

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Financial Statements
September 30, 2019 and 2018

LG Chem, Ltd. and Subsidiaries
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September 30, 2019 and 2018

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Report on Review of Interim Financial Statements

(English Translation of a Report Originally Issued in Korean)

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

Reviewed Financial Statements

We have reviewed the accompanying consolidated interim financial statements of LG Chem, Ltd. and its subsidiaries (collectively referred to as the "Group"). These financial statements consist of the consolidated interim statement of financial position of the Group as at September 30, 2019, and the related consolidated interim statements of profit or loss and comprehensive income for the three-month and nine-month periods ended September 30, 2019 and 2018, and consolidated interim statements of changes in equity and cash flows for the nine-month periods ended September 30, 2019 and 2018, and a summary of significant accounting policies and other explanatory notes, expressed in Korean won.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated interim financial statements in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS) 1034 *Interim Financial Reporting*, and for such internal control as management determines is necessary to enable the preparation of consolidated interim financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to issue a report on these consolidated interim financial statements based on our review.

We conducted our review in accordance with quarterly or semi-annual review standards established by the Securities and Futures Commission of the Republic of Korea. A review of interim financial information consists of making inquiries, primarily of persons responsible for financial and accounting matters, and applying analytical and other review procedures. A review is substantially less in scope than an audit conducted in accordance with Korean Standards on Auditing and consequently does not enable us to obtain assurance that we would become aware of all significant matters that might be identified in an audit. Accordingly, we do not express an audit opinion.

Conclusion

Based on our review, nothing has come to our attention that causes us to believe the accompanying consolidated interim financial statements are not presented fairly, in all material respects, in accordance with Korean IFRS 1034 *Interim Financial Reporting*.

Other Matters

We have audited the consolidated statement of financial position of the Group as at December 31, 2018, and the related consolidated statements of profit or loss, comprehensive income, changes in equity and cash flows for the year then ended, in accordance with Korean Standards on Auditing. We expressed an unqualified opinion on those financial statements, not presented herein, in our audit report dated February 28, 2019. The consolidated statement of financial position as at December 31, 2018, presented herein for comparative purposes, is consistent, in all material respects, with the above audited statement of financial position as at December 31, 2018.

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

November 14, 2019
Seoul, Korea

This report is effective as of November 14, 2019, the review report date. Certain subsequent events or circumstances, which may occur between the review report date and the time of reading this report, could have a material impact on the accompanying consolidated interim financial statements and notes thereto. Accordingly, the readers of the review report should understand that there is a possibility that the above review report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Statements of Financial Position
September 30, 2019 (Unaudited) and December 31, 2018

<i>(in millions of Korean won)</i>	Notes	September 30, 2019 (Unaudited)	December 31, 2018
Assets			
Current assets			
Cash and cash equivalents	3, 5, 6	2,054,796	2,513,702
Trade receivables	3, 5, 7, 31	4,575,222	4,381,199
Other receivables	3, 5, 7, 31	297,502	326,093
Other current financial assets	3, 5, 8	18,793	-
Prepaid income taxes		6,470	1,831
Other current assets	13	924,726	573,460
Inventories	9	4,976,684	4,289,463
Assets held for sale	35	5,966	2,764
Total current assets		12,860,159	12,088,512
Non-current assets			
Other receivables	3, 5, 7	203,318	129,251
Other non-current financial assets	3, 5, 8	148,707	93,350
Investments in associates and joint ventures	1, 10, 33	286,296	266,122
Deferred tax assets	28	477,493	408,136
Property, plant and equipment	11	17,267,112	13,839,198
Intangible assets	12	2,203,614	2,006,238
Investment properties		1,005	950
Other non-current assets	13	83,055	112,380
Total non-current assets		20,670,600	16,855,625
Total assets		33,530,759	28,944,137
Liabilities			
Current liabilities			
Trade payables	3, 5, 31	2,467,243	2,165,969
Other payables	3, 5, 31	2,705,605	2,551,476
Borrowings	3, 5, 14	1,743,523	1,613,146
Other current financial liabilities	3, 5, 8	-	18,477
Provisions	15	213,146	119,366
Income tax payables		160,060	247,787
Other current liabilities	17	720,674	557,313
Total current liabilities		8,010,251	7,273,534
Non-current liabilities			
Other payables	3, 5	10,555	9,984
Borrowings	3, 5, 14	7,210,495	3,708,001
Other non-current financial liabilities	3, 5, 8	3,808	30,384
Provisions	15	252,407	218,287
Net defined benefit liabilities	16	355,222	227,544
Deferred tax liabilities	28	52,355	57,856
Other non-current liabilities	17	144,883	96,419
Total non-current liabilities		8,029,725	4,348,475
Total liabilities		16,039,976	11,622,009

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Statements of Financial Position
September 30, 2019 (Unaudited) and December 31, 2018

<i>(in millions of Korean won)</i>	Notes	September 30, 2019 (Unaudited)	December 31, 2018
Equity			
Share capital	1, 19	391,406	391,406
Capital surplus		2,274,623	2,274,623
Other components of equity	21	(374,243)	(374,243)
Accumulated other comprehensive income		(34,819)	(202,994)
Retained earnings	20	14,918,965	14,994,252
Equity attributable to owners of the Parent Company		<u>17,175,932</u>	<u>17,083,044</u>
Non-controlling interest		314,851	239,084
Total equity		<u>17,490,783</u>	<u>17,322,128</u>
Total liabilities and equity		<u>33,530,759</u>	<u>28,944,137</u>

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

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Statements of Profit or Loss
Three-Month and Nine-Month Periods Ended September 30, 2019 and 2018 (Unaudited)

	Notes	Period Ended September 30			
		2019		2018	
		(Unaudited)		(Unaudited)	
		Three months	Nine months	Three months	Nine months
<i>(in millions of Korean won, except per share amounts)</i>					
Revenue	31, 33	7,347,303	21,163,820	7,234,858	20,840,301
Cost of sales	23, 31	(6,094,464)	(17,593,001)	(5,867,550)	(16,659,852)
Gross profit		1,252,839	3,570,819	1,367,308	4,180,449
Selling and administrative expenses	22, 23, 31	(872,565)	(2,647,663)	(764,929)	(2,223,938)
Operating profit	33	380,274	923,156	602,379	1,956,511
Finance income	5, 25	66,326	221,099	44,676	156,242
Finance costs	5, 25	(190,586)	(411,573)	(113,404)	(287,334)
Share of net profit of associates and joint ventures accounted for using the equity method	10	2,972	13,242	3,670	3,213
Other non-operating income	5, 26	146,915	376,860	207,388	291,637
Other non-operating expenses	5, 27	(162,000)	(406,356)	(259,623)	(337,735)
Profit before income tax	32	243,901	716,428	485,086	1,782,534
Income tax expense	28	(106,716)	(283,482)	(138,486)	(389,795)
Profit for the period		137,185	432,946	346,600	1,392,739
Profit is attributable to:					
Owners of the Parent Company		128,555	391,130	343,389	1,352,462
Non-controlling interests		8,630	41,816	3,211	40,277
Earnings per share attributable to the equity holders of the Parent Company (in won)	29				
Basic earnings per ordinary share		1,677	5,102	4,481	17,650
Basic earnings per preferred share		1,689	5,139	4,493	17,687
Diluted earnings per ordinary share		1,573	4,889	4,462	17,483
Diluted earnings per preferred share		1,586	4,927	4,475	17,521

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

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Statements of Comprehensive Income
Three-Month and Nine-Month Periods Ended September 30, 2019 and 2018 (Unaudited)

	Notes	Period Ended September 30			
		2019		2018	
		(Unaudited)		(Unaudited)	
		Three months	Nine months	Three months	Nine months
<i>(in millions of Korean won)</i>					
Profit for the period		137,185	432,946	346,600	1,392,739
Other comprehensive income					
<i>Items that will not be reclassified to profit or loss</i>					
Remeasurements of net defined benefit liability	16	(1,668)	(6,938)	(4,873)	(9,546)
Gain on valuation of financial assets at fair value through other comprehensive income		6,825	5,591	3,555	7,123
Shares of remeasurements of net defined benefit liabilities of associates		-	(132)	(85)	(145)
Income tax relating to these items		(1,419)	365	666	668
<i>Items that may be subsequently reclassified to profit or loss</i>					
Exchange differences on translation of foreign operations		(12,195)	120,768	(105,501)	(18,581)
Cash flow hedge		48,056	70,625	(1,163)	(930)
Shares of other comprehensive income of joint ventures and associates		(1,596)	(297)	(2,767)	(931)
Income tax relating to these items		(12,817)	(18,333)	1,580	(2,109)
Other comprehensive income for the period, net of tax		<u>25,186</u>	<u>171,649</u>	<u>(108,588)</u>	<u>(24,451)</u>
Total comprehensive income for the period		<u>162,371</u>	<u>604,595</u>	<u>238,012</u>	<u>1,368,288</u>
Total comprehensive income for the period is attributable to:					
Owners of the Parent Company		154,084	554,137	245,508	1,331,218
Non-controlling interest		8,287	50,458	(7,496)	37,070

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

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Statements of Changes in Equity
Nine-Month Periods Ended September 30, 2019 and 2018 (Unaudited)

(in millions of Korean won)

	Notes	Attributable to owners of the Parent Company					Total	Non-controlling interests	Total equity
		Share capital	Capital surplus	Other components of equity	Accumulated other comprehensive income	Retained earnings			
Balance at January 1, 2018		391,406	2,274,386	(362,676)	(173,839)	14,039,250	16,168,527	170,050	16,338,577
Comprehensive income									
Profit for the period		-	-	-	-	1,352,462	1,352,462	40,277	1,392,739
Remeasurements of net defined benefit liability	16	-	-	-	-	(6,930)	(6,930)	-	(6,930)
Exchange differences on translation of foreign operations		-	-	-	(17,740)	-	(17,740)	(3,207)	(20,947)
Gain on valuation of financial assets at fair value through other comprehensive income		-	-	-	5,176	-	5,176	-	5,176
Others		-	-	-	(1,605)	(145)	(1,750)	-	(1,750)
Total comprehensive income for the period		-	-	-	(14,169)	1,345,387	1,331,218	37,070	1,368,288
Transactions with owners:									
Dividends	30	-	-	-	-	(460,058)	(460,058)	(33,822)	(493,880)
Equity transactions within the Group		-	237	(11,650)	-	-	(11,413)	11,651	238
Establishment of a subsidiary		-	-	-	-	-	-	46,893	46,893
Others		-	-	-	(162)	(1,970)	(2,132)	(670)	(2,802)
Total transactions with owners		-	237	(11,650)	(162)	(462,028)	(473,603)	24,052	(449,551)
Balance at September 30, 2018 (Unaudited)		391,406	2,274,623	(374,326)	(188,170)	14,922,609	17,026,142	231,172	17,257,314
Balance at January 1, 2019		391,406	2,274,623	(374,243)	(202,994)	14,994,252	17,083,044	239,084	17,322,128
Comprehensive income									
Profit for the period		-	-	-	-	391,130	391,130	41,816	432,946
Remeasurements of net defined benefit liability	16	-	-	-	-	(5,036)	(5,036)	-	(5,036)
Exchange differences on translation of foreign operations		-	-	-	113,216	-	113,216	8,642	121,858
Gain on valuation of financial assets at fair value through other comprehensive income		-	-	-	4,053	-	4,053	-	4,053
Cash flow hedge		-	-	-	51,203	-	51,203	-	51,203
Others		-	-	-	(297)	(132)	(429)	-	(429)
Total comprehensive income for the period		-	-	-	168,175	385,962	554,137	50,458	604,595
Transactions with owners:									
Dividends	30	-	-	-	-	(460,058)	(460,058)	(23,852)	(483,910)
Increase in paid-in capital of a subsidiary		-	-	-	-	-	-	49,558	49,558
Others		-	-	-	-	(1,191)	(1,191)	(397)	(1,588)
Total transactions with owners		-	-	-	-	(461,249)	(461,249)	25,309	(435,940)
Balance at September 30, 2019 (Unaudited)		391,406	2,274,623	(374,243)	(34,819)	14,918,965	17,175,932	314,851	17,490,783

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

LG Chem, Ltd. and Subsidiaries
Consolidated Interim Statements of Cash Flows
Nine-Month Periods Ended September 30, 2019 and 2018 (Unaudited)

(in millions of Korean won)

	Notes	Nine-Month Period Ended September 30	
		2019 (Unaudited)	2018 (Unaudited)
Cash flows from operating activities			
Cash generated from operations	32	1,828,482	1,937,999
Interest received		43,294	33,903
Interest paid		(134,152)	(91,240)
Dividends received		10,990	10,010
Income taxes paid		(463,669)	(573,997)
Net cash inflow from operating activities		<u>1,284,945</u>	<u>1,316,675</u>
Cash flows from investing activities			
Decrease in other receivables		168,578	755,780
Decrease in other non-current receivables		44,315	42,472
Decrease in other current financial assets		-	359
Proceeds from disposal of investments in associates and joint ventures		-	20,748
Proceeds from disposal of financial instruments		2,662	8,465
Proceeds from disposal of property, plant and equipment		52,115	410,619
Proceeds from disposal of intangible assets		4,600	1,137
Government grants received		219,910	-
Increase in other receivables		(132,499)	(493,784)
Increase in other non-current receivables		(99,669)	(28,043)
Acquisition of investments in associates and joint ventures		(32,999)	(33,225)
Acquisition of financial assets		(17,901)	(22,676)
Acquisition of property, plant and equipment		(4,615,623)	(2,844,566)
Acquisition of intangible assets		(211,904)	(72,376)
Business combination		(529)	-
Net cash outflow from investing activities		<u>(4,618,944)</u>	<u>(2,255,090)</u>
Cash flows from financing activities			
Proceeds from borrowings		3,779,443	2,476,762
Capital contribution from non-controlling interests		49,558	46,893
Repayments of borrowings		(523,134)	(251,924)
Dividends paid		(483,910)	(493,880)
Purchase of a subsidiary's treasury shares		-	(659)
Net cash inflow from financing activities		<u>2,821,957</u>	<u>1,777,192</u>
Net increase (decrease) in cash and cash equivalents		(512,042)	838,777
Cash and cash equivalents at the beginning of the period		2,513,702	2,249,341
Effects of exchange rate changes on cash and cash equivalents		53,136	(21,251)
Cash and cash equivalents at the end of the period in the consolidated interim statement of financial position		<u>2,054,796</u>	<u>3,066,867</u>

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

LG Chem, Ltd. and Subsidiaries

Notes to the Consolidated Interim Financial Statements

September 30, 2019 and 2018 (Unaudited), and December 31, 2018

1. General Information

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 September 30, 2019, 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 September 30, 2019, the Parent Company has issued and outstanding 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 Petrochemical business, Energy solutions, 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 Petrochemical 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 Advanced material business manufactures and supplies various kinds of IT materials such as polarizer, automotive material, glass substrate, OLED film, semiconductor materials and display and battery materials for LCD Photoresist, OLED materials, battery materials and others and RO membranes, which will be the next growth engine for future.

The Life Sciences business manufactures and supplies pharmaceutical products, such as 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 'PYANCHOR' for rice farming and others.

