	138,599	114,396
Travel expense	53,108	44,025
Water & utilities	38,899	33,693
Packaging expense	6,959	6,282
Rental expenses	84,277	75,015
Commission expenses	355,316	284,881
Depreciation (Note 11)	98,825	85,722
Advertising expense	29,345	21,846
Freight expenses	533,354	436,780
Training expense	18,887	14,870
Amortization (Note 12)	72,612	42,860
Sample expense	19,318	17,941
Development costs	146,645	125,976
Others	271,314	204,205
Total	2,635,069	2,072,316

23. Breakdown of Expenses by Nature

Cost of sales, and selling and administrative expenses by nature for the years ended December 31, 2017 and 2016, consist of:

<i>(in millions of Korean won)</i>	2017	2016
Changes in inventories of merchandise, finished goods, semi-finished goods and work in process	(200,811)	(176,302)
Raw materials and consumables used	14,262,336	11,269,812
Purchase of merchandise	1,374,890	1,107,162
Employee benefit expenses (Note 24)	2,028,590	1,758,050
Advertising expenses	30,675	23,067
Freight expenses	571,075	471,638
Commission expenses	588,551	472,128
Depreciation and amortization	1,402,012	1,336,693
Operating lease payments	86,881	79,991
Other expenses	2,625,358	2,325,137
Total	22,769,557	18,667,376

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24. Employee Benefit Expenses

Details of employee benefit expenses for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Salaries	1,662,983	1,460,930
Post-employment benefits – Defined benefit plan (Note 16)	140,153	122,052
Post-employment benefits – Defined contribution plan (Note 16)	3,400	2,643
Others	222,054	172,425
Total	2,028,590	1,758,050

25. Finance Income and Costs

Details of finance income and costs for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Finance income		
Interest income ¹	30,216	40,274
Dividend income	331	-
Gain on foreign exchange	162,507	129,052
Gain on foreign currency translation	47,210	8,956
Gain on disposal of available-for-sale securities	-	18
Gain on disposal of trading derivatives	-	1,640
Gain on disposal of hedging derivatives	170	-
Total	240,434	179,940
Finance costs		
Interest expense ²	99,877	76,913
Loss on foreign exchange	205,809	142,985
Loss on foreign exchange translations	14,149	74,173
Loss on disposal of trading derivatives	-	3,141
Loss on redemption of debentures	-	3,031
Total	319,835	300,243

¹ Details of interest income for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Deposits held by financial institutions	26,373	35,945
Available-for-sale financial assets	5	91
Other loans and receivables	3,838	4,238
Total	30,216	40,274

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² Details of interest expense for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Interest on bank overdraft and borrowings	72,526	62,166
Interest on finance lease liabilities	1,517	1,186
Interest on debentures	26,792	15,321
Other interest expenses	6,123	3,172
Capitalized interest for qualifying assets	(7,081)	(4,932)
Total	99,877	76,913

26. Other Non-Operating Income

Details of other non-operating income for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Gain on foreign exchange	309,771	379,385
Gain on foreign currency translation	35,687	78,450
Gain on disposal of property, plant and equipment	8,793	8,284
Gain on disposal of intangible assets	4,869	-
Reversal of impairment loss on property, plant and equipment (Note 11)	12,641	-
Reversal of impairment loss on intangible assets (Note 12)	6	-
Gain on disposal of investment in joint ventures (Note 34)	-	4,004
Others	106,495	70,489
Total	478,262	540,612

27. Other Non-Operating Expenses

Details of other non-operating expenses for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Loss on foreign exchange	315,668	431,003
Loss on foreign currency translation	80,115	49,051
Loss on disposal of property, plant and equipment	46,302	30,178
Loss on disposal of intangible assets	2,264	1,342
Impairment loss on property, plant and equipment (Note 11)	143,482	51,783
Impairment loss on intangible assets (Note 12)	11,563	2,545
Loss on disposal of investments in subsidiaries	458	-
Loss on disposal of investments in joint ventures	-	41,253
Donations	34,874	28,564
Others	135,317	112,891
Total	770,043	748,610

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28. Tax Expense and Deferred Tax

Details of income tax expense for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Current tax on profit for the years	671,931	443,544
Adjustments in respect of prior years	(15,135)	(8,954)
Deferred tax - movement in temporary differences	(114,705)	(50,283)
Deferred tax – tax credit carryforwards	3,105	1,835
	<u>545,196</u>	<u>386,142</u>
Deferred tax charged directly to equity	(3,657)	(13,290)
Current tax charged directly to equity	383	5,982
Income tax expense	<u>541,922</u>	<u>378,834</u>

The aggregate current and deferred tax charged directly to equity (other comprehensive income) for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Current tax		
Remeasurements of net defined benefit liabilities	383	5,982
Deferred tax		
Shares of other comprehensive income of joint ventures	-	(10,801)
Exchange differences on translation of foreign operations	(5,183)	(1,909)
Loss on valuation of available-for-sale financial assets	1,526	(580)
Total	<u>(3,657)</u>	<u>(13,290)</u>

