Doosan Infracore Co., Ltd. and Subsidiaries

Consolidated Financial Statements
December 31, 2017

Doosan Infracore Co., Ltd. and Subsidiaries
Index
December 31, 2017 and 2016

Independent Auditor's Report

(English Translation of a Report Originally Issued in Korean)

To the Shareholders and Board of Directors of
Doosan Infracore Co., Ltd.

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

Management's Responsibilities for the Financial Statements

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

Auditor's Responsibilities

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

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

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

Opinion

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

Other Matters

The consolidated financial statements of Doosan Infracore Co., Ltd. and its subsidiaries as at and for the year ended December 31, 2016, were audited by another auditor who expressed an unqualified opinion on those statements on March 23, 2017.

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

Samil PricewaterhouseCoopers

March 19, 2018
Seoul, Korea

This report is effective as at March 19, 2018, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the accompanying consolidated financial statements and notes thereto. Accordingly, the readers of the audit report should understand that there is a possibility that the above audit report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2017 and 2016

(in Korean won)	Notes	December 31, 2017	December 31, 2016
Assets			
Current assets			
Cash and cash equivalents	2,4,5,10	₩ 943,481,141,254	₩ 538,577,771,079
Short-term financial instruments	2,4,5,10	160,166,932,394	148,025,668,394
Short-term investment securities	2,4,6,10	34,182,400,175	3,030,992,836
Trade and other receivables	2,3,4,7,10,33,35	1,197,046,622,163	1,030,593,672,444
Derivative assets	2,4,9,10	1,868,202,287	6,219,743,447
Inventories	2,8	1,254,963,515,735	1,177,009,110,959
Other current assets		175,725,123,533	146,113,591,597
		3,767,433,937,541	3,049,570,550,756
Non-current assets			
Long-term financial instruments	2,4,5,10	10,500,000	2,011,500,000
Long-term investment securities	2,4,6,10	93,687,457,663	148,120,965,082
Long-term trade and other receivables	2,3,4,7,10,35	16,150,386,229	7,015,864,222
Non-current Derivative assets	2,4,9,10	4,387,862,259	-
Investments in subsidiaries and associates	2,11,33,35	91,838,684,125	29,030,018,221
Property, plant and equipment	2,3,12,34	1,786,904,298,672	1,823,100,285,900
Intangible assets	2,3,13	4,169,281,753,860	4,440,698,436,635
Investment properties	2,14	20,609,998,094	51,375,818,001
Deferred tax assets	2,3,30	251,122,643,405	365,928,831,884
Other non-current assets	10	74,662,610,602	109,956,369,825
		6,508,656,194,909	6,977,238,089,770
Total assets		₩ 10,276,090,132,450	₩ 10,026,808,640,526
Liabilities			
Current liabilities			
Trade and other payables	4,10,15,35	₩ 1,281,736,493,268	₩ 1,041,875,892,086
Short-term borrowings	2,4,10,16,33,34	1,409,287,187,360	952,163,757,440
Current portion of bonds	4,10,16,33	474,641,545,632	764,734,004,459
Current portion of long-term borrowings	2,4,10,16,33,34	96,310,179,828	540,098,382,122
Current tax liabilities	2,30	32,398,041,440	13,098,873,730
Derivative liabilities	2,4,9,10	4,026,802,750	1,542,154,578
Provisions	2,3,18	167,059,619,793	147,784,958,483
Other current liabilities	10	230,185,572,715	191,895,701,579
		3,695,645,442,786	3,653,193,724,477
Non-current liabilities			
Non-current other payables	4,10,15	1,218,603,784	1,253,774,857
Bonds	4,10,16,33	1,154,956,082,362	714,649,461,884
Long-term borrowings	2,4,10,16,33,34	1,513,805,807,222	1,451,538,091,287
Net defined benefit liabilities	2,17	451,858,134,854	510,101,486,646
Non-current derivative liabilities	2,4,9,10	41,708,762,306	-
Deferred tax liabilities	2,3,30	93,587,876,395	78,243,717,573
Non-current provisions	2,3,18	9,584,045,726	25,167,184,042
Other non-current liabilities	2,10	140,563,747,861	144,284,457,632
		3,407,283,060,510	2,925,238,173,921
Total liabilities		7,102,928,503,296	6,578,431,898,398
Equity			
Share capital	1,19	1,040,000,595,000	1,037,276,570,000
Capital surplus	19	211,545,565,029	249,488,144,851
Hybrid capital instruments	20	-	508,259,603,649
Other components of equity	21	(108,457,073,777)	(42,440,546,020)
Accumulated other comprehensive income	6,9,10,12,22	(334,050,917,882)	(270,371,100,895)
Retained earnings	23	784,702,285,730	578,245,971,895
Equity attributable to owners of the Parent Company		1,593,740,454,100	2,060,458,643,480
Non-controlling interest		1,579,421,175,054	1,387,918,098,648
Total equity		3,173,161,629,154	3,448,376,742,128
Total liabilities and equity		₩ 10,276,090,132,450	₩ 10,026,808,640,526