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

LG Chem, Ltd. and Subsidiaries

Notes to the Consolidated Interim Financial Statements

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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

	September 30, 2019			
	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. ²	100	USA	December	Sales and trading
LG Chemical India Pvt. Ltd. ³	100	India	December	Synthetic resin manufacturing and sales
LG Polymers India Pvt. Ltd. ³	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. ⁴	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.	75	China	December	PVC, VCM, EDC manufacturing and sales
Tianjin LG BOTIAN Chemical Co., Ltd.	58	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/EP manufacturing
LG Chem Michigan Inc. ²	100	USA	December	Automotive battery research and manufacturing
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. ²	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. ⁶	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. ⁷	100	Poland	December	Automotive battery research and manufacturing
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	70	China	December	ABS manufacturing and sales
FarmHannong Co., Ltd. ⁸	100	Korea	December	Agricultural pesticide manufacturing and sales
Farm Hannong (Heilongjiang) Chemical Co., Ltd. ⁸	100	China	December	Agricultural pesticide manufacturing
LG Chem Life Sciences India Pvt. Ltd.	100	India	December	Pharmaceutical products sales
LG Chem Life Sciences (Beijing) Co., Ltd.	100	China	December	Pharmaceutical products sales
LG Chem Life Sciences (Thailand) Ltd.	100	Thailand	December	Pharmaceutical products sales
Farmhannong America, Inc. ⁸	100	USA	December	Agricultural pesticide sales
LG Chem Hai Phong Vietnam Co., Ltd.	100	Vietnam	December	Polarizer manufacturing and sales

LG Chem, Ltd. and Subsidiaries

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LG Chem Australia Pty Ltd.	100	Australia	December	ESS sales
LG Chem Mexico S.A. de C.V.	100	Mexico	December	Sales and trading
FarmHannong(Thailand) Ltd. ⁸	100	Thailand	December	Research and development on seeds
LG Chem Hai Phong engineering Plastics LLC.	100	Vietnam	December	EP manufacturing and sales
LG Chem (Guangzhou) Information & Electronics Materials Co.,Ltd.	100	China	December	Polarizer manufacturing
LEYOU NEW ENERGY MATERIALS(WUXI) Co.,LTD ⁹	51	China	December	Battery materials manufacturing and sales
LG Chem Fund I LLC ¹⁰	100	USA	December	Investments in venture companies
Ugimag Korea Co., Ltd ¹¹	100	Korea	December	Electronic parts manufacturing and sales
Uniseal,Inc. ^{2,12}	100	USA	December	Adhesive manufacturing and sales
Uniseal Europe Ltd. ¹²	80	England	December	Adhesive manufacturing and sales
LG Chem Nanjing Energy Solution Co., Ltd. ¹³	100	China	December	Battery manufacturing and sales
LG Chem Life Science Innovation Center, Inc. ^{2,14}	100	USA	December	Pharmaceutical products research
FARMHANNONG(MALAYSIA) SDN. BHD. ^{8,15}	100	Malaysia	December	Agricultural pesticide licensing
Associates				
LG Holdings (HK) Ltd. ¹⁶	26	Hong Kong	December	Sales and trading
TECHWIN Co., Ltd.	21	Korea	December	Environment solution and construction of chemical plant
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA. ¹⁷	100	Brazil	December	Sales and trading
LG Chem Malaysia SDN.BHD. ¹⁷	100	Malaysia	December	Sales and trading
LG Fuel Cell Systems Inc.	23	USA	December	Power fuel cell research
FJ Composite Material Co., Ltd.	33	Japan	May	Heat diffuser research and manufacturing
WUXI CL New Energy Technology Ltd.	30	China	December	ESS manufacturing and sales
LG Chem Life Sciences Poland Ltd. ¹⁷	100	Poland	December	Pharmaceutical products sales
Combustion Synthesis Co., Ltd.	30	Japan	December	Nitride-based ceramic powder production
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD. ¹⁸	49	China	December	Battery materials manufacturing and sales
VINFAST LITHIUM BATTERY PACK LLC. ¹⁹	35	Vietnam	December	Battery manufacturing and sales
Joint ventures				
LG VINA Chemical Co., Ltd.	50	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 September 30, 2019, Ningbo LG Yongxing Chemical Co., Ltd. owns 100% of Ningbo Zhenhai LG Yongxing Trading Co., Ltd.'s shares.

² During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of LG Chem Michigan Inc. for ₩1,128 million. In addition, LG Chem Michigan Inc. owns 100% of LG Chem America, Inc., LG NanoH20, Inc., Uniseal, Inc. and LG Chem Life Science Innovation Center, Inc.'s shares.

³ As at September 30, 2019, LG Chemical India Pvt. Ltd. owns 100% of LG Polymers India Pvt. Ltd.'s shares.

⁴ As at September 30, 2019, the Group acquired additional shares of LG Chem (Nanjing) Information & Electronics Materials Co.,Ltd. for ₩356,464 million.

⁵ During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of LG Chem (China) Investment Co.,Ltd. for ₩68,591 million.

⁶ Although the Parent Company owns less than 50% of the voting rights of Nanjing LG Chem 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.

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- ⁷ During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of LG Chem Wroclaw Energy sp. z o.o for ₩743,355 million.
- ⁸ As at September 30, 2019, FarmHannong Co., Ltd. owns 100% of Farm Hannong (Heilongjiang) Chemical Co., Ltd., Farmhannong America, Inc., FarmHannong(Thailand) Ltd., and FARMHANNONG(MALAYSIA) SDN.BHD.
- ⁹ During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of LEYOU NEW ENERGY MATERIALS(WUXI) Co.,LTD for ₩51,580 million.
- ¹⁰ During the nine-month period ended September 30, 2019, The Parent Company acquired additional shares LG CHEM FUND I LLC for ₩15,273 million.
- ¹¹ During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of Ugimag Korea Co., Ltd for ₩ 4,500 million.
- ¹² Uniseal, Inc. holds 80% of Uniseal Europe Ltd.
- ¹³ During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of LG Chem Nanjing Energy Solution Co., Ltd. for ₩161,465 million.
- ¹⁴ LG Chem Life Science Innovation Center, Inc. was newly established during the nine-month period ended September 30, 2019, and the Group acquired 100% shares of LG Chem Life Science Innovation Center, Inc. for ₩1,128 million.
- ¹⁵ FARMHANNONG(MALAYSIA) SDN.BHD. was newly established during the nine-month period ended September 30, 2019, and the Group acquired 100% shares of FARMHANNONG(MALAYSIA) SDN.BHD. for ₩143 million.
- ¹⁶ During the nine-month period ended September 30, 2019, LG Holdings (HK) Ltd. has completed its equal capital reduction for ₩15,789 million.
- ¹⁷ Classified as an investment in associate due to its small size.
- ¹⁸ During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD for ₩27,676 million.
- ¹⁹ VINFAST LITHIUM BATTERY PACK LLC. was newly established during the nine-month period ended September 30, 2019, and the Parent Company acquired 35% shares of VINFAST LITHIUM BATTERY PACK LLC. for ₩5,323 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)

	September 30, 2019				
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the period
Subsidiaries					
Ningbo LG Yongxing Chemical Co., Ltd.	830,541	254,074	576,467	1,353,851	97,109
Ningbo Zhenhai LG Yongxing Trade Co., Ltd.	5,982	1,606	4,376	14,755	281
LG Chem HK Ltd.	7,907	15	7,892	-	16
LG Chem America, Inc.	244,816	222,198	22,618	604,802	(436)
LG Chemical India Pvt. Ltd.	32,835	35	32,800	-	32
LG Polymers India Pvt. Ltd.	132,073	43,486	88,587	171,654	6,649
LG Chemical (Guangzhou) Engineering Plastics Co., Ltd.	103,870	45,355	58,515	153,092	6,893
LG Chem (Nanjing) Information & Electronics Materials Co., Ltd.	4,159,203	2,256,109	1,903,094	2,851,204	136,303
LG Chem (Taiwan), Ltd.	111,271	44,038	67,233	108,765	2,590
LG Chem Display Materials (Beijing) Co., Ltd.	46,566	15,380	31,186	75,647	4,244
Tianjin LG Bohai Chemical Co., Ltd.	250,301	96,537	153,764	382,173	41,691
Tianjin LG BOTIAN Chemical Co., Ltd.	53,425	40,368	13,057	113,390	9,464
LG Chem (China) Investment Co., Ltd.	626,145	323,623	302,522	46,093	2,473

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LG Chem (Tianjin) Engineering Plastics Co., Ltd.	43,041	7,085	35,956	50,540	(3,706)
LG Chem Europe GmbH	380,310	343,001	37,309	628,787	1,690
LG Chem Poland Sp. z o.o.	69,096	32,267	36,829	89,050	1,300
LG Chem Michigan Inc.	723,844	480,931	242,913	270,175	(62,940)
LGC Petrochemical India Private Ltd.	4,031	1,015	3,016	3,127	356
HAENGBOKNURI CO., LTD.	3,213	1,224	1,989	7,763	436
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	10,510	9,112	1,398	27,970	406
LG Chem Japan Co., Ltd.	5,508	906	4,602	4,921	468
LG NanoH2O, Inc.	22,906	4,441	18,465	20,804	2,987
NanoH2O (Jiangsu) Water Processing Technology Co. Ltd.	4,552	-	4,552	-	1,463
Nanjing LG Chem New Energy Battery Co., Ltd.	1,037,944	887,550	150,394	804,686	24,466
LG Chem (Chongqing) Engineering Plastics Co., Ltd.	33,147	9,399	23,748	26,338	(1,494)
LG Chem Wroclaw Energy sp. z o.o.	3,505,523	2,487,293	1,018,230	1,456,903	(229,444)
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	371,388	293,995	77,393	424,940	(1,518)
FarmHannong Co., Ltd. ¹	1,087,116	680,566	406,550	491,504	18,794
LG Chem Life Sciences India Pvt. Ltd.	3,045	3,368	(323)	5,056	(407)
LG Chem Life Sciences (Beijing) Co., Ltd.	1,308	15	1,293	935	57
LG Chem Life Sciences (Thailand) Ltd.	25,890	15,402	10,488	27,312	3,822
LG Chem Hai Phong Vietnam Co., Ltd.	19,707	13,255	6,452	29,849	1,528
LG Chem Austrailia Pty Ltd.	2,264	1,374	890	1,949	187
LG Chem Mexico S.A. de C.V.	896	154	742	1,019	149
LG Chem Hai Phong engineering Plastics LLC.	24,128	9,000	15,128	1,405	(1,453)
LG Chem (Guangzhou) Information & electronics Materials Co.,Ltd.	435,762	314,771	120,991	108,371	(10,923)
LEYOU NEW ENERGY MATERIALS(WUXI) Co.,LTD	222,364	22,688	199,676	-	2,410
LG Chem Fund I LLC	18,982	-	18,982	-	(2,562)
Ugimag Korea Co., Ltd	40,051	31,266	8,785	15,834	(4,845)
Uniseal, Inc. ¹	37,787	6,916	30,871	47,620	1,821
LG Chem Nanjing Energy Solution Co., Ltd.	792,370	524,485	267,885	-	(7,312)
LG Chem Life Science Innovation Center, Inc.	3,738	2,450	1,288	1,543	86
Associates					
LG Holdings (HK) Ltd.	259,200	104,895	154,305	37,080	11,567
TECHWIN Co., Ltd.	112,881	56,115	56,766	-	-
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	447	139	308	1,298	237
LG Chem Malaysia SDN.BHD.	372	(22)	394	686	85
LG Fuel Cell Systems Inc.	3,472	402	3,070	265	(3,714)
FJ Composite Material Co., Ltd.	8,610	4,943	3,667	1,072	(147)
WUXI CL New Energy Technology Ltd.	8,244	4,645	3,599	(2,327)	(855)
LG Chem Life Sciences Poland Ltd.	194	72	122	240	52
Combustion Synthesis Co., Ltd.	522	36	486	44	(483)
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	156,472	45,212	111,260	-	672
VINFAST LITHIUM BATTERY PACK LLC.	15,208	-	15,208	-	-
Joint ventures					
LG VINA Chemical Co., Ltd.	35,496	27,938	7,558	41,729	(35)
HL Greenpower Co., Ltd.	407,131	361,731	45,400	756,918	3,460
SEETEC Co., Ltd.	331,937	43,961	287,976	449,553	10,033

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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)

	September 30, 2018				
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the period
Subsidiaries					
Ningbo LG Yongxing Chemical Co., Ltd.	963,819	423,025	540,794	1,620,758	126,258
Ningbo Zhenhai LG Yongxing Trade Co., Ltd.	5,100	1,275	3,825	18,349	386
LG Chem HK Ltd.	41,129	23,135	17,994	311,021	270
LG Chem America, Inc.	253,512	231,148	22,364	612,689	2,122
LG Chemical India Pvt. Ltd.	32,642	10	32,632	-	26
LG Polymers India Pvt. Ltd.	127,412	49,975	77,437	185,944	5,065
LG Chemical (Guangzhou) Engineering Plastics Co., Ltd.	113,211	61,030	52,181	171,766	(12,571)
LG Chem (Nanjing) Information & Electronics Materials Co., Ltd.	3,053,130	1,814,956	1,238,174	2,433,343	(5,060)
LG Chem (Taiwan), Ltd.	115,512	56,025	59,487	126,306	(772)
LG Chem Display Materials (Beijing) Co., Ltd.	45,304	18,402	26,902	60,742	1,281
Tianjin LG Bohai Chemical Co., Ltd.	295,557	198,844	96,713	405,543	12,862
Tianjin LG BOTIAN Chemical Co., Ltd.	49,548	45,406	4,142	119,397	2,039
LG Chem (China) Investment Co., Ltd.	484,389	280,679	203,710	43,061	2,995
LG Chem (Tianjin) Engineering Plastics Co., Ltd.	62,905	23,306	39,599	68,203	(5,727)
LG Chem Europe GmbH	314,725	279,870	34,855	514,143	5,338
LG Chem Poland Sp. z o.o.	74,862	39,062	35,800	93,061	2,201
LG Chem Michigan Inc.	608,810	317,874	290,936	249,680	5,192
LGC Petrochemical India Private Ltd.	2,826	558	2,268	3,186	351
HAENGBOKNURI CO., LTD.	2,700	1,022	1,678	6,526	372
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	6,796	5,805	991	25,903	11
LG Chem Japan Co., Ltd.	3,862	363	3,499	4,279	412
LG NanoH2O, Inc. ¹	18,058	5,832	12,226	18,505	2,524
NanoH2O (Jiangsu) Water Processing Technology Co. Ltd.	4,150	1,160	2,990	-	99
Nanjing LG Chem New Energy Battery Co., Ltd.	680,418	568,736	111,682	432,795	10,586
LG Chem (Chongqing) Engineering Plastics Co., Ltd.	36,690	11,442	25,248	26,784	(4,029)
LG Chem Wroclaw Energy sp. z o.o.	981,630	595,010	386,620	155,670	(52,880)
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	299,117	214,814	84,303	306,964	2,781
FarmHannong Co., Ltd. ¹	1,142,277	690,079	452,198	516,624	16,446
LG Life Sciences India Pvt. Ltd.	4,935	3,180	1,755	8,550	(300)
LG Life Sciences (Beijing) Co., Ltd.	1,086	11	1,075	746	(87)
LG Life Sciences (Thailand) Ltd.	13,667	6,818	6,849	19,134	3,240
LG Chem Hai Phong Vietnam Co., Ltd.	17,037	7,567	9,470	19,405	6,239
LG Chem Australia Pty Ltd.	740	124	616	1,214	97
LG Chem Mexico S.A. de C.V.	571	73	498	598	91
LG Chem Hai Phong engineering Plastics LLC.	15,410	47	15,363	-	(112)
LG Chem (Guangzhou) Information & electronics Materials Co.,Ltd.	51,543	97	51,446	-	(434)
LEYOU NEW ENERGY MATERIALS(WUXI) Co.,LTD	94,676	3	94,673	-	582
LG Chem Fund I LLC	1,393	1,391	2	-	(1,399)
Associates					
LG Holdings (HK) Ltd.	243,926	43,030	200,896	37,245	13,878

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TECHWIN Co., Ltd.	79,106	32,206	46,900	106,404	8,619
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	155	139	16	1,160	(21)
LG Chem Malaysia SDN.BHD.	285	16	269	475	25
LG Fuel Cell Systems Inc.	33,125	7,276	25,849	6,284	(34,240)
FJ Composite Material Co., Ltd.	6,258	2,782	3,476	1,815	(506)
WUXI CL New Energy Technology Ltd.	9,827	5,386	4,441	-	(353)
LG Life Sciences Poland Ltd.	162	99	63	164	(9)
Combustion Synthesis Co., Ltd.	1,086	29	1,057	99	(388)
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	53,322	-	53,322	-	-
Joint ventures					
LG VINA Chemical Co., Ltd.	17,858	11,150	6,708	44,982	275
HL Greenpower Co., Ltd.	272,159	233,223	38,936	359,699	1,064
SEETEC Co., Ltd.	342,716	44,789	297,927	389,660	17,491

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 nine-month period ended September 30, 2019, are as follows:

Subsidiary	Reason
LG Chem Life Science Innovation Center, Inc.	Newly established
FARMHANNONG(MALAYSIA) SDN. BHD.	Newly established

2. Summary of Significant Accounting Policies

The principal accounting policies applied in the preparation of these consolidated interim financial statements are set out below. These policies have been consistently applied to all the periods 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 interim financial statements have been condensed, restructured and translated into English from the Korean language financial statements.