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Movements in deferred tax assets (liabilities) for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017					
	Increase (decrease)					Ending balance
	Beginning balance	Business combination	Profit (loss) for the year	Other comprehensive income	Exchange differences	
Net defined benefit liabilities	203,259	15,483	55,867	-	(55)	274,554
Plan assets	(191,322)	(13,965)	(32,227)	-	-	(237,514)
Reserve for research and human resources development	(56,467)	-	38,133	-	-	(18,334)
Provision for impairment on receivables	613	-	91	-	(27)	677
Property, plant and equipment	61,408	405	25,739	-	(3,556)	83,996
Intangible assets	(31,122)	-	1,525	-	1,979	(27,618)
Investments in subsidiaries, associates and joint ventures	(8,478)	-	(7,226)	-	3,693	(12,011)
Accrued income	(941)	(3)	(153)	-	1	(1,096)
Others	70,388	(28,714)	79,040	1,526	16,549	138,789
	47,338	(26,794)	160,789	1,526	18,584	201,443
Exchange differences on translation of foreign operations	638	-	-	(5,183)	44	(4,501)
Tax credit carryforwards	10,242	8,123	(3,105)	-	258	15,518
Tax loss carryforwards	71,284	-	(42,427)	-	(2,438)	26,419
Deferred tax assets (liabilities)	129,502	(18,671)	115,257	(3,657)	16,448	238,879

(in millions of Korean won)

	2016					
	Increase (decrease)					Ending balance
	Beginning balance	Business combination	Profit (loss) for the year	Other comprehensive income	Exchange differences	
Net defined benefit liabilities	162,825	9,022	31,399	-	13	203,259
Plan assets	(151,901)	(2,616)	(36,805)	-	-	(191,322)
Reserve for research and human resources development	(116,160)	-	59,693	-	-	(56,467)
Provision for impairment on receivables	1,501	1,513	(2,387)	-	(14)	613
Property, plant and equipment	104,416	(25,012)	(15,326)	-	(2,670)	61,408
Intangible assets	(18,736)	(11,844)	215	-	(757)	(31,122)
Investments in subsidiaries, associates and joint ventures	23,627	6,097	(29,274)	(10,801)	1,873	(8,478)
Accrued income	(1,922)	(199)	1,180	-	-	(941)
Others	47,907	16,190	6,557	(580)	314	70,388
	51,557	(6,849)	15,252	(11,381)	(1,241)	47,338
Exchange differences on translation of foreign operations	2,545	-	-	(1,909)	2	638
Tax credit carryforwards	12,076	-	(1,835)	-	1	10,242
Tax loss carryforwards	1,613	21,605	48,321	-	(255)	71,284
Deferred tax assets (liabilities)	67,791	14,756	61,738	(13,290)	(1,493)	129,502

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The reconciliations between income tax expense and accounting profit for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Profit before income tax expense	<u>2,563,895</u>	<u>1,659,828</u>
Tax at domestic tax rates applicable to profits in the respective countries¹	630,825	443,659
Tax effects of:		
Income not subject to tax	160	(10,202)
Expenses not deductible for tax purposes	225,091	25,843
Unrecognized deferred income tax for temporary differences in the current year	(163,328)	1,556
Tax credit	(92,964)	(64,833)
Effects of change in tax rate	(16,466)	-
Others	(41,396)	(17,189)
Income tax expense	<u>541,922</u>	<u>378,834</u>
Effective tax rate (income tax expense / profit before income tax)	21.14%	22.82%

¹ The weighted average applicable tax rate on profit before income tax for the year ended December 31, 2017, is 24.60% (2016: 26.73%).

Realization of deferred tax assets is dependent on the Group's ability to generate future taxable profits in excess of the profits arising from the reversal of taxable temporary differences, and economic and industry outlooks. Management periodically reviews on these factors.

Details of deductible (taxable) temporary differences unrecognized as deferred tax assets (liabilities) as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016	
Investments in subsidiaries, associates and joint ventures	(464,966)	(380,282)	Permanently re-invested income not distributed as dividend
Investments in subsidiaries, associates and joint ventures	926,897	601,391	No possibility of disposal
Goodwill	(8,193)	(8,193)	
Unused tax loss carryforwards	353,224	495,501	Uncertainty of future tax income

The maturity of unused loss is as follows:

<i>(in millions of Korean won)</i>	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Tax loss carryforwards	79,864	107,217	59,056	213,710

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29. Earnings per Share

Basic earnings per share is calculated by dividing the profit attributable to owners of the Parent Company by the weighted average number of shares in issue excluding shares purchased by the Parent Company and held as treasury shares. As at the reporting date, the Parent Company has no potential ordinary shares. Preferred shares have a right to participate in the profits of the Parent Company. These participation rights have been considered in presenting the EPS for ordinary shares and preferred shares.

Basic earnings per share attributable to the owners of the Parent Company for the years ended December 31, 2017 and 2016, is computed as follows:

Basic earnings per ordinary share

*(in millions of Korean won and
in number of shares)*

	2017	2016
Profit attributable to ordinary shares ¹	1,748,829	1,147,967
Weighted average number of ordinary shares outstanding ²	68,940,266	65,911,305
Basic earnings per ordinary shares (in won)	<u>25,367</u>	<u>17,417</u>

Basic earnings per preferred share

*(in millions of Korean won and
in number of shares)*

	2017	2016
Profit attributable to preferred shares ¹	196,451	133,157
Weighted average number of preferred shares outstanding ²	7,672,456	7,623,402
Basic earnings per preferred shares (in won)	<u>25,605</u>	<u>17,467</u>

¹ Profit attributable to ordinary and preferred shares are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Profit attributable to the equity holders of the Parent Company	1,945,280	1,281,124
Ordinary shares dividends (A)	329,557	296,601
Preferred shares dividends (B)	38,498	34,686
Undistributed earnings for the year	1,577,225	949,837
Undistributed earnings available for ordinary shares (C)	1,419,272	851,366
Undistributed earnings available for preferred shares (D)	157,953	98,471
Profit for the year attributable to ordinary shares (A+C)	1,748,829	1,147,967
Profit for the year attributable to preferred shares (B+D)	196,451	133,157