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

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Profit or Loss
Years Ended December 31, 2017 and 2016

(in Korean won)	Notes		2017		2016
Sales	2,24,25,35	₩	6,567,897,225,498	₩	5,729,550,204,080
Cost of sales	2,8,12,13,17,26,35		(5,024,999,368,311)		(4,404,458,833,345)
Gross profit			1,542,897,857,187		1,325,091,370,735
Selling and administrative expenses	7,12,13,14,17,26,27		(882,128,558,541)		(834,273,183,329)
Operating profit			660,769,298,646		490,818,187,406
Finance income	9,10,28		296,665,608,495		176,163,146,947
Finance costs	9,10,28		(455,734,726,941)		(427,649,808,272)
Other non-operating income	29		64,152,908,525		56,182,312,441
Other non-operating expenses	7,29		(72,931,806,741)		(213,312,054,726)
Loss on disposal of investment in subsidiaries and associates	2,11		(3,294,696,326)		(151,702,916)
Profit (loss) before income tax			489,626,585,658		82,050,080,880
Income tax expense	2,30		(192,983,826,788)		(162,639,901,346)
Profit (loss) from continuing operations			296,642,758,870		(80,589,820,466)
Profit from discontinued operations	37		-		196,574,676,248
Profit (loss) for the year		₩	296,642,758,870	₩	115,984,855,782
Owners of the Parent Company			148,594,494,986		63,180,866,208
Non-controlling interests			148,048,263,884		52,803,989,574
Earnings (loss) per share	2,31				
From continuing and discontinued operations					
Basic earnings per share		₩	627	₩	214
Diluted earnings per share			620		214
From continuing operations					
Basic earnings (loss) per share		₩	627	₩	(734)
Diluted earnings (loss) per share			620		(734)

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

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Comprehensive Income
Years Ended December 31, 2017 and 2016

(in Korean won)		2017		2016
Profit (loss) for the year	₩	296,642,758,870	₩	115,984,855,782
Other comprehensive income				
Items that will not be reclassified to profit or loss				
Remeasurements of net defined benefit liabilities		(6,717,591,709)		1,076,069,895
Revaluation reserves of property, plant and equipment		34,547,697,525		(29,875,400,000)
Share of other comprehensive income of associates		397,099,884		-
Share of retained earnings of associates		(71,846,321)		-
Items that may be subsequently reclassified to profit or loss				
Changes in the fair value of available-for-sale financial assets		(4,403,370,796)		7,509,623,052
Share of retained earnings of associates		-		(54,238,168)
Exchange differences		(157,850,633,039)		28,106,613,754
Gain (loss) on valuation of derivatives		(5,400,168,266)		18,149,753,211
Total comprehensive income for the year	₩	157,143,946,148	₩	140,897,277,526
Total comprehensive income for the year is attributable to:				
Owners of the Parent Company		70,873,060,791		46,187,327,828
Non-controlling interest		86,270,885,357		94,709,949,698

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

Doosan Infracore Co., Ltd. and Subsidiaries

Consolidated Statements of Changes in Equity
Years Ended December 31, 2017 and 2016