The Group's consolidated interim financial statements for the nine-month period ended September 30, 2019, have been prepared in accordance with Korean IFRS 1034 *Interim Financial Reporting*. These consolidated interim financial statements have been prepared in accordance with Korean IFRS which is effective or early adopted as at September 30, 2019.

(a) New and amended standards and interpretations adopted by the Group

The Group has applied the following new and amended standards and interpretations for the first time for their annual reporting period commencing January 1, 2019.

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- Enactment of Korean IFRS 1116 *Leases*

Korean IFRS 1116 *Leases* replaces Korean IFRS 1017 *Leases*. Under Korean IFRS 1116, with implementation of a single lease model, lessee is required to recognize assets and liabilities for all lease which lease term is over 12 months and underlying assets are not low value assets. A lessee is required to recognize a right-of-use asset and a lease liability representing its obligation to make lease payments.

With implementation of Korean IFRS 1116 *Lease*, the Group has changed accounting policy. The Group has adopted Korean IFRS 1116 retrospectively, as permitted under the specific transitional provisions in the standard, and recognized the cumulative impact of initially applying the standard as at January 1, 2019, the date of initial application. The Group has not restated comparatives for the 2018 reporting period. The impact of the adoption of the leasing standard and the new accounting policies are disclosed in Note 11.

- Amendments to Korean IFRS 1109 *Financial Instruments*

The narrow-scope amendments made to Korean IFRS 1109 *Financial Instruments* enable entities to measure certain prepayable financial assets with negative compensation at amortized cost. When a modification of a financial liability measured at amortized cost that does not result in the derecognition, a modification gain or loss shall be recognized in profit or loss. The amendment does not have a significant impact on the consolidated interim financial statements.

- Amendments to Korean IFRS 1019 *Employee Benefits*

The amendments require that an entity shall calculate current service cost and net interest for the remainder of the reporting period after a plan amendment, curtailment or settlement based on updated actuarial assumptions from the date of the change. The amendments also require that a reduction in a surplus must be recognized in profit or loss even if that surplus was not previously recognized because of the impact of the asset ceiling. The amendment does not have a significant impact on the consolidated interim financial statements.

- Amendments to Korean IFRS 1028 *Investments in Associates and Joint Ventures*

The amendments clarify that an entity shall apply Korean IFRS 1109 to financial instruments in an associate or joint venture to which the equity method is not applied. These include long-term interests that, in substance, form part of the entity's net investment in an associate or joint venture. The amendment does not have a significant impact on the consolidated interim financial statements.

- Enactment to Interpretation of Korean IFRS 2123 *Uncertainty over Income Tax Treatments*

The Interpretation explains how to recognize and measure deferred and current income tax assets and liabilities where there is uncertainty over a tax treatment, and includes guidance on how to determine whether each uncertain tax treatment is considered separately or together. It also presents examples of circumstances where a judgement or estimate is required to be reassessed. The enactment does not have a significant impact on the consolidated interim financial statements.

- Annual Improvements to Korean IFRS 2015 – 2017 Cycle:

· Korean IFRS 1103 *Business Combination*

The amendments clarify that when a party to a joint arrangement obtains control of a business that is a joint operation, and had rights to the assets and obligations for the liabilities relating to that joint operation immediately before the acquisition date, the transaction is a business combination achieved in stages. In such cases, the acquirer shall remeasure its entire previously held interest in

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the joint operation. The amendment does not have a significant impact on the consolidated interim financial statements.

- Korean IFRS 1111 *Joint Agreements*

The amendments clarify that when a party that participates in, but does not have joint control of, a joint operation might obtain joint control of the joint operation in which the activity of the joint operation constitutes a business. In such cases, previously held interests in the joint operation are not remeasured. The amendment does not have a significant impact on the consolidated interim financial statements.

- Paragraph 57A of Korean IFRS 1012 *Income Tax*

The amendment is applied to all the income tax consequences of dividends and requires an entity to recognize the income tax consequences of dividends in profit or loss, other comprehensive income or equity according to where the entity originally recognized those past transactions or events. The amendment does not have a significant impact on the consolidated interim financial statements.

- Korean IFRS 1023 *Borrowing Costs*

The amendments clarify that if a specific borrowing remains outstanding after the related qualifying asset is ready for its intended use (or sale), it becomes part of general borrowings. The amendment does not have a significant impact on the consolidated interim financial statements.

(b) New and amended standards and interpretations not 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, 2019 and have not been adopted by the Group are set out below.

2.2 Significant Accounting Policies

Significant accounting policies and method of computation used in the preparation of the condensed consolidated interim financial statements are consistent with those of the consolidated financial statements for the year ended December 31, 2018, except for the changes due to the application of amendment and enactments of standards described in Note 2.1.(a) and the ones described below.

2.2.1 Income Tax Expense

Income tax expense for the interim period is recognized based on management's best estimate of the weighted average annual income tax rate expected for the full financial year. The estimated average annual tax rate is applied to the pre-tax 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 September 30, 2019 and December 31, 2018, 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>	September 30, 2019		December 31, 2018	
	Assets	Liabilities	Assets	Liabilities
USD	3,141,232	3,201,010	2,458,886	2,396,650
EUR	237,967	2,746,216	197,975	892,963
JPY	46,734	214,846	27,849	114,399
CNY and others	589,870	7,750	128,392	6,085

As at September 30, 2019 and December 31, 2018, 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>	September 30, 2019		December 31, 2018	
	10% Increase	10% Decrease	10% Increase	10% Decrease
USD	(5,978)	5,978	6,224	(6,224)

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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 consolidated interim statement of financial position as non-current financial assets. The Group's equity investments are publicly traded and are related to the KOSDAQ, NASDAQ and HSI 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 September 30, 2019 and December 31, 2018. 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>	September 30, 2019		December 31, 2018	
	10% Increase	10% Decrease	10% Increase	10% Decrease
KOSDAQ	463	(463)	315	(315)
NASDAQ	429	(429)	168	(168)
HSI	5,530	(5,530)	7,798	(7,798)
Total	6,422	(6,422)	8,281	(8,281)

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 nine-month periods ended September 30, 2019 and 2018. 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	
	2019	2018	2019	2018
Increase	(26,470)	(17,771)	(26,470)	(17,771)
Decrease	26,470	17,771	26,470	17,771

(2) Credit risk

Credit risk arises from trade receivables and that the Group holds, as well as debt instruments at

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amortized cost or fair value through other comprehensive income.

A. Trade receivables

The Group applies the simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance for trade receivables. To measure the expected credit losses, trade receivables have been grouped based on shared credit risk characteristics and the days past due. The loss allowance provision as at September 30, 2019 is as follows. Expected credit losses include forward-looking information.

(in millions of Korean won)

	Receivables not past due ¹	Receivables past due but not impaired ¹	Impaired receivables ²	Total
September 30, 2019				
<i>(trade receivables)</i>				
Gross carrying amount	4,085,272	491,661	5,383	4,582,316
Expected loss rate	0.1%	0.3%	61.1%	0.2%
Loss allowance provision	2,214	1,591	3,289	7,094
December 31, 2018				
<i>(trade receivables)</i>				
Gross carrying amount	4,115,060	268,488	5,561	4,389,109
Expected loss rate	0.1%	0.4%	78.0%	0.2%
Loss allowance provision	2,512	1,063	4,335	7,910

¹ See Note 7.(3)

² Impaired receivables are those for which impairment indicators have been confirmed, such as significant lack of collectability (See Note 7.(3)).

Movements in the loss allowance provision for trade receivables for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

(in millions of Korean won)

	Trade receivables	
	September 30, 2019	December 31, 2018
Beginning balance	7,910	7,552
Business combination (Note 34)	-	23
Increase in loss allowance recognized in profit or loss during the nine-month period ended September 30, 2019	2	701
Receivables written off during the nine-month period ended September 30, 2019, as uncollectible	(651)	(333)
Exchange differences	(167)	(33)
Ending balance	7,094	7,910

As at September 30, 2019, the carrying amount of trade receivables representing the maximum exposure to credit risk amounts to ₩4,582,316 million (December 31, 2018: ₩4,389,109 million).

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B. Other financial assets at amortized cost

Movements in loss allowance provision for other financial assets at amortized cost for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	Other receivables	
	September 30, 2019	December 31, 2018
Beginning balance	2,726	959
Increase in loss allowance recognized as 'other expenses' in profit or loss during the nine-month period ended September 30, 2019	(640)	1,783
Exchange differences	23	(16)
Ending balance	2,109	2,726

All of the financial assets at amortized costs are considered to have low credit risk, and the loss allowance recognized during the period was, therefore, limited to 12 months expected losses.

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 new 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 bond insurance contracts with Korea Trade Insurance Corporation and others 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 if 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 has also entered into derivative contract with several financial institutions. 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.

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.

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(in millions of Korean won)

	September 30, 2019			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Borrowings (excluding lease liabilities)	1,836,696	1,715,627	3,462,724	2,578,369
Lease liabilities	29,822	31,064	31,122	53,417
Trade and other payables ¹	5,172,848	10,411	46	98
Total	7,039,366	1,757,102	3,493,892	2,631,884

(in millions of Korean won)

	December 31, 2018			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Borrowings (excluding financial lease liabilities)	1,694,761	840,260	2,250,480	910,985
Finance lease liabilities	5,177	5,177	15,887	5,000
Trade and other payables	4,717,445	6,710	3,177	97
Total	6,417,383	852,147	2,269,544	916,082

¹ Included \$49,881 millions of financial liabilities to a financial institution relating to reverse factoring arrangement. The Parent Company has entered into reverse factoring arrangement with a financial institution whereby suppliers receive payments from the financial institution on the due date of each invoice and the Parent Company pays to the financial institution at the end of extended credit period as agreed in the reverse factoring arrangement.

As at September 30, 2019, the Group has entered into swap contracts for which cash flow hedge accounting is applied, to avoid market price fluctuation of raw materials.

(in millions of Korean won)

	September 30, 2019				
	Purpose of the contracts	Hedged items	Financial institution	Maturity	Fair value
Merchandise (raw materials) swap ¹	Cash flow hedge	Non-ferrous metal	Citi bank	~2021. 12	52,148

Details of derivative assets and liabilities as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019		December 31, 2018	
	Assets	Liabilities	Assets	Liabilities
Merchandise (raw materials) swap ¹	52,148	-	-	18,477
Total	52,148	-	-	18,477

¹ Gain (loss) resulting from the contracts to avoid cash flow fluctuation risk of expected future transaction is accounted for as accumulated other comprehensive income (Note 5).

3.2 Capital Risk Management

The Group's objectives for 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.

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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 September 30, 2019 and December 31, 2018, were as follows:

<i>(in millions of Korean won, except for ratios)</i>	September 30, 2019	December 31, 2018
Total borrowings (Note 14) (A)	8,954,018	5,321,147
Less: cash and cash equivalents (B)	<u>(2,054,796)</u>	<u>(2,513,702)</u>
Net debt (C=A+B)	<u>6,899,222</u>	<u>2,807,445</u>
Total liabilities (D)	16,039,976	11,622,009
Total equity (E)	<u>17,490,783</u>	<u>17,322,128</u>
Total capital (F=C+E)	<u>24,390,005</u>	<u>20,129,573</u>
Gearing ratio (C/F)	28.3%	13.9%
Debt-to-equity ratio (D/E)	91.7%	67.1%

3.3 Fair Value

(1) Carrying amount and fair value of financial instruments by category as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019		December 31, 2018	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets (current)				
Cash and cash equivalents	2,054,796	1	2,513,702	1
Deposits held by financial institutions	30,368	1	42,902	1
Trade receivables	4,575,222	1	4,381,199	1
Other receivables (excluding deposits held by financial institutions)	267,134	1	283,191	1
Current derivative financial assets	18,793	18,793	-	-
Financial assets (non-current)				
Deposits held by financial institutions	107,437	1	64,331	1
Other receivables (excluding deposits held by financial institutions)	95,881	1	64,919	1
Other non-current financial assets (carried at fair value)				
Marketable financial assets	53,173	53,173	49,214	49,214
Non-marketable financial assets	62,179	1	44,136	-
Non-current derivative financial assets	33,355	33,355	-	-
Financial liabilities (current)				
Trade and other payables	5,172,848	1	4,717,445	1
Current borrowings (excluding lease liabilities)	1,721,795	1	1,608,138	1
Current lease liabilities	21,728	2	5,008	1
Current derivative financial liabilities	-	-	18,477	18,477

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<i>(in millions of Korean won)</i>	September 30, 2019		December 31, 2018	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial liabilities (non-current)				
Non-current borrowings (excluding lease liabilities)	7,100,213	7,358,606	3,684,765	3,740,154
Non-current lease liabilities	110,282	²	23,236	24,689
Other non-current payables	10,555	¹	9,984	¹
Other non-current financial liabilities (Conversion rights)	3,808	3,808	30,384	30,384

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 Fair values for these financial assets and liabilities are not disclosed above in accordance with related Korean IFRS.

(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 by using Korean won currency note yield in the same credit grade with the Parent Company (AA+), and the applied discount rates as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in percentage)</i>	September 30, 2019	December 31, 2018
Discount rate	1.55% ~ 2.02%	2.01% ~ 2.53%

(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 levels are defined as follows:

- Level 1: The fair value of financial instruments traded in active markets (such as publicly traded derivatives and equity securities) is based on quoted market prices at the end of the reporting period. The quoted market price used for financial assets held by the Group is the current bid price. These instruments are included in level 1.

- Level 2: The fair value of financial instruments that are not traded in an active market (for example, over-the-counter derivatives) is determined using valuation techniques which maximize the use of observable market data and rely as little as possible on entity-specific estimates. If all significant inputs required to fair value an instrument are observable, the instrument is included in level 2.

- Level 3: If one or more of the significant inputs is not based on observable market data, the instrument is included in level 3. This is the case for unlisted equity securities.

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Fair value hierarchy classifications of the financial instruments that are measured at fair value or their fair value are disclosed as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (marketable financial assets)	53,173	-	-	53,173
Current derivative financial assets	-	18,793	-	18,793
Non-current derivative financial assets	-	33,355	-	33,355
Non-current financial liabilities (conversion rights)	-	-	3,808	3,808
Financial assets/liabilities not measured at fair value				
Non-current borrowings (excluding finance lease liabilities)	-	6,696,248	662,358	7,358,606

(in millions of Korean won)

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (marketable financial assets)	49,214	-	-	49,214
Other current financial liabilities (derivative instruments)	-	18,477	-	18,477
Other non-current financial liabilities (conversion rights)	-	-	30,384	30,384
Financial assets/liabilities not measured at fair value				
Non-current borrowings (excluding finance lease liabilities)	-	3,120,475	619,679	3,740,154
Non-current finance lease liabilities	-	24,689	-	24,689

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(4) Valuation Technique and the Inputs

Valuation techniques and inputs used in level 3 fair value measurements are as follows:

(in millions of Korean won)

		September 30, 2019			
	Fair value	Level	Valuation Technique	Inputs	Coverage of Level 3 inputs
Financial liabilities					
– Convertible Bond					
Convertible Bond	662,358	3	Binominal option pricing model	Annual rates of credit volatility	-0.5%p ~ +0.5%p
Equity Conversion Option	3,808	3	Binominal option pricing model	Annual rates of credit volatility Underlying asset (equity) volatility	-0.5%p ~ +0.5%p -5% ~ +5%

(in millions of Korean won)

		December 31, 2018			
	Fair value	Level	Valuation Technique	Inputs	Coverage of Level 3 inputs
Financial liabilities					
– Convertible Bond					
Convertible Bond	619,679	3	Binominal option pricing model	Annual rates of credit volatility	-0.5%p ~ +0.5%p
Equity Conversion Option	30,384	3	Binominal option pricing model	Annual rates of credit volatility Underlying asset (equity) volatility	-0.5%p ~ +0.5%p -5% ~ +5%

(5) Sensitivity analysis for Recurring Fair Value Measurements Categorized Within Level 3

Sensitivity analysis of financial instruments is performed to measure favorable and unfavorable changes in the fair value of financial instruments which are affected by the unobservable parameters, using a statistical technique. When the fair value is affected by more than two input parameters, the most favorable or most unfavorable amounts are presented.