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² Weighted average numbers of shares are calculated as follows:

Ordinary shares outstanding	2017			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2017. 1. 1 - 2017. 12. 31	65,911,305	365	24,057,626,325
Share issuance due to a business combination	2017. 1. 1 - 2017. 12. 31	4,321,243	365	1,577,253,695
Purchase of treasury shares	2017. 1. 1 - 2017. 12. 31	(1,284,891)	365	(468,985,215)
Purchase of treasury shares	2017. 1. 17 - 2017. 12. 31	(7,730)	349	(2,697,770)
Total				25,163,197,035

Weighted average number of ordinary shares outstanding: $25,163,197,035 / 365 = 68,940,266$ shares

Preferred shares outstanding	2017			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2017. 1. 1 - 2017. 12. 31	7,623,402	365	2,782,541,730
Share issuance due to a business combination	2017. 1. 1 - 2017. 12. 31	59,879	365	21,855,835
Purchase of treasury shares	2017. 1. 1 - 2017. 12. 31	(10,328)	365	(3,769,720)
Purchase of treasury shares	2017. 1. 17 - 2017. 12. 31	(520)	349	(181,480)
Total				2,800,446,365

Weighted average number of preferred shares outstanding: $2,800,446,365 / 365 = 7,672,456$ shares

Ordinary shares outstanding	2016			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2016. 1. 1 - 2016. 12. 31	65,911,305	366	24,123,537,630
Total				24,123,537,630

Weighted average number of ordinary shares outstanding: $24,123,537,630 / 366 = 65,911,305$ shares

Preferred shares outstanding	2016			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2016. 1. 1 - 2016. 12. 31	7,623,402	366	2,790,165,132
Total				2,790,165,132

Weighted average number of preferred shares outstanding: $2,790,165,132 / 366 = 7,623,402$ shares

There were no dilutive potential outstanding ordinary shares at the reporting date. Accordingly, diluted earnings per share for profit attributable to the equity holders of the Parent Company is identical to basic earnings per share.

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30. Dividends

Details of dividends of the Parent Company as at December 31, 2017 and 2016, are as follows:

	December 31, 2017	December 31, 2016
Number of shares entitled to dividends: shares issued and outstanding (par value per share: ₩5,000)		
Ordinary shares	68,939,927	65,911,305
Preferred shares	7,672,433	7,623,402
Dividend per share (<i>in Korean won, %</i>)		
Ordinary shares: cash	6,000 (120%)	5,000 (100%)
Preferred shares: cash	6,050 (121%)	5,050 (101%)
Cash dividends to distribute (<i>in millions of Korean won</i>)		
Ordinary shares	413,640	329,557
Preferred shares	46,418	38,498
	<u>460,058</u>	<u>368,055</u>

Dividend payout ratios of the Parent Company for the years ended December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	2017	2016
Dividends (A)	460,058	368,055
Profit attributable to equity holders of the Parent Company (B)	1,945,280	1,281,124
Dividend payout ratio (A/B)	<u>23.65%</u>	<u>28.73%</u>

Dividend yield ratios of the Parent Company for the years ended December 31, 2017 and 2016, are as follows:

	2017		2016	
<i>(in Korean won)</i>	Ordinary shares	Preferred Shares	Ordinary shares	Preferred Shares
Dividend per share (A)	6,000	6,050	5,000	5,050
Market value at the end of year (B) ¹	393,625	245,375	264,700	180,600
Dividend yield ratio (A/B)	<u>1.52%</u>	<u>2.47%</u>	<u>1.89%</u>	<u>2.80%</u>

¹ Average price in the stock market during the week preceding the two business days before the record date of the shareholders' list for the general meeting of shareholders related to above dividends.

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31. Related Party Transactions

As at December 31, 2017 and 2016, LG Corp. is an entity exercising a significant influence over the Group, which owns 33.34% of the Parent Company's ordinary shares.

Details of associates and other related parties that have sales and other transactions with the Group or have receivables and payables balances as at December 31, 2017 and 2016, are as follows, and the details of investments in subsidiaries, associates and joint ventures are described in Note 1.3:

Related party	Related party's subsidiary (Domestic)	Related party's subsidiary (overseas)	Details
SERVEONE	-	Serveone(Nanjing) Co., LTD. and others	Subsidiary of LG Corp.
LG CNS Co., Ltd.	LG N-Sys Inc. and others	LG CNS America Inc. and others	Subsidiary of LG Corp.
LG Siltron Incorporated	-	-	Subsidiary of LG Corp.
LG Management Development Institute	-	-	Subsidiary of LG Corp.
LG Sports Ltd.	-	-	Subsidiary of LG Corp.
LG Holdings Japan	-	-	Subsidiary of LG Corp.
LG MMA Corporation	-	-	Joint venture of LG Corp.
LG Display Co., Ltd.	-	LG Display (China) Co., Ltd. and others	LG Enterprise group ¹
LG Electronics, Inc.	LG Innotek Co., Ltd. and others	Inspur LG Digital Mobile Communications Co., Ltd. and others	LG Enterprise group ¹
LG International Corp.	Pantos Logistics Co.,Ltd. and others	LG International (Japan) Ltd. and others	LG Enterprise group ¹
LG Hausys, Ltd.	-	LG Hausys Tianjin Co., Ltd. and others	LG Enterprise group ¹
LG Household & Health Care Ltd.	Coca-Cola Beverage Co.	-	LG Enterprise group ¹
LG Life Sciences Ltd. ²	-	-	LG Enterprise group ¹
LG Uplus Corp.	-	-	LG Enterprise group ¹
G II R Inc.	HS AD Inc.	-	LG Enterprise group ¹
Silicon Works Co.,Ltd.	-	-	LG Enterprise group ¹

¹ Although the entity is not the related party of the Group in accordance with Korean IFRS 1024, the entity belongs to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

² On January 1, 2017, LG Life Sciences Ltd. was merged into the Parent Company.