	Attributable to Owners of the Parent Company								
	Share capital	Capital surplus	Hybrid capital instruments	Other components of equity	Accumulated other comprehensive income	Retained Earnings	Subtotal	Non-controlling Interest	Total
Balance at January 1, 2016	₩ 1,037,276,570,000	₩ 245,301,050,451	₩ 508,259,603,649	₩ (37,401,620,359)	₩ (207,670,131,707)	₩ 475,597,665,117	₩ 2,021,363,137,151	₩ 1,081,593,171,229	₩ 3,102,956,308,380
Total comprehensive income (loss):							-		-
Profit for the year	-	-	-	-	-	63,180,866,208	63,180,866,208	52,803,989,574	115,984,855,782
Remeasurement of net defined benefit liabilities	-	-	-	-	-	(344,604,900)	(344,604,900)	1,420,674,795	1,076,069,895
Revaluation reserves of property, plant and equipment	-	-	-	-	(88,030,246,138)	58,154,846,138	(29,875,400,000)	-	(29,875,400,000)
Changes in the fair value of available-for-sale financial assets	-	-	-	-	7,509,623,052	-	7,509,623,052	-	7,509,623,052
Share of retained earnings of associates	-	-	-	-	-	(54,238,168)	(54,238,168)	-	(54,238,168)
Exchange differences	-	-	-	-	(11,646,759,548)	-	(11,646,759,548)	39,753,373,302	28,106,613,754
Gain(loss) on valuation of derivatives	-	-	-	-	17,417,841,184	-	17,417,841,184	731,912,027	18,149,753,211
	-	-	-	-	(74,749,541,450)	120,936,869,278	46,187,327,828	94,709,949,698	140,897,277,526
Transactions with owners							-		-
Acquisition of treasury shares	-	-	-	(2,030,605)	-	-	(2,030,605)	-	(2,030,605)
Cancellation of share options	-	4,187,094,400	-	(4,187,094,400)	-	-	-	-	-
Share-based payment	-	-	-	134,592,399	-	-	134,592,399	-	134,592,399
Dividends paid for hybrid capital securities	-	-	-	-	-	(18,288,562,500)	(18,288,562,500)	-	(18,288,562,500)
Capital increase of subsidiaries	-	-	-	22,118,381,131	-	-	22,118,381,131	(23,277,026,187)	(1,158,645,056)
Purchase of subsidiary equity	-	-	-	(4,521,363,632)	-	-	(4,521,363,632)	(120,501,975,875)	(125,023,339,507)
Disposal of subsidiary shares	-	-	-	(18,581,410,554)	12,048,572,262	-	(6,532,838,292)	355,393,979,783	348,861,141,491
	-	4,187,094,400	-	(5,038,925,661)	12,048,572,262	(18,288,562,500)	(7,091,821,499)	211,614,977,721	204,523,156,222
Balance at December 31, 2016	₩ 1,037,276,570,000	₩ 249,488,144,851	₩ 508,259,603,649	₩ (42,440,546,020)	₩ (270,371,100,895)	₩ 578,245,971,895	₩ 2,060,458,643,480	₩ 1,387,918,098,648	₩ 3,448,376,742,128
							-		-
Balance at January 1, 2017	₩ 1,037,276,570,000	₩ 249,488,144,851	₩ 508,259,603,649	₩ (42,440,546,020)	₩ (270,371,100,895)	₩ 578,245,971,895	₩ 2,060,458,643,480	₩ 1,387,918,098,648	₩ 3,448,376,742,128
Total comprehensive income (loss):							-		-
Profit for the year	-	-	-	-	-	148,594,494,986	148,594,494,986	148,048,263,884	296,642,758,870
Remeasurement of net defined benefit liabilities	-	-	-	-	-	(5,908,110,490)	(5,908,110,490)	(809,481,219)	(6,717,591,709)
Revaluation reserves of property, plant and equipment	-	-	-	-	33,549,343,476	34,930	33,549,378,406	998,319,119	34,547,697,525
Changes in the fair value of available-for-sale financial assets	-	-	-	-	(4,403,370,796)	-	(4,403,370,796)	-	(4,403,370,796)
Share of other comprehensive income of associates	-	-	-	-	368,821,194	-	368,821,194	28,278,690	397,099,884
Share of retained earnings of associates	-	-	-	-	-	(64,025,578)	(64,025,578)	(7,820,743)	(71,846,321)
Exchange differences	-	-	-	-	(96,515,360,869)	-	(96,515,360,869)	(61,335,272,170)	(157,850,633,039)
Gain on valuation of derivatives	-	-	-	-	(4,748,766,062)	-	(4,748,766,062)	(651,402,204)	(5,400,168,266)
	-	-	-	-	(71,749,333,057)	142,622,393,848	70,873,060,791	86,270,885,357	157,143,946,148
Transactions with owners							-		-
Cancellation of share options	-	1,053,454,693	-	(1,053,454,693)	-	-	-	-	-
Transfer of capital surplus	-	(82,200,482,487)	-	-	-	82,200,482,487	-	-	-
Issuance of bonds with warrants	-	41,976,882,023	-	-	-	-	41,976,882,023	-	41,976,882,023
Exercise of stock warrants	2,724,025,000	1,227,565,949	-	-	-	-	3,951,590,949	-	3,951,590,949
Dividends paid for hybrid capital securities	-	-	-	-	-	(18,366,562,500)	(18,366,562,500)	-	(18,366,562,500)
Dividend of subsidiary	-	-	-	-	-	-	-	(28,541,041,200)	(28,541,041,200)
Repayment of hybrid capital securities	-	-	(508,259,603,649)	(58,904,993,351)	-	-	(567,164,597,000)	-	(567,164,597,000)
Disposal of subsidiary shares	-	-	-	(6,058,079,713)	8,069,516,070	-	2,011,436,357	133,773,232,249	135,784,668,606
	2,724,025,000	(37,942,579,822)	(508,259,603,649)	(66,016,527,757)	8,069,516,070	63,833,919,987	(537,591,250,171)	105,232,191,049	(432,359,059,122)
Balance at December 31, 2017	₩ 1,040,000,595,000	₩ 211,545,565,029	₩ -	₩ (108,457,073,777)	₩ (334,050,917,882)	₩ 784,702,285,730	₩ 1,593,740,454,100	₩ 1,579,421,175,054	₩ 3,173,161,629,154

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

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Cash Flows
Years Ended December 31, 2017 and 2016