The results of the sensitivity analysis for the effect on profit or loss from changes in inputs for convertible notes categorized as level 3 and subject to sensitivity analysis, are as follows:

(in millions of Korean won)

		September 30, 2019	
		The effect on profit	The effect on loss
Financial liabilities			
– Convertible Bond			
Annual rates of credit volatility		50	(51)
Financial liabilities			
– Equity Conversion Option			
Annual rates of credit volatility		192	(183)
Underlying asset (equity) volatility		877	(924)

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<i>(in millions of Korean won)</i>	December 31, 2018	
	The effect on profit	The effect on loss
Financial liabilities		
– Convertible Bond		
Annual rates of credit volatility	6,899	(7,011)
Financial liabilities		
– Equity Conversion Option		
Annual rates of credit volatility	985	(966)
Underlying asset (equity) volatility	3,237	(3,434)

4. Critical Accounting Estimates and Assumptions

The preparation of financial statements requires the Group to make estimates and assumptions concerning the future. Estimates and assumptions are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. The resulting accounting estimates will, by definition, seldom equal the related actual results.

Significant accounting estimates and assumptions applied in the preparation of these condensed consolidated interim financial statements are the same as those applied to the consolidated financial statements for the year ended December 31, 2018, except for the estimates used to determine income tax expense, and accounting estimates and assumptions for implementation of Korean IFRS 1116 explained as below.

(1) Lease

On adoption of Korean IFRS 1116, the Group recognized lease liabilities in relation to leases which had previously been classified as ‘operating leases’ under the principles of Korean IFRS 1017. These liabilities were measured at the present value of the remaining lease payments, discounted using the lessee’s incremental borrowing rate as at January 1, 2019.

For leases previously classified as ‘finance leases’, the Group recognized the carrying amount of the lease asset and lease liability immediately before the initial application as the carrying amount of the right-of-use asset and the lease liability at the date of initial application. Right-of use assets were measured at the amount equal to the lease liability, adjusted by the amount of any prepaid or accrued lease payments relating to that lease as at December 31, 2018 (Note 11).

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5. Financial Instruments by Category

Categorizations of financial instruments as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

Financial assets	September 30, 2019			Total
	Financial assets at amortized cost	Financial assets at fair value through profit or loss	Financial assets at fair value through other comprehensive income	
Cash and cash equivalents	2,054,796	-	-	2,054,796
Trade receivables	4,294,744	-	280,478	4,575,222
Other receivables	297,502	-	-	297,502
Other non-current receivables	203,318	-	-	203,318
Other current financial assets	-	-	18,793	18,793
Other non-current financial assets	-	21,687	127,020	148,707
Total	6,850,360	21,687	426,291	7,298,338

(in millions of Korean won)

Financial liabilities	September 30, 2019			Total
	Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Other financial liabilities ¹	
Trade payables	-	2,467,243	-	2,467,243
Other payables	-	2,705,605	-	2,705,605
Borrowings (current)	-	1,721,795	21,728	1,743,523
Other current financial liabilities	-	-	-	-
Other non-current financial liabilities	3,808	-	-	3,808
Other non-current payables	-	10,555	-	10,555
Borrowings (non-current)	-	7,100,213	110,282	7,210,495
Total	3,808	14,005,411	132,010	14,141,229

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	December 31, 2018			
	Financial assets at amortized cost	Financial assets at fair value through profit or loss	Financial assets at fair value through other comprehensive income	Total
Financial assets				
Cash and cash equivalents	2,513,702	-	-	2,513,702
Trade receivables	3,986,675	-	394,524	4,381,199
Other receivables	326,093	-	-	326,093
Other non-current receivables	129,251	-	-	129,251
Other non-current financial assets	-	16,077	77,273	93,350
Total	6,955,721	16,077	471,797	7,443,595

(in millions of Korean won)

	December 31, 2018			
	Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Other financial liabilities ¹	Total
Financial liabilities				
Trade payables	-	2,165,969	-	2,165,969
Other payables	-	2,551,476	-	2,551,476
Borrowings (current)	-	1,608,138	5,008	1,613,146
Other current financial liabilities	-	-	18,477	18,477
Other non-current financial liabilities	30,384	-	-	30,384
Other non-current payables	-	9,984	-	9,984
Borrowings (non-current)	-	3,684,765	23,236	3,708,001
Total	30,384	10,020,332	46,721	10,097,437

¹ Other financial liabilities include financial lease liabilities that are not subject to the categorizations.

Net gains or losses on each category of financial instruments for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Dividend income				
Financial assets at fair value through other comprehensive income	1,267	1,316	115	123
Interest income				
Financial assets at amortized cost	9,934	35,326	11,938	35,435

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<i>(in millions of Korean won)</i>	2019		2018	
	Three months	Nine months	Three months	Nine months
Interest expense				
Financial liabilities at amortized cost	(61,782)	(168,145)	(40,210)	(103,962)
Other financial liabilities	(684)	(1,977)	(252)	(776)
Gain (loss) on valuation				
Financial assets at fair value through profit or loss	89	167	65	65
Financial assets at fair value through other comprehensive income	7,317	6,487	3,588	9,755
Derivative instruments	62,386	97,202	(2,683)	(495)
Loss on redemption of debentures				
Financial liabilities at amortized cost	-	-	-	(13)
Loss on disposal				
Financial assets at fair value through other comprehensive income	-	-	-	(1,542)
Exchange differences				
Financial assets at amortized cost	155,301	261,284	(23,451)	104,959
Financial liabilities at amortized cost	(247,816)	(334,573)	(51,747)	(168,305)
Other financial liabilities	476	40	(224)	(82)

6. Cash and Cash Equivalents

Details of cash and cash equivalents as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Bank deposits and cash on hand	870,179	872,337
Deposits held by financial institutions and others	1,184,617	1,641,365
Total	2,054,796	2,513,702

As at September 30, 2019, cash and cash equivalents include ₩4,329 million which is subject to a restriction on the use in association with the national R&D projects.

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7. Trade and Other Receivables

Trade and other receivables and its provisions for impairment, as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables	4,582,316	(7,094)	4,575,222
Other current receivables	299,611	(2,109)	297,502
Other non-current receivables ¹	203,318	-	203,318
Total	5,085,245	(9,203)	5,076,042

(in millions of Korean won)

	December 31, 2018		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables	4,389,109	(7,910)	4,381,199
Other current receivables	328,819	(2,726)	326,093
Other non-current receivables ¹	129,251	-	129,251
Total	4,847,179	(10,636)	4,836,543

¹ As at September 30, 2019, ₩837 million of other non-current receivables represents deposits which are restricted from withdrawal in connection with maintaining checking accounts (December 31, 2018: ₩931 million).

Details of other receivables as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019	December 31, 2018
Current		
Non-trade receivables	226,684	242,740
Deposits held by financial institutions ¹	30,368	42,902
Accrued income	2,578	3,533
Guarantee deposits provided	37,872	36,918
	<u>297,502</u>	<u>326,093</u>
Non-current		
Non-trade receivables	31,684	7,030
Deposits held by financial institutions ²	107,437	64,331
Loans	508	312
Guarantee deposits provided	63,689	57,578
	<u>203,318</u>	<u>129,251</u>
Total	500,820	455,344

¹ As at September 30, 2019, ₩300 million (December 31, 2018: ₩300 million) is pledged as a collateral for borrowings and others.

² As at September 30, 2019, ₩106,600 million (December 31, 2018: ₩63,400 million) is restricted from being withdrawn in relation to large, small and medium-sized companies cooperation agreement and others.

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The aging analysis of trade and other receivables as at September 30, 2019 and December 31, 2018, is as follows:

(in millions of Korean won)

	September 30, 2019		December 31, 2018	
	Trade receivables	Other receivables	Trade receivables	Other receivables
Receivables not past due	4,085,272	471,662	4,115,060	445,357
Past due but not impaired				
Up to 3 months	491,661	29,158	268,488	10,604
Between 3-6 months	428,550	21,270	247,287	6,850
Over 6 months	37,429	4,986	5,631	1,907
	25,682	2,902	15,570	1,847
Impaired receivables	5,383	2,109	5,561	2,109
	4,582,316	502,929	4,389,109	458,070

Movements on the provision for impairment of trade and other receivables for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	7,910	-	2,726	-
Business combination (Note 34)	-	-	-	-
Additions (reversal)	2	-	(640)	-
Write-off	(651)	-	-	-
Exchange differences	(167)	-	23	-
Ending balance	7,094	-	2,109	-

(in millions of Korean won)

	December 31, 2018			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	7,552	-	959	-
Business combination (Note 34)	23	-	-	-
Additions	701	-	1,783	-
Write-off	(333)	-	-	-
Exchange differences	(33)	-	(16)	-
Ending balance	7,910	-	2,726	-

As at September 30, 2019 and December 31, 2018, the carrying amounts of trade and other receivables are approximation of their fair values.

The Group transferred trade and other receivables to financial institutions for ₩491,238 million at September 30, 2019, and derecognized the trade and other receivables from the financial statements at the date of disposal, as substantial all the risks and rewards were transferred.

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8. Other Financial Assets

Details of other financial assets as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Other financial assets		
Financial assets at fair value through other comprehensive income (futures contract) (current)	18,793	-
Financial assets at fair value through other comprehensive income (excluding futures contract) (non-current)	93,665	77,273
Financial assets at fair value through other comprehensive income (futures contract) (non-current)	33,355	-
Financial assets at fair value through profit or loss (excluding futures contract) (non-current)	21,686	16,077
	<u>167,499</u>	<u>93,350</u>
Other financial liabilities		
Financial liabilities at fair value through other comprehensive income (futures contract) (current)	-	18,477
Financial liabilities at fair value through profit or loss (conversion rights) (non-current)	3,808	30,384
	<u>3,808</u>	<u>48,861</u>

Changes in equity securities and debts instruments included in other financial assets for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Beginning balance	93,350	23,782
Acquisitions / Transfer	17,954	89,240
Disposals	(2,607)	(14,009)
Gain (loss) on valuation (before income tax effects) through other comprehensive income	6,487	(5,736)
Gain on valuation (before income tax effects) through profit or loss	167	73
Ending balance	<u>115,351</u>	<u>93,350</u>

During the nine-month period ended September 30, 2019 and the year ended December 31, 2018, the Group did not recognize impairment for other financial assets.

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9. Inventories

Details of inventories as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019		
	Gross Amount	Valuation allowance	Carrying amount
Merchandise	184,365	(3,999)	180,366
Finished / Semi-finished products	2,802,898	(134,933)	2,667,965
Work-in-process	16,050	-	16,050
Raw materials	1,268,072	(18,346)	1,249,726
Supplies	173,718	-	173,718
Materials-in-transit	688,859	-	688,859
Total	5,133,962	(157,278)	4,976,684

(in millions of Korean won)

	December 31, 2018		
	Gross Amount	Valuation allowance	Carrying amount
Merchandise	167,842	(958)	166,884
Finished / Semi-finished products	2,480,102	(125,479)	2,354,623
Work-in-process	15,530	-	15,530
Raw materials	1,111,386	(18,573)	1,092,813
Supplies	154,304	-	154,304
Materials-in-transit	505,309	-	505,309
Total	4,434,473	(145,010)	4,289,463

During the nine-month period ended September 30, 2019, the cost of inventories recognized as expense and included in 'cost of sales' amounted to ₩13,026,169 million (2018: ₩12,821,834 million).

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10. Investments in Associates and Joint Ventures

Changes in investments in associates and joint ventures for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019						
	Beginning balance	Acquisitions / transfer	Dividends	Share of profit (loss) of associates and joint ventures	Share of other comprehensive income of associates and joint ventures	Others	Ending balance
LG VINA Chemical Co., Ltd	4,479	-	-	(54)	406	-	4,831
HL Greenpower Co., Ltd.	19,565	-	-	3,819	-	(118)	23,266
LG Holdings (HK) Ltd.	54,735	-	-	3,008	(1,304)	(15,789)	40,650
TECHWIN Co., Ltd.	9,828	-	-	2,096	(15)	-	11,909
SEETEC Co., Ltd.	145,649	-	(10,000)	4,883	-	(14)	140,518
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	579
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	150
LG Fuel Cell Systems Inc.	-	-	-	-	-	-	-
FJ Composite Materials Co., LTD.	2,315	-	-	(357)	152	-	2,110
WUXI CL New Energy Technology Ltd.	1,288	-	-	(287)	44	-	1,045
LG Life Sciences Poland Ltd.	17	-	-	-	-	-	17
Combustion Synthesis Co., Ltd.	1,397	-	-	(168)	27	151	1,407
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD. ¹	26,120	27,676	-	302	393	-	54,491
VINFAST LITHIUM BATTERY PACK LLC. ²	-	5,323	-	-	-	-	5,323
	<u>266,122</u>	<u>32,999</u>	<u>(10,000)</u>	<u>13,242</u>	<u>(297)</u>	<u>(15,770)</u>	<u>286,296</u>

(in millions of Korean won)

	December 31, 2018						
	Beginning balance	Acquisitions / transfer	Dividends	Share of profit (loss) of associates and joint ventures	Share of other comprehensive income of associates and joint ventures	Others	Ending balance
LG VINA Chemical Co., Ltd	3,327	1,767	(810)	246	(51)	-	4,479
HL Greenpower Co., Ltd.	20,239	-	-	(467)	-	(207)	19,565
LG Holdings (HK) Ltd.	51,028	-	-	4,029	(322)	-	54,735
TECHWIN Co., Ltd.	8,010	-	-	1,818	-	-	9,828
SEETEC Co., Ltd.	146,741	-	(10,000)	9,368	-	(460)	145,649
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	579
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	150
LG Fuel Cell Systems Inc.	30,334	5,036	-	(9,647)	718	(26,441)	-
FJ Composite Materials Co., LTD.	2,669	-	-	(198)	(156)	-	2,315
WUXI CL New Energy Technology Ltd.	1,002	559	-	(224)	(49)	-	1,288
LG Life Sciences Poland	17	-	-	-	-	-	17

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Ltd.											
Combustion Synthesis Co., Ltd.	-	1,503	-	(118)	(4)	16	1,397				
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	-	26,129	-	279	(288)	-	26,120				
	<u>264,096</u>	<u>34,994</u>	<u>(10,810)</u>	<u>5,086</u>	<u>(152)</u>	<u>(27,092)</u>	<u>266,122</u>				

¹During the nine-month period ended September 30, 2019, the Parent Company acquired additional shares of HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD. for ₩27,676 million.

²During the nine-month period ended September 30, 2019, the Parent Company newly acquired 35% shares of VINFAST LITHIUM BATTERY PACK LLC. for ₩5,323 million.