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Sales and purchases with related parties for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017			
	Sales and others	Purchase and others		
		Purchase of raw materials /merchandises	Acquisition of property, plant and equipment and intangible assets	Others
Entity with a significant influence over the Group				
LG Corp.	11	-	-	62,919
Associates and joint ventures				
SEETEC Co., Ltd.	18,790	116,707	1,199	88,239
TECWIN Co., Ltd.	-	166	4,225	540
HL Greenpower Co., Ltd.	260,001	-	-	-
Others	28	-	-	2,685
Other related parties				
LG MMA Corporation	84,437	224,231	-	5,356
SERVEONE and its subsidiaries	14,397	528,579	361,697	368,971
LG CNS Co., Ltd. and its subsidiaries	31,376	2,690	185,926	72,349
Others	8	-	-	12,251
Others				
LG Display Co., Ltd. and its subsidiaries	1,336,880	-	14,750	2,165
LG Electronics Inc. and its subsidiaries	975,117	293,867	486,062	32,062
LG International Corp. and its subsidiaries	300,401	501,885	517	363,143
LG Hausys, Ltd. and its subsidiaries	219,427	7,906	3,289	7,692
Others	21,226	28,246	1,203	9,614
Total	3,262,099	1,704,277	1,058,868	1,027,986

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(in millions of Korean won)

	2016			
	Sales and others	Purchase and others		
		Purchase of raw materials /merchandises	Acquisition of property, plant and equipment and intangible assets	Others
Entity with a significant influence over the Group				
LG Corp.	12	-	-	49,446
Associates and joint ventures				
SEETEC Co., Ltd.	11,046	100,780	15	82,477
TECWIN Co., Ltd.	-	208	1,801	-
HL Greenpower Co., Ltd.	119,257	-	-	-
Others	1,750	-	-	2,347
Other related parties				
LG MMA Corporation	81,841	139,894	-	3,118
SERVEONE and its subsidiaries	16,718	476,199	194,929	90,093
LG CNS Co., Ltd. and its subsidiaries	24,411	3,535	92,402	60,378
Others	26	-	-	11,140
Others				
LG Display Co., Ltd. and its subsidiaries	1,326,553	-	-	65
LG Electronics Inc. and its subsidiaries	641,678	250,886	34,515	14,411
LG International Corp. and its subsidiaries	259,371	310,726	10	211,898
LG Hausys, Ltd. and its subsidiaries	204,523	2,965	7,387	78,388
Others	22,373	34,901	310	8,314
Total	2,709,559	1,320,094	331,369	612,075

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Balances of receivables and payables arising from sales and purchases of goods and services as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	December 31, 2017			
	Receivables			Total
	Trade receivables and others	Loan receivables	Other receivables	
Entity with a significant influence over the Group				
LG Corp.	-	-	9,183	9,183
Associates and joint ventures				
SEETEC Co., Ltd.	1,752	-	279	2,031
TECWIN Co., Ltd.	-	-	-	-
HL Greenpower Co., Ltd.	60,726	-	-	60,726
Others	16	-	-	16
Other related parties				
LG MMA Corporation	8,663	-	482	9,145
SERVEONE and its subsidiaries	2,893	-	27,948	30,841
LG CNS Co., Ltd. and its subsidiaries	20,209	-	-	20,209
Others	-	-	4,873	4,873
Others				
LG Display Co., Ltd. and its subsidiaries	240,427	-	6,057	246,484
LG Electronics Inc. and its subsidiaries	287,566	-	46,116	333,682
LG International Corp. and its subsidiaries	48,332	-	891	49,223
LG Hausys, Ltd. and its subsidiaries	40,089	-	92	40,181
Others	318	-	398	716
Total	710,991	-	96,319	807,310

(in millions of Korean won)

	December 31, 2017			
	Payables			Total
	Trade payables	Borrowings	Other payables	
Entity with a significant influence over the Group				
LG Corp.	-	-	7,897	7,897
Associates and joint ventures				
SEETEC Co., Ltd.	10,698	-	10,759	21,457
TECWIN Co., Ltd.	-	-	2,195	2,195
HL Greenpower Co., Ltd.	-	-	-	-
Others	-	-	-	-
Other related parties				
LG MMA Corporation	19,140	-	-	19,140
SERVEONE and its subsidiaries	12,630	-	442,860	455,490
LG CNS Co., Ltd. and its subsidiaries	994	-	116,422	117,416
Others	-	-	557	557
Others				
LG Display Co., Ltd. and its subsidiaries	-	-	8,660	8,660
LG Electronics Inc. and its subsidiaries	114,892	-	127,946	242,838
LG International Corp. and its subsidiaries	35,962	-	40,581	76,543
LG Hausys, Ltd. and its subsidiaries	3,409	-	1,811	5,220
Others	2,151	-	5,779	7,930
Total	199,876	-	765,467	965,343