(in Korean won)	Note		2017		2016
Cash flows from operating activities	36				
Cash generated from operations:					
Profit for the year		₩	296,642,758,870	₩	115,984,855,782
Adjustments			683,827,770,950		653,349,944,296
Changes in operating assets and liabilities			(83,731,338,160)		20,023,264,004
Interest received			11,127,322,178		13,406,879,435
Interest paid			(185,853,970,400)		(227,942,883,719)
Dividends received			2,108,514,977		5,400,000
Income tax paid			(58,429,689,782)		(61,834,959,484)
Net cash inflow from operating activities			665,691,368,633		512,992,500,314
Cash flows from investing activities					
Decrease in short-term financial instruments			25,050,508,204		179,351,302,468
Disposal of long-term investment securities			3,388,601,075		55,340,845,687
Disposal of property, plant and equipment and investment properties			41,292,473,602		50,396,713,962
Disposal of intangible assets			1,226,414,034		1,305,963,518
Business transfer			-		929,419,723,186
Increase in short-term financial instruments			(12,141,264,000)		-
Increase in loans			(168,851,490)		-
Acquisition of long-term investment securities			(3,510,363,900)		(40,066,219,698)
Acquisition of investment in Associates and Joint Ventures			(65,864,874,081)		(27,936,825,000)
Acquisition of property, plant and equipment			(134,197,987,710)		(173,943,691,398)
Acquisition of intangible assets			(77,460,993,080)		(64,233,909,078)
Others			(33,902,408,352)		-
Net cash inflow (outflow) from investing activities			(256,288,745,698)		909,633,903,647
Cash flows from financing activities					
Proceeds from borrowings			1,380,727,776,826		-
Proceeds from issuance of bonds			1,015,382,768,080		467,186,644,080
Change in subsidiary equity			133,721,600,000		242,528,119,780
Repayment of borrowings			(1,115,135,547,875)		(1,096,762,547,569)
Repayment of bonds			(765,000,000,000)		(922,859,192,122)
Dividends paid			(46,907,603,700)		(18,288,562,500)
Capital increase of subsidiaries			-		(1,158,645,055)
Purchase of subsidiary equity			-		(125,023,339,507)
Acquisition of treasury shares			-		(2,030,605)
Exercise of call options on hybrid capital securities			(570,521,500,000)		-
Net cash inflow (outflow) from financing activities			32,267,493,331		(1,454,379,553,498)
Effects of exchange rate changes on cash and cash equivalents			(36,766,746,091)		10,328,398,232
Net increase (decrease) in cash and cash equivalents			404,903,370,175		(21,424,751,305)
Cash and cash equivalents at the beginning of the year			538,577,771,079		560,002,522,384
Cash and cash equivalents at the end of the year		₩	943,481,141,254	₩	538,577,771,079

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

1 General Information

(1) The Parent Company

Doosan Infracore Co., Ltd. (the “Parent Company” or the “Company”) was incorporated on October 23, 2000, through a spin-off from Daewoo Heavy Industries Ltd. (“DHI”) under the corporate restructuring agreement dated January 20, 2000, between DHI and its creditors, and approved by DHI’s shareholders on June 27, 2000. The Parent Company operates and manages manufacturing and selling businesses of industrial machinery and equipment.

The spin-off of the Parent Company was done by acquiring assets and assuming liabilities of machinery business sector of DHI as at September 30, 2000, amounting to ₩ 2,494 billion and ₩ 2,806 billion, respectively. Accordingly, DHI’s shareholders became shareholders of the Parent Company, the newly established company.

On February 2, 2001, the Parent Company listed its stock on the Korea Exchange, and changed its name to Doosan Infracore Co., Ltd. from Daewoo Heavy Industries & Machinery Ltd. on April 29, 2005. The Parent Company’s common stock as at December 31, 2017, amount to ₩ 1,040,001 million, of which 36.30% is owned by Doosan Heavy Industries and Construction Co., Ltd.

(2) Consolidated Subsidiaries

1) The Parent Company’s consolidated subsidiaries as at December 31, 2017 and 2016, are as follows:

Subsidiary	Main business	Location	Ownership interest held by the Group[1] (%)		Ownership interest held by non-controlling interests[1] (%)		Fiscal year end
			2017	2016	2017	2016	
Doosan Infracore China Co., Ltd.	Manufacturing and Sales	China	80.00	80.00	20.00	20.00	December 31
Doosan Infracore (China) Investment Co., Ltd.	Holdings	China	100.00	100.00	-	-	December 31
Doosan Infracore North America LLC	Other Service	USA	100.00	100.00	-	-	December 31
Doosan Infracore Japan Corp.	Purchases	Japan	100.00	100.00	-	-	December 31
Doosan (China) Financial Leasing Corp.	Finance	China	100.00	100.00	7.80	7.80	December 31
Doosan Bobcat Chile S.A.	Sales	Chile	100.00	100.00	-	-	December 31
Doosan Infracore (Shandong) Co., Ltd.	Manufacturing and Sales	China	100.00	100.00	13.00	13.00	December 31
Doosan Infracore Norway AS.	Manufacturing and Sales	Norway	100.00	100.00	-	-	December 31
Doosan Infracore South America Industria E Comercio De Maquinas De Construcao LTDA	Sales	Brazil	99.99	99.99	0.01	0.01	December 31
Doosan Infracore Bobcat Ireland Ltd.	Other Service	Ireland	100.00	100.00	-	-	December 31
Doosan Infracore Construction Equipment India Private Ltd.	Sales	India	100.00	100.00	-	-	March 31
Doosan Bobcat Co., Ltd.	Holdings	Korea	55.34	59.33	44.66	40.67	December 31
Doosan Bobcat Singapore Pte. Ltd. [3]	Holdings	Singapore	100.00	100.00	44.66	40.67	December 31
Doosan Bobcat Korea Co., Ltd. [3]	Sales	Korea	100.00	100.00	44.66	40.67	December 31
Doosan Bobcat Chile Compact SpA.	Sales	Chile	100.00	100.00	44.66	40.67	December 31
Doosan Bobcat India Private Ltd. [3]	Manufacturing and Sales	India	100.00	100.00	44.66	40.67	March 31
Bobcat Corp.	Sales	Japan	100.00	100.00	44.66	40.67	December 31
Doosan Bobcat Mexico S.A. de C.V. [3]	Other Service	Mexico	100.00	100.00	44.66	40.67	December 31
Doosan Bobcat China Co., Ltd. [5]	Manufacturing and Sales	China	100.00	100.00	44.66	40.67	December 31
Clark Equipment Co. [6]	Manufacturing and Sales	USA	100.00	100.00	44.66	40.67	December 31
Bobcat Equipment Ltd.	Sales	Canada	100.00	100.00	44.66	40.67	December 31
Doosan International Australia Pty Ltd.	Sales	Australia	100.00	100.00	44.66	40.67	December 31
Doosan Holdings Europe Ltd. [2, 5]	Holdings	Ireland	100.00	100.00	44.66	40.67	December 31
Doosan Infracore Europe S.A.	Sales	Belgium	100.00	100.00	44.66	40.67	December 31
Bobcat Bensheim GmbH	Sales	Germany	100.00	100.00	44.66	40.67	December 31
Doosan Holding France S.A.S.	Holdings	France	100.00	100.00	44.66	40.67	December 31
Doosan Techno Holding Co., Ltd.	Management	Ireland	100.00	100.00	44.66	40.67	December 31
Doosan Benelux SA.	Sales	Belgium	100.00	100.00	44.66	40.67	December 31
Doosan Infracore Europe B.V. [4]	Sales	Netherlands	100.00	100.00	-	-	December 31
Doosan International Italia S.r.L	Sales	Italy	100.00	100.00	44.66	40.67	December 31

Subsidiary	Main business	Location	Ownership interest held by the Group[1] (%) 2017	Ownership interest held by the Group[1] (%) 2016	Ownership interest held by non-controlling interests[1] (%) 2017	Ownership interest held by non-controlling interests[1] (%) 2016	Fiscal year end
CJSC Doosan International Russia	Sales	Russia	100.00	100.00	44.66	40.67	December 31
Doosan International UK Ltd.	Sales	England	100.00	100.00	44.66	40.67	December 31
Doosan International South Africa Pty Ltd.	Sales	South Africa	100.00	100.00	44.66	40.67	December 31
Doosan Bobcat EMEA s.r.o.[2, 8]	Manufacturing	Czech	100.00	100.00	44.66	40.67	December 31
Bobcat Lyon SAS	Sales	France	100.00	100.00	44.66	40.67	December 31
Bobcat France S.A.	Manufacturing	France	100.00	100.00	44.66	40.67	December 31
Geith International Ltd.	Sales	Ireland	100.00	100.00	44.66	40.67	December 31
Doosan International Luxemburg S.a.r.l	Management	Luxemburg	100.00	100.00	44.66	40.67	December 31

1 The 'ownership interest held by the Group' refers to the simply aggregated portion of ownership interests directly held by the Parent Company and its subsidiaries. On the other hand, the 'ownership interests held by non-controlling interests', which do not belong to the Group directly nor indirectly, refers to the effective portion calculated by subtracting 'ownership interest held by the Group' from 100%. Accordingly, there may be a discrepancy between the calculated portion of 'ownership interests held by non-controlling interests' and the aggregated ratio of ownership in a certain subsidiary held by each entity in the Group.

2 For the year ended December 31, 2017, the Doosan Bobcat Engineering s.r.o. was merged into Doosan Bobcat EMEA s.r.o., and Doosan Trading Ltd. into Doosan Holdings Europe Ltd., respectively.

3 For the year ended December 31, 2017, the company names have changed from Doosan International South East Asia Pte. Ltd. to Doosan Bobcat Singapore Pte. Ltd., from Doosan Infracore India Private Ltd. to Doosan Bobcat India Private Ltd., from Doosan Infracore Bobcat Korea Co., Ltd. to Doosan Bobcat Korea Co., Ltd., and from Doosan International Mexico S.A. de C.V. to Doosan Bobcat Mexico S.A. de C.V., respectively.

4 The company name has changed from Doosan International Portable Power of Netherlands BV to Doosan Infracore Customization Center Europe B.V., for the year ended December 31, 2016, and it has eventually changed to Doosan Infracore Europe B.V for the year ended December 31, 2017.