11. Property, Plant and Equipment

Changes in property, plant and equipment for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019											
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Right-of-use assets	Construction-in-progress	Machinery in-transit	Total
Beginning												
balance	1,620,153	3,187,757	827,775	4,691,884	12,865	471,130	149,599	115,901	-	2,588,018	174,116	13,839,198
Cost	1,657,105	3,959,198	1,407,903	14,412,619	41,803	1,233,217	420,342	315,049	-	2,641,276	174,116	26,262,628
Accumulated depreciation	-	(735,173)	(566,151)	(9,564,688)	(28,783)	(750,202)	(268,298)	(196,996)	-	-	-	(12,110,291)
Accumulated impairment	(36,952)	(36,268)	(13,977)	(156,047)	(155)	(11,885)	(2,445)	(2,152)	-	(53,258)	-	(313,139)
Changes in accounting policy	-	-	(17,697)	(9,668)	-	-	-	-	171,887	-	-	144,522
Restated beginning balance	1,620,153	3,187,757	810,078	4,682,216	12,865	471,130	149,599	115,901	171,887	2,588,018	174,116	13,983,720
Acquisitions/Transfer	148,451	573,970	177,347	2,375,736	5,327	217,566	38,816	140,529	35,881	4,526,683	170,704	8,411,010
Disposals/Transfer	(4,124)	(2,494)	(2,947)	(86,863)	(10,101)	(11,185)	(2,342)	(174)	(10,498)	(3,654,959)	(158,760)	(3,944,447)
Exchange differences	(57)	28,537	3,831	48,367	57	3,863	1,198	-	3,052	6,336	-	95,184
Depreciation	-	(83,785)	(40,564)	(884,495)	(1,973)	(121,598)	(33,755)	(61,753)	(21,318)	-	-	(1,249,241)
Impairment	-	(3,139)	(1,429)	(18,606)	-	(421)	(29)	-	-	-	-	(23,624)
Transfer to non-current asset held for sale (Note 35)	-	-	-	(5,436)	-	(54)	-	-	-	-	-	(5,490)
Ending balance	<u>1,764,423</u>	<u>3,700,846</u>	<u>946,316</u>	<u>6,110,919</u>	<u>6,175</u>	<u>559,301</u>	<u>153,487</u>	<u>194,503</u>	<u>179,004</u>	<u>3,466,078</u>	<u>186,060</u>	<u>17,267,112</u>
Cost	1,801,375	4,565,445	1,558,516	16,550,696	32,786	1,406,000	450,887	374,586	227,667	3,517,870	186,060	30,671,888
Accumulated depreciation	-	(825,115)	(596,517)	(10,283,862)	(26,460)	(834,390)	(294,975)	(177,931)	(48,663)	-	-	(13,087,913)
Accumulated impairment	(36,952)	(39,484)	(15,683)	(155,915)	(151)	(12,309)	(2,425)	(2,152)	-	(51,792)	-	(316,863)

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	December 31, 2018										
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Construction-in-progress	Machinery-in-transit	Total
Beginning balance	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
Cost	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
Accumulated depreciation	-	(637,025)	(521,806)	(8,840,809)	(26,143)	(669,189)	(243,973)	(136,034)	-	-	(11,074,979)
Accumulated impairment	(36,952)	(38,387)	(13,948)	(147,199)	(148)	(13,041)	(2,374)	(2,152)	(43,554)	-	(297,755)
Business combination (Note 34)	12,115	13,497	632	22,163	247	1,992	159	-	1,310	-	52,115
Acquisitions/ Transfer	42,589	523,470	222,046	2,336,407	2,235	217,702	86,201	113,754	4,741,547	181,833	8,467,784
Disposals/ Transfer	(2,817)	(5,098)	(1,765)	(792,444)	(183)	(11,304)	(2,624)	(3,485)	(3,461,294)	(150,003)	(4,431,017)
Exchange differences	(29)	(6,950)	(466)	(20,254)	(2)	(138)	320	-	(1,865)	-	(29,384)
Depreciation	-	(95,479)	(47,000)	(986,099)	(3,066)	(139,783)	(40,127)	(67,767)	-	-	(1,379,321)
Impairment	-	(4,295)	(343)	(37,727)	(25)	(862)	(104)	-	(9,557)	-	(52,913)
Reversal of impairment	-	24	42	365	5	1	15	-	-	-	452
Ending balance	1,620,153	3,187,757	827,775	4,691,884	12,865	471,130	149,599	115,901	2,588,018	174,116	13,839,198
Cost	1,657,105	3,959,198	1,407,903	14,412,619	41,803	1,233,217	420,342	315,049	2,641,276	174,116	26,262,628
Accumulated depreciation	-	(735,173)	(566,151)	(9,564,688)	(28,783)	(750,202)	(268,298)	(196,996)	-	-	(12,110,291)
Accumulated impairment	(36,952)	(36,268)	(13,977)	(156,047)	(155)	(11,885)	(2,445)	(2,152)	(53,258)	-	(313,139)

During the nine-month period ended September 30, 2019, the Group capitalized ₩18,276 million of borrowing costs (2018: ₩13,669 million), 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 2.31% (2018: 2.18%).

Line items including depreciation in the consolidated statements of profit or loss for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Cost of sales	403,539	1,131,066	315,055	923,949
Selling and administrative expenses	42,180	114,374	29,652	85,403
Others	1,363	3,801	1,971	3,466
Total	447,082	1,249,241	346,678	1,012,818

Lease

The Group has applied Korean IFRS 1116 retrospectively with the cumulative effect of initially applying the new lease standard recognized at the date of initial application, as permitted under the specific transitional provisions in the standard. Accordingly, reclassifications and adjustments arising from the new lease standard were recognized in the consolidated statement of financial position as at January 1, 2019.

- Adjustments recognized on adoption of Korean IFRS 1116 Lease

On adoption of Korean IFRS 1116, the Group recognized lease liabilities in relation to leases which had previously been classified as 'operating leases' under the principles of Korean IFRS 1017. These liabilities were measured at the present value of the remaining lease payments, discounted using the lessee's incremental borrowing rate as at January 1, 2019. The weighted average

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lessee's incremental borrowing rate applied to the lease liabilities on January 1, 2019 was 2.45%.

For leases previously classified as 'finance leases', the Group recognized the carrying amount of the lease asset and lease liability immediately before the initial application as the carrying amount of the right-of-use asset and the lease liability at the date of initial application.

(in millions of Korean won)

	2019	
Operating lease commitments disclosed as at December 31, 2018	₩	148,310
Discounted using the lessee's incremental borrowing rate of at the date of initial application		136,043
Add: finance lease liabilities recognized as at December 31, 2018		28,244
Less: short-term leases recognized on a straight-line basis as expense		(30,871)
Less: low-value leases recognized on a straight-line basis as expense		(10,111)
Lease liabilities recognized as at January 1, 2019		123,305
Current lease liabilities		25,305
Non-current lease liabilities		98,000
	₩	123,305

Right-of use assets were measured at the amount equal to the lease liability, adjusted by the amount of any prepaid or accrued lease payments relating to that lease recognized in the statement of financial position as at December 31, 2018. There were no onerous lease contracts that would have required an adjustment to the right-of-use assets at the date of initial application.

(i) Amounts recognized in the consolidated interim statement of financial position

The consolidated interim statement of financial position shows the following amounts relating to leases:

(in millions of Korean won)

	September 30, 2019	January 1, 2019
Right-of-use assets ¹		
Real-estate	142,497	131,096
Machinery	15,492	17,968
Vehicles	19,381	20,459
Tools	8	17
Equipment	1,626	2,347
	<u>179,004</u>	<u>171,887</u>

¹ Included in the line item 'Property, plant and equipment' in the consolidated interim statements of financial position.

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<i>(in millions of Korean won)</i>	September 30, 2019	January 1, 2019
Lease liabilities ¹		
Current	21,728	25,305
Non-current	110,282	98,000
	<u>132,010</u>	<u>123,305</u>

¹ Included in the line item 'borrowings' in the consolidated interim statements of financial position. In the previous year, the Group only recognized lease liabilities in relation to leases that were classified as 'finance leases' under Korean IFRS 1017 *Leases*. These were presented as part of the Group's borrowings.

(ii) Amounts recognized in the consolidated interim statement of profit or loss

The consolidated interim statement of profit or loss shows the following amounts relating to leases:

<i>(in millions of Korean won)</i>	2019
Depreciation of right-of-use assets	
Real-estate	11,886
Machinery	2,505
Vehicles	6,328
Tools	10
Equipment	589
	<u>21,318</u>
Interest expense relating to lease liabilities (included in finance cost)	1,977
Expense relating to short-term leases (included in cost of goods sold and administrative expenses)	36,887
Expense relating to leases of low-value assets that are not short-term leases (included in cost of goods sold and administrative expenses)	8,036
Expense relating to variable lease payments not included in lease liabilities (included in cost of goods sold and administrative expenses)	16

The total cash outflow for leases during the nine-month period ended September 30, 2019 was ₩54,378 million.

Financial line items affected by the initial application of Korea IFRS 1116 in the consolidated interim statement of financial position as at January 1, 2019 are as follows:

- property, plant and equipment: decreased by ₩27,365 million
- right-of-use assets: increased by ₩171,887 million
- long-term prepaid expenses: decreased by ₩49,460 million
- lease liabilities: increased by ₩95,062 million

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(iii) Practical expedients applied

In applying Korean IFRS 1116 for the first time, the Group has used the following practical expedients permitted by the standard:

- the use of a single discount rate to a portfolio of leases with reasonably similar characteristics
- reliance on previous assessments on whether leases are onerous
- the accounting for operating leases with a remaining lease term of less than 12 months as at January 1, 2019, as short-term leases
- the exclusion of initial direct costs for the measurement of the right-of-use asset at the date of initial application, and
- the use of hindsight in determining the lease term where the contract contains options to extend or terminate the lease

- The Group's leasing activities and how these are accounted for

The Group leases various offices, warehouses, machinery and cars. Lease contracts are typically made for fixed periods, but may have extension options. Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions. The lease agreements do not impose any covenants, but leased assets shall not be provided as collateral for borrowing purposes.

Until the 2018 financial year, leases of property, plant and equipment were classified as either finance or operating leases. Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

From January 1, 2019, leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the Group. Each lease payment is allocated between the liability and finance cost. The finance cost is charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis.

Assets and liabilities arising from a lease are initially measured on a present value basis. Lease liabilities include the net present value of the following lease payments:

- fixed payments (including in-substance fixed payments), less any lease incentives receivable
- variable lease payment that are based on an index or a rate
- amounts expected to be payable by the lessee under residual value guarantees
- the exercise price of a purchase option if the lessee is reasonably certain to exercise that option, and
- payments of penalties for terminating the lease, if the lease term reflects the lessee exercising that option

The lease payments are discounted using the interest rate implicit in the lease, if that rate can be readily determined. If that rate cannot be readily determined, the lessee's incremental borrowing rate is used. The lessee's incremental borrowing rate is defined as the rate of interest that a lessee would have to pay to borrow over a similar term, and with a similar security, the funds necessary to obtain an asset of a similar value to the right-of-use asset in a similar economic environment.

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Right-of-use assets are measured at cost comprising the following:

- the amount of the initial measurement of lease liability
- any lease payments made at or before the commencement date less any lease incentives received
- any initial direct costs, and
- restoration costs

Payments associated with short-term leases and leases of low-value assets are recognized on a straight-line basis as an expense in profit or loss. Short-term leases are leases with a lease term of 12 months or less. Low-value assets comprise IT-equipment and small items of office furniture.

(i) Variable lease payments

Some property leases contain variable payment terms that are linked to usage generated from warehouses. Variable lease payments that depend on the usage are recognized in profit or loss in the period in which the condition that triggers those payments occurs.

(ii) Extension and termination options

Extension and termination options are included in a number of property and equipment leases across the Group. These terms are used to maximize operational flexibility in terms of managing contracts. The majority of extension and termination options held are exercisable only by the Group and not by the respective lessor. In determining the lease term, management considers all facts and circumstances that create an economic incentive to exercise an extension option, or not to exercise a termination option. Periods covered by extension options (or termination options) are only included in the lease term if it is reasonably certain to exercise an extension option, or not to exercise a termination option.

12. Intangible Assets

Changes in intangible assets for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

	September 30, 2019					
	Development costs	Industrial property rights	Goodwill	Memberships	Others	Total
Beginning balance	220,860	405,282	1,017,855	50,885	311,356	2,006,238
Separate acquisitions/ Transfer ¹	60,730	188,871	-	-	47,622	297,223
Additions – internal development	11,141	-	-	-	-	11,141
Disposals/ Transfer	(8,208)	(3,082)	-	(114)	(10,225)	(21,629)
Exchange differences	444	2,509	4,971	22	114	8,060
Amortization	(35,563)	(31,733)	-	-	(30,123)	(97,419)
Ending balance	249,404	561,847	1,022,826	50,793	318,744	2,203,614

¹ Intangible assets acquired from Dupont related to S-OLED are included.

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(in millions of Korean won)

	December 31, 2018					Total
	Development costs	Industrial property rights	Goodwill	Memberships	Others	
Beginning balance	192,046	371,381	925,593	50,806	283,329	1,823,155
Business combination (Note 34)	-	4	87,871	-	51,829	139,704
Separate acquisitions/ Transfer	83,049	63,008	-	702	34,750	181,509
Additions – internal development	16,065	-	-	-	-	16,065
Disposals/ Transfer	(15,149)	(69)	-	(623)	(23,150)	(38,991)
Exchange differences	(115)	1,433	4,391	-	(120)	5,589
Amortization	(42,276)	(30,475)	-	-	(35,197)	(107,948)
Impairment	(12,760)	-	-	-	(85)	(12,845)
Ending balance	220,860	405,282	1,017,855	50,885	311,356	2,006,238

Line items including amortization of intangible assets for the three-month and nine-month periods ended September 30, 2019 and 2018, as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Cost of sales	7,351	19,438	5,734	17,604
Selling and administrative expenses	28,388	77,981	21,110	62,180
Total	35,739	97,419	26,844	79,784

The Group recognized total research and development costs of ₩796,317 million (2018: ₩737,036 million) as expenses.

Changes in greenhouse gas emission permits for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

(in thousands of tons and millions of Korean won)

	September 30, 2019			
	2018		2019	
	Quantity	Amount	Quantity	Amount
Beginning balance	7,903	7,359	7,546	-
Allocation with nil consideration	245	-	-	-
Purchase	100	2,790	-	-
Borrowings/ Carry forwards between years	20	-	(20)	-
Surrendered to the government	(8,268)	(10,149)	-	-
Ending balance	-	-	7,526	-

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<i>(in thousands of tons and millions of Korean won)</i>	December 31, 2018					
	2017		2018		2019	
	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance	7,520	18,635	6,648	-	-	-
Allocation with nil consideration	160	-	897	-	7,546	-
Purchase	481	11,826	-	-	-	-
Borrowings/Carry forwards between years	(358)	(7,359)	358	7,359	-	-
Surrendered to the government	(7,803)	(23,102)	-	-	-	-
Ending balance	-	-	7,903	7,359	7,546	-

13. Other Current and Non-Current Assets

Details of other current and non-current assets as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Current		
Prepayments to suppliers and prepaid expenses	305,519	138,502
Prepaid value added tax	483,797	373,187
Others	135,410	61,771
Total	924,726	573,460
Non-current		
Long-term prepayments and long-term prepaid expenses	82,957	112,223
Others	98	157
Total	83,055	112,380

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14. Borrowings

Borrowings as at September 30, 2019 and December 31, 2018, consist of:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Current		
Short-term borrowings	1,175,642	1,254,142
Current portion of long-term borrowings of bank loans	326,270	304,004
Current-portion of debentures	219,883	49,992
Lease liabilities	21,728	5,008
	<u>1,743,523</u>	<u>1,613,146</u>
Non-current		
Long-term borrowings	1,739,611	981,858
Debentures	5,360,602	2,702,907
Lease liabilities	110,282	23,236
	<u>7,210,495</u>	<u>3,708,001</u>
Total	<u>8,954,018</u>	<u>5,321,147</u>

Details of short-term borrowings as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	Bank	Latest maturity date	Interest rate(%) as at September 30, 2019	September 30, 2019	December 31, 2018
Bank loans	Nonghyup Bank, others	Sep. 25, 2020	2.60 and others	1,175,642	1,254,142
Total				<u>1,175,642</u>	<u>1,254,142</u>

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Details of long-term borrowings as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)	September 30, 2019				
	Bank	Annual interest rate (%)	Amount in Korean won	Current	Non-current
Borrowings in Korean won	KEB Hana Bank ¹	1.75	88	88	-
	KDB ¹	(1Y) + 1.45 ~ 1.99	7,608	-	7,608
Borrowings in foreign currencies	HSBC	USD: 3M LIBOR + 0.95~1.40 CNY: PBOC ×0.95	245,088	55,395	189,693
	SMBC	3M LIBOR + 0.65~1.05	107,665	43,588	64,077
	Agricultural Bank of China	USD: 3M LIBOR + 0.80 CNY: PBOC ×0.90	38,656	10,445	28,211
	Construction Bank of China	PBOC ×0.90	20,853	3,883	16,970
	Communications Bank of China	PBOC ×1.00	39,223	5,897	33,326
	CITI	USD: 3M LIBOR + 0.95 EUR: EURIBOR + 0.65	284,010	44,158	239,852
	Bank of America	3M LIBOR + 0.90	46,851	-	46,851
	ING	6M EURIBOR + 0.70~0.83	157,560	-	157,560
	UOB	6M LIBOR + 1.20	115,111	55,515	59,596
	Standard Chartered Bank	USD: 3M LIBOR + 1.20 CNY: PBOC ×0.95	110,152	-	110,152
	Mizuho Banking Corporation	3M LIBOR + 0.98	32,143	7,143	25,000
	BNP	3M EURIBOR + 0.80	19,695	19,695	-
	CNOOC Finance	PBOC ×0.90	36,569	16,346	20,223
	Hangseng	3M LIBOR + 1.00	30,392	30,392	-
	Bank of China	3M LIBOR + 0.95	25,299	12,873	12,426
	MUFG	USD: 3LIBOR + 1.00 EUR:3M EURIBOR + 0.60~0.80	178,952	5,957	172,995
	ANZ	3M LIBOR +0.85	119,193	-	119,193
	Industrial and Commercial Bank of China	PBOC ×1.00	41,557	4,812	36,745
	CIMB	3LIBOR + 1.50	59,593	5,959	53,634
	KEB Hana Bank	3M EURIBOR + 0.62	262,600	-	262,600
KDB	3LIBOR + 0.93	31,115	3,112	28,003	
Deutsche Bank	PBOC×0.84	55,908	1,012	54,896	
Total			2,065,881	326,270	1,739,611