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	December 31, 2016			
	Receivables			Total
	Trade receivables and others	Loan receivables	Other receivables	
Entity with a significant influence over the Group				
LG Corp.	-	-	6,572	6,572
Associates and joint ventures				
SEETEC Co., Ltd.	-	-	-	-
TECWIN Co., Ltd.	-	-	-	-
HL Greenpower Co., Ltd.	43,493	-	-	43,493
LG Fuel Cell Systems Inc.	-	9,857	341	10,198
Others	-	-	20	20
Other related parties				
LG MMA Corporation	8,858	-	583	9,441
SERVEONE and its subsidiaries	3,128	-	26,183	29,311
LG CNS Co., Ltd. and its subsidiaries	17,152	-	45	17,197
Others	-	-	4,314	4,314
Others				
LG Display Co., Ltd. and its subsidiaries	105,174	-	81,467	186,641
LG Electronics Inc. and its subsidiaries	236,834	-	22,294	259,128
LG International Corp. and its subsidiaries	37,592	-	904	38,496
LG Hausys, Ltd. and its subsidiaries	36,381	-	341	36,722
Others	1,005	-	937	1,942
Total	489,617	9,857	144,001	643,475

(in millions of Korean won)

	December 31, 2016			
	Payables			Total
	Trade payables	Borrowings	Other payables	
Entity with a significant influence over the Group				
LG Corp.	-	-	420	420
Associates and joint ventures				
SEETEC Co., Ltd.	10,009	-	9,695	19,704
TECWIN Co., Ltd.	76	-	140	216
HL Greenpower Co., Ltd.	-	-	-	-
LG Fuel Cell Systems Inc.	-	-	-	-
Others	-	-	95	95
Other related parties				
LG MMA Corporation	15,777	-	-	15,777
SERVEONE and its subsidiaries	726	-	228,113	228,839
LG CNS Co., Ltd. and its subsidiaries	25,757	-	19,494	45,251
Others	-	-	301	301
Others				
LG Display Co., Ltd. and its subsidiaries	-	-	30	30
LG Electronics Inc. and its subsidiaries	78,137	-	4,786	82,923
LG International Corp. and its subsidiaries	19,814	-	24,579	44,393
LG Hausys, Ltd. and its subsidiaries	4,401	-	456	4,857
Others	2,801	-	4,085	6,886
Total	157,498	-	292,194	449,692

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Fund transactions with related parties for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017		2016	
	Equity contributions in cash (capital reduction)	Loan (Repayment)	Equity contributions in cash (capital reduction)	Loan (Repayments)
Associates and joint ventures				
FJ Composite Materials Co.,LTD.	3,015	-	-	-
LG Fuel Cell Systems Inc.	24,527	(9,584)	17,555	-
KLPE Limited Liability Partnership	-	-	(23,724)	-
WUXI CL New Energy Technology Ltd.	1,178	-	-	-
LG Holdings (HK) Ltd.	(19,499)	-	-	-
Total	9,221	(9,584)	(6,169)	-

Dividends received from related parties for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017	2016
Associates and joint ventures		
SEETEC Co., Ltd.	10,000	17,500
LG VINA Chemical Co., Ltd.	846	926
Total	10,846	18,426

Dividends paid to related parties for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017	2016
Entity with significant influence over the Group		
LG Corp.	111,097	99,987
Total	111,097	99,987

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Compensation for key management of the Group for the years ended December 31, 2017 and 2016, consists of:

<i>(in millions of Korean won)</i>	2017	2016
Short-term employee benefits	74,125	43,427
Post-employment benefits	6,092	3,173
Total	80,217	46,600

Key management includes directors and audit committee members having duties and responsibilities over planning, operations and controlling of the Group's business activities.

There are no provisions recognized against receivables from related parties as at December 31, 2017.

As at December 31, 2017, there is no payment guarantees provided by the Group for related parties.

32. Cash Generated from Operations

Reconciliation between profit before income tax and cash generated from operations for the years ended December 31, 2017 and 2016, is as follows:

<i>(in millions of Korean won)</i>	2017	2016
Profit before income tax	2,563,895	1,659,828
Adjustments for:		
Depreciation	1,305,324	1,282,379
Amortization	96,718	54,314
Post-employment benefits	140,153	122,052
Finance income	(111,029)	(134,850)
Finance costs	197,233	202,963
Foreign exchange differences	(88,652)	16,249
Loss on valuation of inventories	1,401	20,050
Gain on disposal of property, plant and equipment	(8,793)	(8,284)
Gain on disposal of intangible assets	(4,869)	-
Loss on disposal of property, plant and equipment	46,302	30,178
Loss on disposal of intangible assets	2,264	1,342
Impairment loss on property, plant and equipment	143,482	51,783
Impairment loss on intangible assets	11,563	2,545
Reversal of impairment loss on property, plant and equipment	(12,641)	-
Reversal of impairment loss on intangible assets	(6)	-
Gain on disposal of investments in associates and joint ventures	(7,680)	(4,004)
Loss on disposal of investments in associates and joint ventures	-	41,253
Additions to provisions	169,373	117,596
Other expense (income)	(12,806)	9,870