5 For the year ended December 31, 2016, Doosan Infracore Portable Power (Shanghai) Co., Ltd. and Doosan International China Co., Ltd. were both merged into Doosan Infracore Suzhou Co., Ltd., and for the year ended December 31, 2017, its name has changed to Doosan Bobcat China Co., Ltd.

6 For the year ended December 31, 2016, Doosan Infracore International, Inc. was merged into Clark Equipment Co.

7 For the year ended December 31, 2016, Doosan Holdings International Ltd. was merged into Doosan Holdings Europe Ltd.

8 For the year ended December 31, 2016, the company name has changed from Doosan Bobcat Manufacturing s.r.o. to Doosan Bobcat EMEA s.r.o.

2) Summarized financial information for major consolidated subsidiaries as at and for the year ended December 31, 2017 is as follows:

(in millions of Korean won)

	Assets	Liabilities	Sales	Profit (loss) for the year	Total comprehensive income (loss)
Doosan Infracore China Co., Ltd.	₩ 969,532	₩ 648,577	₩ 945,715	₩ 136,623	₩ 136,623
Doosan Infracore (China) Investment Co., Ltd.	214,767	6,212	8,714	2,310	2,310
Doosan (China) Financial Leasing Corp.	516,649	351,304	35,977	2,306	2,306
Doosan Infracore Europe B.V.	84,556	84,663	186,954	(693)	(756)
Doosan Bobcat Inc. and its subsidiaries	6,183,837	2,756,294	4,068,260	273,758	552,356

3) Financial information for subsidiaries attributable to significant non-controlling interests as at and for the year ended December 31, 2017, is as follows:

(in millions of Korean won)

	Net income allocated to non-controlling interests	Cumulative non-controlling interests	Dividends allocated to non-controlling interests
Doosan Infracore China Co., Ltd.	₩ 27,325	₩ 63,162	₩ -
Doosan Bobcat Inc. and its subsidiaries	₩ 114,760	₩ 1,530,797	₩ 28,541

(3) Changes in the Scope of Consolidation

1) Changes in the scope of consolidation for the year ended December 31, 2017, are as follows:

Subsidiary	Description	Reason
Doosan Bobcat Engineering s.r.o.	Excluded from consolidation	Merger
Doosan Trading Ltd.	Excluded from consolidation	Merger

2) Changes in the scope of consolidation for the year ended December 31, 2016, are as follows:

Subsidiary	Description	Reason
Doosan Infracore Portable Power (Shanghai) Co., Ltd.	Excluded from consolidation	Merger
Doosan International China Co., Ltd.	Excluded from consolidation	Merger
Doosan International Manufacturing China Co., Ltd.	Excluded from consolidation	Liquidation
Doosan Holdings International Ltd.	Excluded from consolidation	Merger
Doosan Infracore International, Inc.	Excluded from consolidation	Merger
Doosan Infracore Machine Tools Yantai Co., Ltd.	Excluded from consolidation	Disposal of business unit
Doosan Infracore Germany GmbH.	Excluded from consolidation	Disposal of business unit
Doosan Infracore America Corp.	Excluded from consolidation	Disposal of business unit
Doosan Infracore North America LLC	Newly included in consolidation	Establishment of new corporation
GB-DIBH PF Equity 1	Newly included in and excluded from consolidation	[1]

[1] The private equity investment trust was included in the scope of consolidation based on the judgment that the Group had control over the entity, because the Group substantially received most of the profits of the entity and had the greatest influence on it. The entity was excluded from the scope of consolidation since it was disposed on November, 2016.

2 Basis of Preparation and Significant Accounting Policies

2.1 Basis of Preparation

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

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

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

The preparation of financial statements requires the use of critical accounting estimates. Management also needs to exercise judgement in applying the Group's accounting policies. The areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to the consolidated financial statements are disclosed in Note 3.

The significant accounting policies under Korean IFRS followed by the Group in the preparation of its consolidated financial statements are summarized below, and these accounting policies, except for the effects of the changes in accounting policies that are described below, have been applied consistently to the consolidated financial statements for the current period and the accompanying comparative period.

The accompanying consolidated financial statements have been prepared on the historical cost basis, except for certain non-current assets and financial instruments that are measured at fair values, as explained in the accounting policies below. Historical cost, in general, is estimated based on the fair values of the consideration given in exchange for assets.

(1) New and amended standards adopted by the Group

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

- Amendments to Korean IFRS 1007 *Statement of Cash Flows*

  Amendments to Korean IFRS 1007 *Statement of Cash Flows* require to provide disclosures that enable users of financial statements to evaluate changes in liabilities arising from financing activities, including both changes arising from cash flows and non-cash flows.

- Amendments to Korean IFRS 1012 *Income Tax*

  Amendments to Korean IFRS 1012 clarify how to account for deferred tax assets related to debt instruments measured at fair value. Korean IFRS 1012 provides requirements on the recognition and measurement of current or deferred tax liabilities or assets. The amendments issued clarify the requirements on recognition of deferred tax assets for unrealized losses, to address diversity in practice.