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, 2018				
	Bank	Annual interest rate (%)	Amount in Korean won	Current	Non-current
Borrowings in Korean won	KEB Hana Bank ¹	1.75	353	353	-
	KDB ¹	1Y + 1.45 ~ 1.99	8,508	-	8,508
Borrowings in foreign currencies	HSBC	3M LIBOR + 1.00~1.05	240,167	39,097	201,070
	SMBC	3M LIBOR + 0.98~1.05	94,568	50,265	44,303
	Agricultural Bank of China	USD: 3M LIBOR + 0.80 CNY: PBOC ×0.90	42,694	8,665	34,029
	Construction Bank of China	PBOC ×0.90	23,890	3,750	20,140
	Communications Bank of China	PBOC	40,617	2,751	37,866
	CITI	USD: 3M LIBOR + 0.95 Euro: EURIBOR + 0.70	146,957	-	146,957
	Bank of America	3M LIBOR + 0.90	11,181	11,181	-
	ING	6M Euribor + 0.70~0.83	153,422	-	153,422
	UOB	6M LIBOR + 1.15~1.55	108,954	53,101	55,853
	Standard Chartered Bank	3M LIBOR + 1.60	26,216	26,216	-
	Mizuho Banking Corporation	3M LIBOR + 0.98~1.02	78,154	48,030	30,124
	BNP	Euro: EURIBOR + 0.99 PLN: WIBOR + 0.55	19,178	19,178	-
	CNOOC Finance	PBOC ×0.90	54,850	22,298	32,552
	Hangseng	3M LIBOR + 1.00	31,836	3,352	28,484
	Bank of China	3M LIBOR + 0.95	29,743	12,065	17,678
	MUFG	3M Libor + 1.00	44,659	2,791	41,868
ANZ	3M Libor +1.42	111,705	-	111,705	
Industrial and Commercial Bank of Chin	PBOC	18,210	911	17,299	
Total			<u>1,285,862</u>	<u>304,004</u>	<u>981,858</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 September 30, 2019 and December 31, 2018, are as follows:

		September 30, 2019				
		Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current	Non- current
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
51-1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.56	2021.02.20	190,000	-	190,000
51-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.88	2023.02.20	240,000	-	240,000
51-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.07	2025.02.20	270,000	-	270,000
51-4th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.29	2028.02.20	300,000	-	300,000
52-1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.02	2022.03.13	160,000	-	160,000
52-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.11	2024.03.13	240,000	-	240,000
52-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.21	2026.03.13	200,000	-	200,000
52-4th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.40	2029.03.13	400,000	-	400,000
1-1st USD Overseas Convertible bonds¹	Credit Suisse	-	2021.04.16	264,286	-	264,286
1-2nd EUR Overseas Convertible bonds²	Credit Suisse	-	2021.04.16	414,375	-	414,375
USD foreign currency debenture with maturity in 2024	CITI and others	3.25	2024.10.15	600,650	-	600,650
USD foreign currency debenture with maturity in 2029	CITI and others	3.63	2029.04.15	600,650	-	600,650
EUR foreign currency debenture with maturity in 2023	CITI and others	0.50	2023.04.15	657,320	-	657,320
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
	NH Investment & Securities Co., Ltd. and others	2.71	2021.03.02	50,000	-	50,000
	NH Investment & Securities Co., Ltd. and others	3.00	2023.03.02	40,000	-	40,000
Less: discount on debentures				(46,796)	(117)	(46,679)
Total				<u>5,580,485</u>	<u>219,883</u>	<u>5,360,602</u>

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¹ Details of 1-1st USD overseas convertible bonds are as follows:

	Details
Aggregate principal amount	USD 220,000,000
Issue price	USD 220,000,000
Coupon rate (%)	0.00
Issue date	April 16, 2018
Maturity date	April 16, 2021
Redemption	- Redemption at maturity: Outstanding bond principal, which is not repaid early or which call option is not exercised on, is repaid at maturity as a lump sum. - Prepayment: The issuer has a call option.
Underlying shares	509,606 registered ordinary shares (treasury shares)
Conversion price (Korean won/shares)	460,000
Conversion period	From May 27, 2018 to April 06, 2021
Call option by the issuer	- Share price (based on closing price) is higher than 130% of conversion price for more than 20 trading days during 30 consecutive trading days in a row, after 1 year from the closing date. - The amount of outstanding bonds is less than 10% in aggregate principal amount of the bonds originally issued (clean up call). - As a result of changes relating to tax laws in Korea, the issuer becomes obliged to pay any additional amounts.
Call option by bondholders	- The shares cease to be listed or admitted to trading or are suspended for a period equal to or exceeding 30 consecutive trading days. - The occurrence of a change of control

² Details of 1-2nd EUR overseas convertible bonds are as follows:

	Details
Aggregate principal amount	EUR 315,200,000
Issue price	EUR 315,200,000
Coupon rate (%)	0.00
Issue date	April 16, 2018
Maturity date	April 16, 2021
Redemption	- Redemption at maturity: Outstanding bond principal, which is not repaid early or which call option is not exercised on, is repaid at maturity as a lump sum. - Prepayment: The issuer has a call option.
Underlying shares	775,128 registered ordinary shares (treasury shares)
Conversion price (Korean won/shares)	533,600
Conversion period	From May 27, 2018 to April 06, 2021
Call option by the issuer	- Share price (based on closing price) is higher than 130% of conversion price for more than 20 trading days during 30 consecutive trading days in a row, after 1 year from the closing date. - The amount of outstanding bonds is less than 10% in aggregate principal amount of the bonds originally issued (clean up call). - As a result of changes relating to tax laws in Korea, the issuer becomes obliged to pay any additional amounts.
Call option by bondholders	- The shares cease to be listed or admitted to trading or are suspended for a period equal to or exceeding 30 consecutive trading days. - The occurrence of a change of control

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(in millions of Korean won)

		December 31, 2018				
	Financial institution	Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current	Non- current
48th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.77	2019.02.21	50,000	50,000	-
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
51-1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.56	2021.02.20	190,000	-	190,000
51-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.88	2023.02.20	240,000	-	240,000
51-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.07	2025.02.20	270,000	-	270,000
51-4th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.29	2028.02.20	300,000	-	300,000
1-1st USD Overseas Convertible bonds¹	Credit Suisse	-	2021.04.16	245,982	-	245,982
1-2nd EUR Overseas Convertible bonds²	Credit Suisse	-	2021.04.16	403,191	-	403,191
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
	NH Investment & Securities Co., Ltd. and others	2.71	2021.03.02	50,000	-	50,000
	NH Investment & Securities Co., Ltd. and others	3.00	2023.03.02	40,000	-	40,000
Less: discount on debentures				(36,274)	(8)	(36,266)
Total				<u>2,752,899</u>	<u>49,992</u>	<u>2,702,907</u>

Details of lease liabilities as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

		September 30, 2019			
Leaser	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Hyundai Oil Bank and others	1.98 ~ 4.13	2068.12.31	132,010	21,728	110,282

(in millions of Korean won)

		December 31, 2018			
Leaser	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Hyundai Oil Bank	3.12	2024.12.31	27,168	4,886	22,282
CHUNGBUK					
TECHNOPARK	4.13	2023.12.31	1,076	122	954
Total			<u>28,244</u>	<u>5,008</u>	<u>23,236</u>

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15. Provisions

Changes in provisions for other liabilities and charges for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, as follows:

	September 30, 2019				
	Warranty ¹	Greenhouse gas emission ²	Legal Claims ³	Restoration ⁴	Total
Beginning balance	198,575	11,700	402	126,976	337,653
Additions	274,059	19,937	28	747	294,771
Used	(144,684)	(10,149)	-	(12,038)	(166,871)
Ending balance	327,950	21,488	430	115,685	465,553
Less : current portion	(164,858)	(21,488)	(46)	(26,754)	(213,146)
Total	163,092	-	384	88,931	252,407

	December 31, 2018				
	Warranty ¹	Greenhouse gas emission ²	Legal claims ³	Restoration ⁴	Total
Beginning balance	92,662	23,069	20,629	90,056	226,416
Additions	208,511	11,733	7,070	50,439	277,753
Used	(102,598)	(23,102)	(27,297)	(13,519)	(166,516)
Ending balance	198,575	11,700	402	126,976	337,653
Less : current portion	(81,146)	(11,700)	-	(26,520)	(119,366)
Total	117,429	-	402	100,456	218,287

¹ Warranty provisions have been accrued for the estimated warranty costs to be incurred due to quality control, exchange, refunds with the regard to products based on historical experience. In addition, provisions related to operational loss compensation for ESS fire accidents are included.

² Greenhouse gas emission provisions have been accrued for estimated expenditures to be obligated for any excess emission. The estimated emission as at September 30, 2019 amounts to 6,108 thousand tons (September 2018: 5,955 thousand tons).

³ Lawsuit provisions have been accrued for certain pending cases.

⁴ As at September 30, 2019, restoration provisions have been accrued for the estimated expenses to restore land pollutions and others.

16. Net Defined Benefit Liabilities

Details of net defined benefit liabilities recognized in the consolidated interim statements of financial position as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)	September 30, 2019	December 31, 2018
Present value of defined benefit obligations ¹	1,247,935	1,167,524
Fair value of plan assets	(892,713)	(939,980)
Liabilities in the consolidated interim statement of financial position	355,222	227,544

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¹ The present value of retirement benefit obligations is net of existing contributions to the National Pension Plan of ₩780 million as at September 30, 2019 (2018: ₩837 million).

The amounts recognized in the consolidated interim statements of profit or loss for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Current service cost ¹	40,364	120,848	35,912	107,898
Interest cost	1,119	4,149	1,425	4,309
Total, included in employee benefit expenses	41,483	124,997	37,337	112,207

¹ The above amounts excluded ₩1,336 million (2018: ₩743 million) of expenses capitalized to construction in progress and development costs.

Post-employment benefits recognized for defined contribution plan for the nine-month period ended September 30, 2019, amounted to ₩6,125 million (2018: ₩5,438 million).

Post-employment benefits recognized in the consolidated interim statements of profit or loss for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Cost of sales	28,887	86,958	25,783	78,409
Selling and administrative expenses	14,628	44,164	13,671	39,236
Total	43,515	131,122	39,454	117,645

Movements in the present value of defined benefit obligations for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019	December 31, 2018
Beginning balance	1,167,524	1,049,511
Business combination	-	2,461
Transfer in	8,451	12,012
Transfer out	(3,875)	(8,412)
Current service cost	122,184	146,272
Past service cost	-	812
Interest expense	22,986	32,609
Remeasurements:		
Actuarial loss from change in demographic assumptions	-	2,553
Actuarial gain from change in financial assumptions	-	62,476
Actuarial loss from experience adjustments	-	2,139
Others	-	(91)
Exchange differences	(436)	(666)
Payments from plans	(68,899)	(134,152)
Ending balance	1,247,935	1,167,524

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Movements in the fair value of plan assets for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Beginning balance	939,980	868,830
Transfer in	-	1,546
Transfer out	(184)	(628)
Interest income	18,837	26,763
Remeasurements:		
Return on plan assets (excluding amounts included in interest income)	(6,938)	(8,942)
Contributions:		
Employers	-	155,567
Payments from plans	(58,082)	(102,229)
Administrative costs	(900)	(927)
Ending balance	<u>892,713</u>	<u>939,980</u>

The actual return on plan assets for the nine-month period ended September 30, 2019, was ₩11,899 million (December 31, 2018: ₩17,821 million).

The significant actuarial assumptions as at September 30, 2019 and December 31, 2018, are as follows:

	September 30, 2019	December 31, 2018
Discount rate	2.7% ~ 3.0%	2.7% ~ 3.5%
Salary growth rate	2.2% ~ 5.0%	2.2% ~ 5.0%

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The sensitivity analysis for changes in key actuarial assumptions as at September 30, 2019, is as follows:

<i>(in millions of Korean won)</i>	Increase by 0.5%	Decrease by 0.5%
Discount rate:		
Increase (decrease) in defined benefit obligations	(67,636)	74,118
Salary growth rate:		
Increase (decrease) in defined benefit obligations	72,285	(66,716)

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 consolidated 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 September 30, 2019 and December 31, 2018, consist of:

<i>(in millions of Korean won)</i>	September 30, 2019		December 31, 2018	
	Amount	Composition	Amount	Composition
Insurance contracts with guaranteed yield	885,048	99.14%	922,829	98.18%
Equity linked bonds	7,355	0.82%	15,576	1.66%
Time deposits	310	0.04%	1,575	0.16%
	<u>892,713</u>	<u>100.00%</u>	<u>939,980</u>	<u>100.00%</u>

Plan assets consist of various debt instruments with principal and interest protection and others which have no quoted market prices in an active market.

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17. Other Current and Non-Current Liabilities

Details of other current and non-current liabilities as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Current		
Advances from customers	329,388	128,308
Withholdings	84,189	117,442
Unearned revenues	39,757	13,105
Accrued expenses	267,340	298,458
Total	<u>720,674</u>	<u>557,313</u>
Non-current		
Long-term accrued expenses	56,348	52,359
Long-term unearned revenues	15,272	15,272
Long-term advanced received	73,263	28,788
Total	<u>144,883</u>	<u>96,419</u>

18. Commitments and Contingencies

(1) As at September 30, 2019, the Parent Company and certain subsidiaries have been guaranteed from Seoul Guarantee Insurance Company for the execution of contracts and others.

(2) As at September 30, 2019, 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	THB
Limit of bank overdraft	59,100	-	-	220	1,100	29	-	10
Limit of the letter of credit	32,000	478	-	327	5,560	83	2,894	-
Limit of discount of notes from export	-	1,153	-	-	-	-	-	-
Limit of payment guarantees in other foreign currency	-	135	-	-	-	-	-	-
Limit of loan arrangements	-	-	99,888	2,465	3,728	880	-	-

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 USD 55 million.