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Increase in inventories	(395,807)	(352,076)
Increase in trade receivables	(971,452)	(12,632)
Increase in other receivables	(8,865)	(5,003)
Increase in other current assets	(67,956)	(2,456)
Increase in settlement of derivatives	(2,114)	(1,408)
Increase in trade payables	328,348	349,246
Increase in other payables	419,855	69,673
Increase (decrease) in other current liabilities	96,191	(85,228)
Decrease in net defined benefit liabilities	(64,709)	(175,254)
Decrease in provisions	(134,525)	(67,969)
Other cash flows from operations	86,228	(98,949)
Cash generated from operations	3,716,426	3,083,208

Changes in liabilities arising from financial activities for the year ended December 31, 2017, are as follows:

(in millions of Korean won)

		2017						
	At January 1, 2017	Cash flows from financing activities	Business combination	Exchange differences	Amortization (transfer)	Reclassification of current portion	Effect of change in exchange rate	At December 31, 2017
Short-term borrowings	2,212,641	(1,627,571)	453,045	(5,988)	-	493,456	(74,259)	1,451,324
Long-term borrowings	638,268	276,493	46,980	(32,393)	-	(271,307)	(111,719)	546,322
Debentures	39,732	1,002,473	229,720	-	(2,473)	(222,149)	-	1,047,303
Total	2,890,641	(348,605)	729,745	(38,381)	(2,473)	-	(185,978)	3,044,949

The significant non-cash transactions for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017	2016
Transfer of construction-in-progress	1,820,436	1,391,481
Transfer of machinery-in-transit	74,475	39,604
Reclassification of long-term borrowings into current maturities	493,456	392,661
Acquisition of an entity by means of the issuance of equity instruments	1,138,593	-

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33. Segment Information

General information about the Group's reportable segments is as follows:

Segment	Products or services	Major customers
Basic materials & Chemicals	ABS, PC, EP, PE, PP, Acrylic, Alcohol, SAP, PVC, Synthetic rubber, Special resin, BPA, Ethylene, Propylene and others	LG Electronics Inc., OCI Company Co. Ltd., Mitsubishi Corp. and others
Energy solutions	Mobile batteries, Automotive batteries, Electricity storage batteries and others	Hewlett-Packard Co., General Motors Corp., and others
IT & Electronic materials and Advanced materials ¹	Polarizers, 3D FPR, LCD Photoresist, OLED materials, Battery materials and others	LG Display Co., Ltd., Samsung Display Co., Ltd., BOE, AUO and others
Life sciences ²	Growth hormone, Vaccine, Antidiabetic, agricultural chemicals and others	HUADONG NINGBO, UNICEF, Intervet and others
Common and others	Crop protection products, Seeds, Fertilizers, General management, sales and R&D	National Agriculture Cooperative Federation and others

¹ The Group presents IT & Electronic materials and Advanced materials as Advanced materials is included in IT & Electronic materials since 2016. The comparative information was restated to reflect such changes.

² Life Sciences segment was disclosed separately as LG Life Sciences, Ltd. was merged into the Parent Company on January 1, 2017.

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The segment information on revenue, profit and loss for the years ended December 31, 2017 and 2016, is as follows:

<i>(in millions of Korean won)</i>	2017					
	Basic materials & Chemicals	Energy solutions	IT & Electronic materials and Advanced materials	Life sciences	Common and others³	Total
Total segment revenue	17,426,895	4,560,554	3,064,983	551,524	608,518	26,212,474
Inter-segment revenue	181,160	8	322,656	3,067	7,569	514,460
Revenue from external customers ¹	17,245,735	4,560,546	2,742,327	548,457	600,949	25,698,014
Operating profit (loss) ²	2,808,142	28,875	111,443	53,522	(73,525)	2,928,457

<i>(in millions of Korean won)</i>	2016				
	Basic materials & Chemicals	Energy solutions	IT & Electronic materials and Advanced materials	Common and others³	Total
Total segment revenue	14,447,066	3,561,601	2,654,965	333,538	20,997,170
Inter-segment revenue	165,492	-	164,171	8,211	337,874
Revenue from external customers ¹	14,281,574	3,561,601	2,490,794	325,327	20,659,296
Operating profit (loss) ²	2,138,625	(49,337)	(54,965)	(42,403)	1,991,920

¹ Revenue from external customers consists of sales of goods. Interest income and dividend income are included in finance income.

² Management assesses the performance of the operating segments based on a measurement of operating profit of segment.

³ Common and other segments include operating segments not qualifying as a reportable segment, supporting divisions as well as R&D divisions.

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The segment information on assets and liabilities as at December 31, 2017 and 2016, is as follows:

<i>(in millions of Korean won)</i>	December 31, 2017					
	Basic materials & Chemicals	Energy solutions	IT & Electronic materials and Advanced materials	Life sciences	Common and others³	Total
Reportable segment asset ¹	9,307,132	5,460,448	3,503,330	1,809,248	4,961,063	25,041,221
Investments in associates and joint ventures	4,057	21,242	-	17	238,780	264,096
Reportable segment liability ¹	3,317,393	2,176,990	731,585	427,667	2,049,009	8,702,644

<i>(in millions of Korean won)</i>	December 31, 2016				
	Basic materials & Chemicals	Energy solutions	IT & Electronic materials and Advanced materials	Common and others	Total
Reportable segment asset ¹	8,441,909	4,434,851	3,423,864	4,186,436	20,487,060
Investments in associates and joint ventures	4,604	16,927	-	239,297	260,828
Reportable segment liability ¹	3,342,989	1,985,652	1,007,775	99,677	6,436,093

¹ Assets and liabilities are measured in a manner consistent with those in the financial statements, and allocated on the basis of segment operation.