- Amendments to Korean IFRS 1112 *Disclosures of Interests in Other Entities*

  Amendments to Korean IFRS 1112 clarify when an entity's interest in a subsidiary, a joint venture or an associate is classified as held for sales in accordance with Korean IFRS 1105, the entity is required to disclose other information except for summarized financial information in accordance with Korean IFRS 1112.

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

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

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

  When an investment in an associate or a joint venture is held by, or is held indirectly through, an entity that is a venture capital organization, or a mutual fund, unit trust and similar entities including investment-linked insurance funds, the entity may elect to measure that investment at fair value through profit or loss in accordance with Korean IFRS 1109. The amendments clarify that an entity shall make this election separately for each associate of joint venture, at initial recognition of the associate or joint venture. The amendments will be effective for annual periods beginning on or after January 1, 2018, with early adoption is permitted. The Group does not expect the amendments to have a significant impact on the financial statements because the Group is not a venture capital organization.

- Amendments to Korean IFRS 1040 *Investment properties*

Paragraph 57 of Korean IFRS 1040 clarifies that a transfer to, or from, investment property, including property under construction, can only be made if there has been a change in use that is supported by evidence, and provides a list of circumstances as examples. The amendment will be effective for annual periods beginning on or after January 1, 2018, with early adoption permitted. The Group does not expect the amendment to have a significant impact on the financial statements.

- Amendments to Korean IFRS 1102 *Share-based Payment*

Amendments to Korean IFRS 1102 clarify accounting for a modification to the terms and conditions of a share-based payment that changes the classification of the transaction from cash-settled to equity-settled. And also, clarifies that the measurement approach should treat the terms and conditions of a cash-settled award in the same way as for an equity-settled award. This amendment will be effective for annual periods beginning on or after January 1, 2018, with early adoption permitted. The Group does not expect the amendments to have a significant impact on the consolidated financial statements.

- Enactment of Interpretation 2122 *Foreign Currency Transaction and Advance Consideration*

According to the enactment, the date of the transaction for the purpose of determining the exchange rate to use on initial recognition of the related asset, expense or income (or part of it) is the date on which an entity initially recognizes the non-monetary asset or non-monetary liability arising from the payment or receipt of advance consideration. If there are multiple payments or receipts in advance, the entity shall determine a date of the transaction for each payment or receipt of advance consideration. The enactment will be effective for annual periods beginning on or after January 1, 2018, with early adoption permitted. The Group does not expect the enactment to have a significant impact on the consolidated financial statements.

- Enactment of Korean IFRS 1116 *Leases*

Korean IFRS 1116 *Leases* issued on May 22, 2017 is effective for annual periods beginning on or after January 1, 2019, with early adoption permitted. This standard will replace Korean IFRS 1017 *Leases,* Interpretation 2104 *Determining whether an Arrangement contains a Lease*, Interpretation 2015 *Operating Leases-Incentives*, and Interpretation 2027 *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*.

At inception of a contract, the entity shall assess whether the contract is, or contains, a lease. Also, at the date of initial application, the entity shall assess whether the contract is, or contains, a lease in accordance with the standard. However, the entity will not need to reassess all contracts with applying the practical expedient because the entity elected to apply the practical expedient only to contracts entered before the date of initial application.

For a contract that is, or contains, a lease, the entity shall account for each lease component within the contract as a lease separately from non-lease components of the contract. A lessee is required to recognize a right-of-use asset representing its right to use the underlying leased asset and a lease liability representing its obligation to make lease payments. The lessee may elect not to apply the requirements to short-term leases (a lease term of 12 months or less at the commencement date) and low value assets (e.g. underlying assets below $ 5,000). In addition, as a practical expedient, the lessee may elect, by class of underlying asset, not to separate non-lease components from lease components, and instead account for each lease component and any associated non-lease components as a single lease component.

① *The Group as a lessee*

- Lessee accounting

A lessee shall apply this standard to its leases either:

- retrospectively to each prior reporting period presented applying Korean IFRS 1008 *Accounting Policies, Changes in Accounting Estimates and Errors* (Full retrospective application); or
- retrospectively with the cumulative effect of initially applying the standard recognized at the date of initial application.

The Group has not yet elected the application method.

- Financial impact

The Group plans to perform an impact assessment to identify potential financial effects of applying Korean IFRS 1116 during 2018. Accordingly, it is difficult to provide reasonable estimates of financial effects until the analysis is complete.

② *The Group as a lessor*

- Lessor accounting and financial impact

The Group expects the effect on the financial statements applying the new standard will not be significant as accounting for the Group, as a lessor, will not significantly change.

- Enactment of Korean IFRS 1109 *Financial Instruments*

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

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

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

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

The Group performed an impact assessment to identify potential financial effects of applying Korean IFRS 1109. The assessment was performed based on available information as at December 31, 2017, and the results of the assessment are explained as below. The Group plans to perform more detailed analysis on the financial effects based on additional information in the future; therefore, the results of the assessment may change due to additional information that the Group may obtain after the assessment.