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- (3) As at September 30, 2019, the Parent Company and certain subsidiaries have B2B purchase arrangements with several financial institutions with limit of ₩450,000 million and ₩152,400 million, respectively.
- (4) As at September 30, 2019, in relation to price fixing of mobile batteries, the consumers in Canada and Israel have filed two class actions against the Parent Company and certain overseas subsidiaries. However, the ultimate outcome of these cases cannot be determined at the reporting date.
- (5) In addition, as at September 30, 2019, the Parent Company and certain subsidiaries have been named as a plaintiff in 16 and 16 legal actions, respectively, involving ₩17,511 million and ₩3,345 million in claims, respectively. They have been named as a defendant in 172 and 29 legal actions, respectively, with ₩6,398 million and ₩19,875 million in claims, respectively. The ultimate outcome of these cases cannot be determined at the reporting date.
- (6) As at September 30, 2019, the Parent Company is under investigation by the related authorities in relation to the manipulation of the emission of fine dust-causing substance in the Yeosu Industrial Complex, and the final outcome of these investigations cannot be determined at the reporting date. As at September 30, 2019, the Parent Company shut down the relevant production facilities.
- (7) The Parent Company has entered into manufacture and production technical contracts with ExxonMobil 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 September 30, 2019, the Parent Company has entered into payment guarantee contract of US\$ 6 million, EUR 7 million and KRW 2,983 million with financial institutions to guarantee the warrant of certain installed products. Also, certain subsidiaries have entered into payment guarantee contract of CNY 230 million with financial institutions in relation to custom of imported raw materials.
- (10) As at September 30, 2019 and December 31, 2018, assets pledged as collateral for the borrowings are as follows:

(in millions of Korean won)

	September 30, 2019			Secured party
	Secured amount	Borrowings / Loan	Limit	
Other receivables	300	Long-term borrowings	88	KEB Hana Bank
Factory	20,880	Short-term and long-term borrowings	16,250	KDB
	<u>21,180</u>		<u>16,338</u>	

(in millions of Korean won)

	December 31, 2018			Secured party
	Secured amount	Borrowings / Loan	Limit	
Other receivables	300	Long-term borrowings	353	KEB Hana Bank
Factory	20,880	Long-term borrowings	16,800	KDB
Dormitory	600	Long-term borrowings	1,038	Woori Bank
	<u>21,780</u>		<u>18,191</u>	

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

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Property, plant and equipment	2,789,741	2,041,834

19. Share Capital

Changes in share capital and share premium for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, 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, 2018	70,592,343	352,962	7,688,800	38,444	2,014,038
December 31, 2018	70,592,343	352,962	7,688,800	38,444	2,014,038
September 30, 2019	70,592,343	352,962	7,688,800	38,444	2,014,038

Changes in treasury shares for the nine-month period ended September 30, 2019 and for the year ended December 31, 2018, are as follows:

<i>(in millions of Korean won and in shares)</i>	Number of shares		Carrying amount	Gain on disposal of treasury shares
	Ordinary shares	Preferred shares		
January 1, 2018	1,652,416	16,367	354,945	13,855
Acquisition of fractional shares	1	-	-	-
December 31, 2018	1,652,417	16,367	354,945	13,855
September 30, 2019	1,652,417	16,367	354,945	13,855

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20. Retained Earnings

Retained earnings as at September 30, 2019 and December 31, 2018, consist of:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Legal reserve ¹	332,535	329,554
Discretionary reserve ²	13,608,917	12,541,819
Retained earnings before appropriation	977,513	2,122,879
Total	<u>14,918,965</u>	<u>14,994,252</u>

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 September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Treasury shares (Note 19)	(354,945)	(354,945)
Capital transactions within the Group ¹	(19,298)	(19,298)
Total	<u>(374,243)</u>	<u>(374,243)</u>

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 three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Wages and salaries	191,999	660,037	203,653	604,858
Post-employment benefits (Note 16)	14,628	44,164	13,671	39,236
Employee benefits	48,726	140,643	39,357	111,681
Travel expense	19,332	56,498	15,150	43,309
Water & utilities	14,431	39,758	12,145	34,715
Packaging expense	2,091	5,705	2,049	6,082
Rental expenses	27,503	75,628	25,497	70,281
Commission expenses	152,848	384,303	110,555	309,359
Depreciation (Note 11)	42,184	114,384	29,661	85,418
Advertising expense	10,252	27,988	7,181	23,284
Freight expenses	150,213	436,149	135,786	408,677
Training expense	7,068	18,552	7,072	17,016
Amortization (Note 12)	28,388	77,981	21,111	62,180
Sample expense	4,869	14,751	4,499	13,624
Development costs	54,652	159,758	45,233	134,843
Others	103,381	391,364	92,309	259,375
Total	872,565	2,647,663	764,929	2,223,938

23. Breakdown of Expenses by Nature

Cost of sales, and selling and administrative expenses by nature for the three-month and nine-month periods ended September 30, 2019 and 2018, consist of:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Changes in inventories of merchandise, finished goods, semi-finished goods and work in process	(100,991)	(327,344)	(316,823)	(593,192)
Raw materials and consumables used	4,098,018	12,406,531	4,464,309	12,407,468
Purchase of merchandise	432,969	946,982	370,306	1,007,558
Employee benefit expenses (Note 24)	611,373	1,975,587	614,518	1,795,242
Advertising expenses	10,527	28,872	7,569	24,254
Freight expenses	160,770	468,207	145,695	437,949
Commission expenses	246,327	643,760	189,012	513,595
Depreciation and amortization	481,463	1,342,868	372,705	1,090,296
Operating lease payments	21,972	65,038	25,463	71,557
Other expenses	1,004,601	2,690,163	759,725	2,129,063
Total	6,967,029	20,240,664	6,632,479	18,883,790

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24. Employee Benefit Expenses

Details of employee benefit expenses for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Salaries	498,996	1,648,105	518,115	1,512,836
Post-employment benefits – Defined benefit plan (Note 16)	41,483	124,997	37,337	112,207
Post-employment benefits – Defined contribution plan (Note 16)	2,032	6,125	2,117	5,438
Others	68,862	196,360	56,949	164,761
Total	611,373	1,975,587	614,518	1,795,242

25. Finance Income and Costs

Details of finance income and costs for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Finance income				
Interest income ¹	9,934	35,326	11,938	35,435
Dividend income	1,268	1,316	115	123
Exchange differences	41,137	157,457	32,623	118,665
Gain on valuation of derivative instruments	13,921	26,934	-	2,019
Others	66	66	-	-
Total	66,326	221,099	44,676	156,242
Finance costs				
Interest expense ²	56,058	151,846	35,894	91,069
Exchange differences	134,523	259,449	75,670	194,412
Loss on valuation of derivative instruments	-	273	1,840	1,840
Others	5	5	-	13
Total	190,586	411,573	113,404	287,334

¹ Details of interest income for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Deposits held by financial institutions	9,023	31,640	10,578	31,770
Other loans and receivables	911	3,686	1,360	3,665
Total	9,934	35,326	11,938	35,435

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² Details of interest expense for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Interest related to financial institutions	22,683	70,049	21,996	55,303
Interest on lease liabilities	684	1,977	252	776
Interest on debentures	35,590	87,255	16,182	43,620
Other interest expenses	3,509	10,841	2,032	5,039
Capitalized interest for qualifying assets	(6,408)	(18,276)	(4,568)	(13,669)
Total	56,058	151,846	35,894	91,069

26. Other Non-Operating Income

Details of other non-operating income for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Exchange differences	137,513	350,804	201,005	268,055
Gain on disposal of property, plant and equipment	4,232	8,725	963	3,982
Gain on disposal of intangible assets	54	215	-	2
Reversal of impairment loss on property, plant and equipment (Note 11)	-	-	141	452
Others	5,116	17,116	5,279	19,146
Total	146,915	376,860	207,388	291,637

27. Other Non-Operating Expenses

Details of other non-operating expenses for the three-month and nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Three months	Nine months	Three months	Nine months
Exchange differences	136,166	322,061	233,380	255,736
Loss on disposal of property, plant and equipment	6,967	33,227	6,010	23,072
Loss on disposal of intangible assets	16	933	2	79
Impairment loss on property, plant and equipment (Note 11)	5,140	23,624	12,581	28,966
Impairment loss on intangible assets (Note 12)	-	-	3,074	4,778
Donations	8,148	11,226	1,173	6,841
Others	5,563	15,285	3,403	18,263
Total	162,000	406,356	259,623	337,735

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28. Tax Expense and Deferred Tax

Income tax expense is recognized based on the best estimate of weighted average annual income tax rate expected for the full financial year. The estimated average annual income tax rate used for the year ending December 31, 2019, is 24.3% (the estimated tax rate for the year ended December 31, 2018: 25.1%).

29. Earnings per Share

Basic earnings per share is calculated by dividing the profit attributable to ordinary shares by the weighted average number of shares in issue excluding shares purchased by the Parent Company and held as treasury 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 three-month and nine-month periods ended September 30, 2019 and 2018, is computed as follows:

Basic earnings per ordinary share

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

	2019		2018	
	Three months	Nine months	Three months	Nine months
Profit attributable to ordinary shares ¹	115,594	351,700	308,913	1,216,759
Weighted average number of ordinary shares outstanding ²	68,939,926	68,939,926	68,939,927	68,939,927
Basic earnings per ordinary shares <i>(in won)</i>	<u>1,677</u>	<u>5,102</u>	<u>4,481</u>	<u>17,650</u>

Basic earnings per preferred share

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

	2019		2018	
	Three months	Nine months	Three months	Nine months
Profit attributable to preferred shares ¹	12,961	39,430	34,476	135,703
Weighted average number of preferred shares outstanding ²	7,672,433	7,672,433	7,672,433	7,672,433
Basic earnings per preferred shares <i>(in won)</i>	<u>1,689</u>	<u>5,139</u>	<u>4,493</u>	<u>17,687</u>

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

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

	2019		2018	
	Three months	Nine months	Three months	Nine months
Profit attributable to the equity holders of the Parent Company				
Ordinary shares dividends (A)	128,555	391,130	343,389	1,352,462
Preferred shares dividends (B)	103,410	310,230	103,410	310,230
Preferred shares dividends (B)	11,605	34,814	11,605	34,814
Undistributed earnings for the period	13,540	46,086	228,374	1,007,418
Undistributed earnings available for ordinary shares (C)	12,184	41,470	205,503	906,530
Undistributed earnings available for preferred shares (D)	1,356	4,616	22,871	100,888
Profit for the period attributable to ordinary shares (A+C)	115,594	351,700	308,913	1,216,759
Profit for the period attributable to preferred shares (B+D)	12,961	39,430	34,476	135,703

² Weighted average numbers of shares are calculated as follows:

Ordinary shares outstanding	2019		
	Period	Number of shares	Number of days
Beginning balance	2019. 1. 1 - 2019. 9. 30	68,939,926	273
Total			18,820,599,798

Weighted average number of ordinary shares outstanding: $18,820,599,798 / 273 = 68,939,926$ shares

Preferred shares outstanding	2019		
	Period	Number of shares	Number of days
Beginning balance	2019. 1. 1 - 2019. 9. 30	7,672,433	273
Total			2,094,574,209

Weighted average number of preferred shares outstanding: $2,094,574,209 / 181 = 7,672,433$ shares

Ordinary shares outstanding	2018		
	Period	Number of shares	Number of days
Beginning balance	2018. 1. 1 - 2018. 9. 30	68,939,927	273
Total			18,820,600,071

Weighted average number of ordinary shares outstanding: $18,820,600,071 / 273 = 68,939,927$ shares

Preferred shares outstanding	2018		
	Period	Number of shares	Number of days
Beginning balance	2018. 1. 1 - 2018. 9. 30	7,672,433	273
Total			2,094,574,209

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Weighted average number of preferred shares outstanding: $2,094,574,209 / 273 = 7,672,433$ shares

Diluted earnings per share is calculated based on the weighted average number of ordinary shares outstanding, adjusted for the assumption that all of dilutive potential ordinary shares to be converted. The Parent Company has one category of dilutive potential ordinary shares: convertible bonds, which were issued during the six-month period ended June 30, 2018. Convertible bonds are considered to be converted into potential ordinary shares and the amount, subtracting income tax effect from related gain and loss such as interest expense on convertible bonds, is added to profit for the period attributable to ordinary shares and preferred shares.

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

	2019		2018	
	Three months	Nine months	Three months	Nine months
Diluted earnings per ordinary shares				
Profit for the period attributable to the ordinary shares	115,594	351,700	308,913	1,216,759
Gain and loss on convertible bonds (after tax effects)	(5,113)	(8,351)	2,248	2,356
Profit used in calculating diluted earnings per share	110,481	343,349	311,161	1,219,115
Weighted average number of ordinary shares outstanding	68,939,926	68,939,926	68,939,927	68,939,927
Adjustments for calculation of diluted earnings per share:				
Assumed conversion of convertible bonds	1,284,734	1,284,734	790,606	790,606
Weighted average number of ordinary shares and potential ordinary shares used as the denominator in calculating diluted earnings per share	<u>70,224,660</u>	<u>70,224,660</u>	<u>69,730,533</u>	<u>69,730,533</u>
Diluted earnings per share attributable to the ordinary shares <i>(in won)</i>	<u>1,573</u>	<u>4,889</u>	<u>4,462</u>	<u>17,483</u>

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

	2019		2018	
	Three months	Nine months	Three months	Nine months
Diluted earnings per preferred shares				
Profit for the period attributable to preferred shares	12,961	39,430	34,475	135,703
Gain and loss on convertible bonds (after tax effects)	(795)	(1,630)	(142)	(1,276)
Profit used in calculating diluted earnings per share	12,166	37,800	34,333	134,427
Weighted average number of preferred shares outstanding	7,672,433	7,672,433	7,672,433	7,672,433
Adjustments for calculation of diluted earnings per share:				
Assumed conversion of convertible bonds	-	-	-	-
Weighted average number of preferred shares and potential preferred shares used as the denominator in calculating diluted earnings per share	<u>7,672,433</u>	<u>7,672,433</u>	<u>7,672,433</u>	<u>7,672,433</u>
Diluted earnings per share attributable to the preferred shares <i>(in won)</i>	<u>1,586</u>	<u>4,927</u>	<u>4,475</u>	<u>17,521</u>

30. Dividends

The ₩460,058 million (2018: ₩460,058 million) of dividends for the year ended December 31, 2018, was paid to the shareholders of the Parent Company in April 2019.

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31. Related Party Transactions

As at September 30, 2019 and December 31, 2018, 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 September 30, 2019 and December 31, 2018, 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
S&I corp.	S&I CM	-	Subsidiary of LG Corp.
LG CNS Co., Ltd.	Biz Tech Partners Co., Ltd. and others	LG CNS America Inc. and others	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. and others	LG Household & Health Care trading (Shanghai) Co.,Ltd.	LG Enterprise group ¹
LG Uplus Corp.	-	-	LG Enterprise group ¹
G II R Inc.	HS AD Inc.	GIIR Rus LLC	LG Enterprise group ¹
Silicon Works Co., Ltd.	-	-	LG Enterprise group ¹
SERVEONE ²	-	Serveone(Nanjing).Co.,Ltd. and others	

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 During nine-month period ended September 30, 2019, SERVEONE has been excluded from other related parties as S&I corp has sold its shares of SERVEONE.

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Sales and purchases with related parties for the nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019			
	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.	2,655	-	-	53,885
Associates and joint ventures				
SEETEC Co., Ltd.	34,097	152,532	336	66,664
TECWIN Co., Ltd.	3	37	3,189	127
HL Greenpower Co., Ltd.	611,193	-	-	719
Others	219	28	-	2,252
Other related parties				
LG MMA Corporation	82,638	150,782	-	4,474
S&I Corporation and its subsidiaries ¹	8,475	433,917	552,355	113,542
LG CNS Co., Ltd. and its subsidiaries	13,242	3,401	196,567	67,876
Others	-	-	-	14,870
Others				
LG Display Co., Ltd. and its subsidiaries	877,677	130	80,089	2,017
LG Electronics Inc. and its subsidiaries	728,854	424,932	403,024	47,620
LG International Corp. and its subsidiaries	135,568	341,441	26,258	399,440
LG Hausys, Ltd. and its subsidiaries	146,525	6,266	2,950	5,290
Others	11,242	18,084	828	6,847
Total	2,652,388	1,531,550	1,265,596	785,623

¹ It included the transactions with SERVEONE as one of related parties, until S&I corporation sold the shares during nine-month period ended September 30, 2019.