The external sales and non-current assets by geographical segments from continuing operations for the years ended December 31, 2017 and 2016, and as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	Sales		Non-current assets¹	
	2017	2016	December 31, 2017	December 31, 2016
Korea ²	8,332,634	6,684,895	10,618,989	8,533,239
China	8,755,465	6,935,977	1,887,324	1,672,386
Asia	4,692,790	3,861,368	31,671	27,532
America	1,429,682	1,218,167	235,481	251,696
Europe	2,149,630	1,678,694	262,199	29,711
Others	337,813	280,195	-	-
Total	25,698,014	20,659,296	13,035,664	10,514,564

¹ Represents aggregate amount of property, plant and equipment, intangible assets and investment properties.

² Domestic sales include the exports made through local letters of credit.

There is no single external customer contributes over 10% of the Group's revenue for the years ended December 31, 2017 and 2016.

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34. Business Combination

In order to enhance future-oriented business portfolio and leap into a global player of red bio industry by enlarging investment in long-term and stable new drugs development, the Parent Company merged LG Life Sciences, Ltd. on January 1, 2017.

Goodwill of ₩686,229 million arising from the business combination is attributable to sales increase expected from combining the operations of the Group and Life Sciences business. Goodwill recognized through the business combination is not deductible for income tax purposes.

The following table summarizes the consideration paid for business combination, the fair value of assets acquired and liabilities assumed at the acquisition date:

<i>(in millions of Korean won)</i>	Amount
Consideration	
Equity securities	
(Ordinary 4,321,243 shares, Preferred 59,879 shares) ¹	1,138,593
Total consideration	1,138,593
Recognized amounts of identifiable assets acquired and liabilities assumed	
Cash and cash equivalents	43,832
Trade and other (non-current) receivables	112,703
Inventories	123,083
Property, plant and equipment	493,321
Intangible assets	273,550
Other assets	8,315
Trade payables	(38,736)
Borrowings	(729,745)
Provisions	(6,053)
Net defined benefit liabilities	(11,922)
Other liabilities	(153,195)
Treasury shares	
(Ordinary 1,284,891 shares, Preferred 10,328 shares) ¹	337,211
Fair value of identifiable net assets	452,364
Goodwill	686,229
Total	1,138,593

¹ The fair value of ordinary shares, preferred shares and treasury shares acquired were based on the market price at the acquisition date.

With regard to the above business combination, share issuance cost of ₩73 million was deducted from equity.

The fair value and gross contractual amount for trade and other (non-current) receivables at the acquisition date amount to ₩114,721 million, of which ₩2,018 million is expected to be uncollectible.

The revenues of ₩548,457 million and profit of ₩48,258 million for the year ended December 31, 2017 arose after the acquisition date are reflected in the consolidated statement of profit or loss.

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On April 1, 2016, the Group acquired 100% shares of FarmHannong Co., Ltd. (formerly Dongbu FarmHannong Co., Ltd.), which is engaged to manufacture domestic agricultural pesticides. As a result of the business combination, the Group expects increase in sales through diversification in market such as entering into new industry and others.

Goodwill of ₩86,858 million arising from the business combination is attributable to the acquired customer base and sales increase expected from combining the operations of the Parent Company and FarmHannong Co., Ltd.

The following table summarizes the consideration paid for FarmHannong Co., Ltd., the fair value of assets acquired and liabilities assumed at the acquisition date:

<i>(in millions of Korean won)</i>	Amount
Consideration	
Cash and cash equivalents	424,500
Total consideration	424,500
Recognized amounts of identifiable assets acquired and liabilities assumed	
Cash and cash equivalents	15,837
Trade and other (non-current) receivables	272,140
Inventories	236,255
Assets held for sale	65,591
Property, plant and equipment	561,083
Intangible assets	141,968
Investment properties	14,235
Other assets	9,198
Trade and other (non-current) payables	(150,385)
Borrowings	(678,687)
Provisions	(98,576)
Net defined benefit liabilities	(38,073)
Deferred tax liabilities	(5,472)
Other liabilities	(23,649)
Fair value of identifiable net assets	321,465
Less: non-controlling interest	16,177
	337,642
Goodwill	86,858
Total	424,500

The fair value of trade and other (non-current) receivables was ₩272,140 million including trade receivables with a fair value of ₩200,619 million. The gross contractual amount for trade receivables at the acquisition date amounts to ₩296,011 million, of which ₩23,871 million was expected to be uncollectible.

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On August 31, 2016, the Group acquired assets and liabilities relating to Pressure Sensitive Adhesive Application business from LG Hausys, Ltd. As a result of the business combination, the Parent Company expects an increase in sales through diversification of market such as adding business portfolio by expanding a business field to an industrial adhesive film area.

Goodwill of ₩4,112 million arose from the business combination is resulted from the customer relationship newly acquired and sales increase from combination of the Parent Company and Pressure Sensitive Adhesive Application business.

The following table summarizes the consideration paid for LG Hausys, Ltd. relating to acquiring Pressure Sensitive Adhesive Application business, the fair value of assets acquired and liabilities assumed at the acquisition date:

<i>(in millions of Korean won)</i>	Amount
Consideration	
Cash and cash equivalents	75,303
Total consideration	<u>75,303</u>
Recognized amounts of identifiable assets acquired and liabilities assumed	
Trade receivables	15,958
Inventories	9,998
Property, plant and equipment	43,006
Intangible assets	13,487
Other assets	1,298
Trade payables	(12,356)
Net defined benefit liabilities	<u>(200)</u>
Fair value of identifiable net assets	71,191
Goodwill	<u>4,112</u>
Total	<u>75,303</u>

The fair value and gross contractual amount for trade receivables at the acquisition date were ₩15,958 million. None of trade receivables were expected to be uncollectible.

The Group has the right to be reimbursed from LG Hausys, Ltd. for damages resulted from lawsuits filed prior to the business combination of the Pressure Sensitive Adhesive Application business.

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On November 1, 2016, the Parent Company acquired assets and liabilities relating to Positive electrode business from GSEM Co., Ltd. As a result of the business combination, the Parent Company expects to result in upgrade of Positive electrode manufacturing technologies and enhancement of competency in battery production through vertical integration.

The following table summarizes the consideration paid for GSEM CO., LTD. in relation to acquiring Positive Electrode business, the fair value of assets acquired and liabilities assumed at the acquisition date:

(in millions of Korean won)

	Amount
Consideration	
Cash and cash equivalents	59,307
Total consideration	<u>59,307</u>
Recognized amounts of identifiable assets acquired and liabilities assumed	
Cash and cash equivalents	800
Inventories	12,318
Property, plant and equipment	47,155
Intangible assets	153
Investment properties	1,041
Other assets	928
Provisions	(800)
Net defined benefit liabilities	(838)
Other liabilities	<u>(1,450)</u>
Fair value of identifiable net assets	59,307
Goodwill	<u>-</u>
Total	<u>59,307</u>

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On December 31, 2016, the Parent Company acquired additional 20% shares of LG Chem (HUIZHOU) Petrochemical Co., Ltd. (formerly, CNOOC & LG Petrochemicals Co., Ltd.), a joint venture, and acquired control in accordance with the shareholders' agreement. As a result of the business combination, the Group expects increase in sales by expanding market share.

Goodwill of ₩14,253 million arose from the business combination is resulted from increase in market share and economies of scale after acquiring control.

The following table summarizes the consideration paid for LG Chem (HUIZHOU) Petrochemical Co., Ltd., the fair value of assets acquired and liabilities assumed at the acquisition date:

<i>(in millions of Korean won)</i>	Amount
Consideration	
Cash and cash equivalents	58,771
Fair value of investment in joint venture before business combination	8,306
Total consideration	67,077
Recognized amounts of identifiable assets acquired and liabilities assumed	
Cash and cash equivalents	63,968
Trade and other non-current receivables	7,139
Inventories	31,547
Property, plant and equipment	163,129
Intangible assets	19,785
Deferred tax assets	21,605
Other assets	32,421
Trade and other non-current payables	(99,747)
Borrowings	(159,096)
Deferred tax liabilities	(1,377)
Other liabilities	(3,912)
Fair value of identifiable net assets	75,462
Less: non-controlling interest	(22,638)
	52,824
Goodwill	14,253
Total	67,077

The shares of LG Chem (HUIZHOU) Petrochemical Co., Ltd. held by the Parent Company before business combination are measured at the fair value and the Parent Company recognized a gain on disposal of investments in joint ventures of ₩4,004 million.

The fair value of trade and other non-current receivables at the acquisition date are ₩7,139 million. None of trade and other non-current receivables are expected to be uncollectible.

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35. Assets Held for sale

The Group decided to dispose of Electrolyte business, 2CCL business and others with the approval of management in February 2016 and January 2017, respectively. The related assets were reclassified as assets held for sale, and the disposal is expected to be completed in 2018. Assets and liabilities of Research Institute and FarmHwaong Co., Ltd., which was acquired during the course of the business combination of FarmHannong Co., Ltd., are also included. The disposal is expected to be completed in 2018.

Details of assets and liabilities of disposal group classified as held for sale as at December 31, 2017 and 2016, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2017	December 31, 2016
Assets of disposal group		
Property, plant and equipment	5,486	7,213
Investment properties	358	-
Other receivables and others	751	891
Total	6,595	8,104
Liabilities of disposal group		
Other payables and others	31	42
Total	31	42

Assets of the disposal group were measured at fair value immediately before the initial classification of the assets as held for sale and the related other non-operating expenses (income) for the years ended December 31, 2017 and 2016, is as follows:

<i>(in millions of Korean won)</i>	2017	2016
Impairment loss on property, plant and equipment	9,061	2,216
Impairment loss on intangible assets	4	-
Total	9,065	2,216

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36. Event after the Reporting Period

(1) With the approval of the corporate management committee on February 6, 2018, the Group decided the issuance of the 51st debentures and issued the 51-1st of ₩190,000 million, 51-2nd of ₩240,000 million, 51-3rd of ₩270,000 million and 51-4th of ₩300,000 million, respectively, on February 20, 2018. The maturity date of each debenture is February 20, 2021, February 20, 2023, February 20, 2025, and February 20, 2028, respectively.

(2) With the approval of the corporate management committee on February 6, 2018, the Group decided the issuance of the 18th debentures of FarmHannong Co, Ltd. and issued the 18-1st debentures of ₩50,000 million, 18-2nd of ₩40,000 million, respectively, on March 2, 2018. The maturity date of each debenture is March 2, 2021 and March 2, 2023, respectively.

37. Approval of Issuance of the Financial Statements

The consolidated financial statements 2017 were approved for issue by the Board of Directors on January 30, 2018 and are subject to change with approval of shareholders at their Annual General Meeting.