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(in millions of Korean won)

	2018			
	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.	-	-	-	51,516
Associates and joint ventures				
SEETEC Co., Ltd.	19,409	94,144	1,170	62,274
TECWIN Co., Ltd.	-	210	2,613	260
HL Greenpower Co., Ltd.	286,815	-	-	480
Others	22	-	-	1,933
Other related parties				
LG MMA Corporation	89,969	210,022	-	5,032
SERVEONE and its subsidiaries	10,492	425,306	452,473	130,892
LG CNS Co., Ltd. and its subsidiaries	57,376	1,744	140,154	67,180
Others	-	-	-	11,331
Others				
LG Display Co., Ltd. and its subsidiaries	904,594	66	1,564	5
LG Electronics Inc. and its subsidiaries	736,594	318,440	761,115	74,173
LG International Corp. and its subsidiaries	222,338	407,658	1,491	301,609
LG Hausys, Ltd. and its subsidiaries	158,153	1,932	1,207	5,351
Others	12,794	20,898	2,242	7,391
Total	2,498,556	1,480,420	1,364,029	719,427

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Balances of receivables and payables arising from sales and purchases of goods and services as at September 30, 2019 and December 31, 2018, are as follows:

(in millions of Korean won)

	September 30, 2019			
	Receivables			
	Trade receivables and others	Loans	Other receivables	Total
Entity with a significant influence over the Group				
LG Corp.	-	-	12,381	12,381
Associates and joint ventures				
SEETEC Co., Ltd.	5,271	-	654	5,925
TECHWIN Co., Ltd.	-	-	-	-
HL Greenpower Co., Ltd.	92,806	-	-	92,806
Others	197	-	6	203
Other related parties				
LG MMA Corporation	8,609	-	558	9,167
S&I Corporation and its subsidiaries	-	-	27,968	27,968
LG CNS Co., Ltd. and its subsidiaries	11,329	-	103	11,432
Others	555	-	4,350	4,905
Others				
LG Display Co., Ltd. and its subsidiaries	200,882	-	325	201,207
LG Electronics Inc. and its subsidiaries	223,055	-	42,551	265,606
LG International Corp. and its subsidiaries	18,794	-	-	18,794
LG Hausys, Ltd. and its subsidiaries	37,629	-	34	37,663
Others	45	-	1,055	1,100
Total	599,172	-	89,985	689,157

(in millions of Korean won)

	September 30, 2019			
	Payables			
	Trade payables	Borrowings	Other payables	Total
Entity with a significant influence over the Group				
LG Corp.	-	-	306	306
Associates and joint ventures				
SEETEC Co., Ltd.	18,558	-	10,887	29,445
TECHWIN Co., Ltd.	-	-	513	513
HL Greenpower Co., Ltd.	-	-	65	65
Others	-	-	273	273
Other related parties				
LG MMA Corporation	16,502	-	-	16,502
S&I Corporation and its subsidiaries	6	-	230,658	230,664
LG CNS Co., Ltd. and its subsidiaries	11	-	101,618	101,629
Others	-	-	647	647
Others				
LG Display Co., Ltd. and its subsidiaries	266	-	9	275
LG Electronics Inc. and its subsidiaries	163,445	-	262,237	425,682
LG International Corp. and its subsidiaries	21,100	-	86,839	107,939
LG Hausys, Ltd. and its subsidiaries	744	-	4,808	5,552
Others	1,621	-	4,122	5,743
Total	222,253	-	702,982	925,235

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(in millions of Korean won)

	December 31, 2018			
	Receivables			
	Trade receivables and others	Loans	Other receivables	Total
Entity with a significant influence over the Group				
LG Corp.	-	-	11,286	11,286
Associates and joint ventures				
SEETEC Co., Ltd.	4,520	-	300	4,820
TECHWIN Co., Ltd.	-	-	-	-
HL Greenpower Co., Ltd.	89,122	-	-	89,122
Others	-	-	837	837
Other related parties				
LG MMA Corporation	12,402	-	610	13,012
S&I Corporation and its subsidiaries	2,859	-	27,949	30,808
LG CNS Co., Ltd. and its subsidiaries	13,155	-	108	13,263
Others	549	-	4,357	4,906
Others				
LG Display Co., Ltd. and its subsidiaries	182,223	-	1,978	184,201
LG Electronics Inc. and its subsidiaries	245,029	-	61,263	306,292
LG International Corp. and its subsidiaries	43,346	-	712	44,058
LG Hausys, Ltd. and its subsidiaries	16,005	-	47	16,052
Others	59	-	721	780
Total	609,269	-	110,168	719,437

(in millions of Korean won)

	December 31, 2018			
	Payables			
	Trade payables	Borrowings	Other payables	Total
Entity with a significant influence over the Group				
LG Corp.	-	-	5,102	5,102
Associates and joint ventures				
SEETEC Co., Ltd.	17,384	-	10,728	28,112
TECHWIN Co., Ltd.	-	-	871	871
HL Greenpower Co., Ltd.	-	-	225	225
Others	-	-	250	250
Other related parties				
LG MMA Corporation	19,803	-	-	19,803
S&I Corporation and its subsidiaries	5,044	-	469,309	474,353
LG CNS Co., Ltd. and its subsidiaries	162	-	167,494	167,656
Others	-	-	689	689
Others				
LG Display Co., Ltd. and its subsidiaries	14	-	4	18
LG Electronics Inc. and its subsidiaries	131,680	-	360,155	491,835
LG International Corp. and its subsidiaries	14,918	-	85,452	100,370
LG Hausys, Ltd. and its subsidiaries	439	-	2,233	2,672
Others	1,659	-	3,852	5,511
Total	191,103	-	1,106,364	1,297,467

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Fund transactions with related parties for the nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
	Equity contributions in cash (capital reduction)	Loan (Repayment)	Equity contributions in cash (capital reduction)	Loan (Repayment)
Associates and joint ventures				
HUAJIN NEW ENERGY MATERIALS(QUAZHOU)CO.,LTD	27,676	-	26,129	-
WUXI CL New Energy Technology Ltd.	-	-	559	-
Combustion Synthesis Co., Ltd.	-	-	1,503	-
LG Fuel Cell Systems Inc.	-	-	5,036	-
Vinfast Lithium Battery Pack Limited Liability Company	5,323	-	-	-
LG Holdings (HK) Ltd.	(15,789)	-	-	-
Total	17,210	-	33,227	-

Dividends received from related parties for the nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019	2018
Associates and joint ventures		
SEETEC Co., Ltd.	10,000	10,000
LG VINA Chemical Co.,Ltd.	-	810
Total	10,000	10,810

Dividends paid by the Group to related parties for the nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019	2018
Entity with a significant influence over the Group		
LG Corp.	141,205	141,205
Total	141,205	141,205

Compensation for key management of the Group for the nine-month periods ended September 30, 2019 and 2018, consists of:

(in millions of Korean won)

	2019	2018
Short-term employee benefits	62,507	47,756
Post-employment benefits	4,666	5,744
Total	67,173	53,500

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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 September 30, 2019.

As at September 30, 2019, 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 nine-month periods ended September 30, 2019 and 2018, is as follows:

<i>(in millions of Korean won)</i>	2019	2018
Profit before income tax	716,428	1,782,534
Adjustments for:		
Depreciation	1,245,449	1,009,367
Amortization	97,419	79,784
Post-employment benefits	124,997	112,207
Finance income	(141,424)	(88,658)
Finance costs	403,589	220,051
Foreign exchange differences	(3,241)	3,997
Gain on valuation of inventories	12,268	47
Gain on disposal of property, plant and equipment	(8,725)	(3,982)
Gain on disposal of intangible assets	(215)	(2)
Loss on disposal of property, plant and equipment	33,227	23,072
Loss on disposal of intangible assets	933	79
Impairment loss on property, plant and equipment	23,624	28,966
Reversal of impairment loss on property, plant and equipment	-	(452)
Impairment loss on intangible assets	-	4,778
Additions to provisions	294,771	139,171
Other income	2,162	(5,358)
Increase in inventories	(641,332)	(1,060,133)
Increase in trade receivables	(107,523)	(523,198)
Decrease (increase) in other receivables	11,716	(9,441)
Increase in other current assets	(177,728)	(31,125)
Increase in trade payables	207,126	535,603
Decrease in other payables	(83,915)	(112,473)
Decrease (increase) in other current liabilities	18,013	(62,691)
Decrease in net defined benefit liabilities	(6,057)	(22,426)
Decrease in provisions	(166,871)	(116,486)
Other cash flows from operations	(26,209)	34,768
Cash generated from operations	<u>1,828,482</u>	<u>1,937,999</u>

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Changes in liabilities arising from financial activities for the nine-month period ended September 30, 2019, are as follows:

(in millions of Korean won)

	2019						At September 30, 2019
	At January 1, 2019	Cash flows from financing activities	Reclassifica tion of current portion	Amortization (transfer)	Lease liabilities	Exchange differences	
Short-term borrowings	1,563,153	(397,176)	376,730	-	-	(19,067)	1,523,640
Long-term borrowings	1,005,094	939,906	(376,730)	-	130,873	150,750	1,849,893
Debentures	2,752,900	2,713,579	-	12,767	-	101,239	5,580,485
Conversion rights	30,384	-	-	-	-	(26,576)	3,808
Total	5,351,531	3,256,309	-	12,767	130,873	206,346	8,957,826

The significant non-cash transactions for the nine-month periods ended September 30, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019	2018
Transfer of construction-in-progress	3,654,959	2,329,111
Transfer of machinery-in-transit	158,760	56,726
Reclassification of long-term borrowings into current portion	596,580	282,712
Reclassification of other payables under the reverse factoring arrangement	49,881	-

33. Segment Information

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

Segment	Products or services	Major customers
Petrochemicals ¹	ABS, PC, PE, PP, Acrylic, Alcohol, SAP, PVC, Synthetic rubber, Special resin, BPA, Ethylene, Propylene and others	LG Electronics Inc., OCI Group 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
Advanced materials ¹	Polarizers, Automotive components, LCD Photoresist, OLED materials, Battery materials and others	LG Display Co., Ltd., Samsung Display Co., Ltd., BOE, AUO and others
Life sciences	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 and others	National Agriculture Cooperative Federation and others

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¹ The Group changed the name of segment from Basic materials & Chemicals business to Petrochemical business, and integrated IT & Electronic materials and Advanced materials into Advanced materials business. In addition, part of the petrochemical business was reclassified into the Advanced materials business sector. The information for comparative period is restated to reflect these changes.

The segment information on revenue, profit and loss for the nine-month periods ended September 30, 2019 and 2018, is as follows:

<i>(in millions of Korean won)</i>	2019					Total
	Petro-chemicals	Energy solutions	Advanced materials	Life sciences	Common and others ³	
Total segment revenue	11,654,769	5,869,699	3,699,970	463,360	496,476	22,184,274
Inter-segment revenue	407,734	-	572,819	3,750	36,151	1,020,454
Revenue from external customers ¹	11,247,035	5,869,699	3,127,151	459,610	460,325	21,163,820
Operating profit (loss) ²	1,100,547	(204,693)	56,832	38,819	(68,349)	923,156

<i>(in millions of Korean won)</i>	2018					Total
	Petro-chemicals	Energy solutions	Advanced materials	Life sciences	Common and others ³	
Total segment revenue	12,886,354	4,422,325	3,463,897	417,359	523,110	21,713,045
Inter-segment revenue	497,277	203	371,088	3,378	798	872,744
Revenue from external customers ¹	12,389,077	4,422,122	3,092,809	413,981	522,312	20,840,301
Operating profit (loss) ²	1,787,716	113,381	81,548	36,060	(62,194)	1,956,511

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 September 30, 2019 and December 31, 2018, is as follows:

<i>(in millions of Korean won)</i>	September 30, 2019					
	Petro-chemicals	Energy solutions	Advanced materials	Life sciences	Common and others³	Total
Reportable segment asset ¹	10,399,663	11,456,583	5,050,392	1,973,870	4,650,251	33,530,759
Investments in associates and joint ventures	5,560	29,634	54,491	17	196,594	286,296
Reportable segment liability ¹	3,066,414	6,387,578	1,164,153	219,577	5,202,254	16,039,976

<i>(in millions of Korean won)</i>	December 31, 2018					
	Petro-chemicals	Energy solutions	Advanced materials	Life sciences	Common and others³	Total
Reportable segment asset ¹	9,376,933	8,110,146	4,743,639	1,873,916	4,839,503	28,944,137
Investments in associates and joint ventures	5,208	20,853	26,120	17	213,924	266,122
Reportable segment liability ¹	3,018,476	4,243,999	1,121,732	194,420	3,043,382	11,622,009

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 nine-month periods ended September 30, 2019 and 2018, and as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	Sales		Non-current assets¹	
	2019	2018	September 30,	December 31,
			2019	2018
Korea ²	6,250,990	6,643,196	12,856,713	11,678,654
China	7,153,342	6,908,328	3,709,290	2,542,444
Asia	2,648,913	3,630,588	61,927	45,648
America	1,325,994	1,229,664	580,455	533,924
Europe	3,235,518	2,121,768	2,263,346	1,045,716
Others	549,063	306,757	-	-
Total	21,163,820	20,840,301	19,471,731	15,846,386

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 nine-month periods ended September 30, 2019 and 2018.

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34. Business Combination

On October 1, 2018, the Group acquired 100% shares of Uniseal, Inc., which manufactures automotive adhesive. As a result of the business combination, the Group expects increase in sales through market diversification.

Goodwill arising from the business combination is attributable to the acquired customer base and sales increase expected from combining the operations of the Parent Group and Uniseal, Inc. The Group recognized a goodwill amounting to ₩64,851 million for the related business combination in the prior year. In 2019, certain intangible assets and goodwill have been subsequently adjusted to reflect the final result of purchase price allocation. In this regard, the Group's prior year financial statement has been partially amended with no effect on total equity.

The following table summarizes the consideration paid for Uniseal, Inc., 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	143,327
Total consideration	<u>143,327</u>
Recognized amounts of identifiable assets acquired and liabilities assumed ¹	
Cash and cash equivalents	456
Trade and other receivables ²	9,082
Inventories	5,594
Property, plant and equipment	22,475
Intangible assets	51,829
Trade and other payables	(4,932)
Other payables	(183)
Deferred tax liabilities	(14,399)
Fair value of identifiable net assets	<u>69,922</u>
Goodwill	<u>73,405</u>
Total	<u>143,327</u>

¹ For goodwill at December 31, 2018, the results of the purchase price allocation for the recognition of identifiable assets acquired and liabilities assumed was incomplete. The allocation has been completed during the nine-month period ended September 30, 2019.

² The fair value of trade and other receivables equals to the gross contractual amounts.

The contingent consideration arrangement requires the Group to pay in cash the former owners of Uniseal, Inc. if the revenue during the year ended August 31, 2019, exceeds \$60 million.

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On October 1, 2018, the Group acquired 100% shares of Ugimag Korea Co., Ltd, which manufactures parts of electronic products and automobiles. As a result of the business combination, the Group expects sales growth increase through enlarging materials business.

Goodwill of W11,615 million arising from the business combination is attributable to the acquired customer base and expected sales growth combining the operations of the Parent Group and Ugimag Korea Co., Ltd.

The following table summarizes the consideration paid for Ugimag Korea 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	23,020
Total consideration	<u>23,020</u>
Recognized amounts of identifiable assets acquired and liabilities assumed ¹	
Cash and cash equivalents	359
Trade and other receivables ¹	7,576
Prepaid income tax	1
Inventories	4,403
Property, plant and equipment	29,640
Intangible assets	4
Trade and other payables	(4,100)
Borrowings	(23,908)
Other liabilities	(2,570)
Fair value of identifiable net assets	<u>11,405</u>
Goodwill	<u>11,615</u>
Total	<u><u>23,020</u></u>

¹ The fair value of trade and other receivables equals to the gross contractual amounts.

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35. Assets Held for sale

The Group decided to dispose of 2CCL business with the approval of management in January 2017. The related assets were reclassified as assets held for sale, and the disposal completed in September 2019. Research Institute, which was acquired during the course of the business combination of FarmHannong Co., Ltd., are also included in disposal group.

Details of assets and liabilities of disposal group classified as held for sale as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Assets of disposal group		
Property, plant and equipment	5,966	2,406
Intangible assets	-	358
Total	5,966	2,764

Assets of the disposal group were measured at fair value immediately before the initial classification of the assets as held for sale and there are no the related other non-operating expenses (income) for the nine-month periods ended September 30, 2019 and 2018.

36. Assets and Liabilities related to Contracts with Customers

Assets and liabilities related to contracts with customers as at September 30, 2019 and December 31, 2018, are as follows:

<i>(in millions of Korean won)</i>	September 30, 2019	December 31, 2018
Contract assets		
Total contract assets	7,538	4,323
Contract liabilities		
Advances in relation to revenue from the Group's main business activities	188,944	47,265
Expected services to be transferred	5,000	34,823
Expected customer incentives	5,425	10,530
Unearned revenue	23,816	16,781
Expected refunds	14,611	9,139
Total contract liabilities	237,796	118,538

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Revenue recognized in relation to contract liabilities

The following table shows how much of the revenue recognized in the current reporting period relates to carried-forward contract liabilities and how much relates to performance obligations that were satisfied in a prior year.

(in millions of Korean won)

September 30, 2019

Revenue recognized in the current year from the contract liability balance at the beginning of the year	46,582
Advances in relation to revenue from the Group's main business activities	39,979
Unearned revenue	2,068
Expected services to be transferred	4,535
Revenue recognized from performance obligations satisfied in previous periods	-