① *Classification and Measurement of Financial Assets*

When implementing Korean IFRS 1109, the classification of financial assets will be driven by the Group's business model for managing the financial assets and contractual terms of cash flow. The following table shows the classification of financial assets measured subsequently at amortized cost, at fair value through other comprehensive income and at fair value through profit or loss. If a hybrid contract contains a host that is a financial asset, the classification of the hybrid contract shall be determined for the entire contract without separating the embedded derivative.

Category		Contractual terms of cash flows: Solely represent payments of principal and interest	Contractual terms of cash flows: All other
Business model	Hold the financial asset for the collection of the contractual cash flows	Measured at amortized cost [1]	Recognized at fair value through profit or loss [2]
	Hold the financial asset for the collection of the contractual cash flows and sale	Recognized at fair value through other comprehensive income [1]	
	Hold for sale	Recognized at fair value through profit or loss	

1 A designation at fair value through profit or loss is allowed only if such designation mitigates an accounting mismatch (irrevocable).
2 Equity investments not held for trading can be recorded in other comprehensive income (irrevocable).

With the implementation of Korean IFRS 1109, the criteria to classify the financial assets at amortized cost or at fair value through other comprehensive income are more strictly applied than the criteria applied with Korean IFRS 1039. Accordingly, the financial assets at fair value through profit or loss may increase by implementing Korean IFRS 1109 and may result an extended fluctuation in profit or loss.

As at December 31, 2017, the Group owns financial assets at fair value through profit or loss of ₩ 35,860 million, loans and receivables of ₩ 1,411,757 million, financial assets held-to-maturity of ₩ 1,894 million, and financial assets available-for-sale of ₩ 91,793 million.

According to Korean IFRS 1109, a debt instrument is measured at amortized cost if: a) the objective of the business model is to hold the financial asset for the collection of the contractual cash flows, and b) the contractual cash flows under the instrument solely represent payments of principal and interest. As at December 31, 2017, the Group measured loans and receivables of ₩ 1,411,757 million, and financial assets held-to-maturity of ₩ 1,894 million at amortized costs.

Based on results from the impact assessment of Korean IFRS 1109, the application of the new standard as at December 31, 2017 does not have a material impact on the Group's financial statements. This is because the Group holds the majority of financial assets measured at amortized cost that meets the both criteria: a) the contractual terms of the financial assets that the Group holds give rise to cash flows that are solely payments of principal and interest on the principal amount outstanding on a specified date, and b) the Group holds the financial assets in order to collect contractual cash flow. Also, if Korean IFRS 1109 is applied for equity instruments classified as financial assets available-for-sale, the Group expects the majority of the financial assets to be measured at fair value through other comprehensive income.

Therefore, the Group expects the application of Korean IFRS 1109 on these financial assets will not have a material impact on the Group's financial statements.

② *Impairment: Financial Assets and Contract Assets*

The new impairment model requires the recognition of impairment provisions based on expected credit losses (ECL) rather than only incurred credit losses as is the case under Korean IFRS 1039. It applies to financial assets classified at amortized cost, debt instruments measured at fair value through other comprehensive income, lease receivables, contract assets, loan commitments and certain financial guarantee contracts.

Under Korean IFRS 1109 'expected loss' model, a credit event (or impairment 'trigger') no longer has to occur before credit losses are recognized. The Group will always recognize (at a minimum) 12-month expected credit losses in profit or loss. Lifetime expected losses will be recognized on assets for which there is a significant increase in credit risk after initial recognition.

Stage[1]		Loss allowance
1	No significant increase in credit risk after initial recognition[2]	12-month expected credit losses (expected credit losses that result from those default events on the financial instrument that are possible within 12 months after the reporting date)
2	Significant increase in credit risk after initial recognition	Lifetime expected credit losses (expected credit losses that result from all possible default events over the life of the financial instrument)
3	Credit-impaired	

[1] A loss allowance for lifetime expected credit losses is required for contract assets or trade receivables that are not, according to Korean IFRS 1115 *Revenue from Contracts with Customers*, considered to contain a significant financing component. Additionally, the Group can elect an accounting policy of recognizing lifetime expected credit losses for all contract assets, lease receivables, and/or all trade receivables, including those that contain a significant financing component.

[2] If the financial instrument has low credit risk at the end of the reporting period, the Group may assume that the credit risk has not increased significantly since initial recognition.

Under Korean IFRS 1109, the asset that is credit-impaired at initial recognition would recognize all changes in lifetime expected credit losses since the initial recognition as a loss allowance with any changes recognized in profit or loss.

As at December 31, 2017, the Group owns debt investment carried at amortized cost of ₩ 1,693,100 million and recognized loss allowance of ₩ 479,903 million for these assets.

For trade receivables, contract assets, and lease receivables that contain a significant financing component, the Group measures the loss allowance at an amount equal to lifetime expected credit losses at initial recognition. The Group performed an impact assessment using the simplified approach where it assumes that the credit risk has not increased significantly since initial recognition if the financial instrument has a low credit risk at the reporting date. As a result of the impact assessment, the Group expects the loss allowance to be ₩ 481,249 million as at December 31, 2017, which is an increase by ₩ 1,346 million from ₩ 479,903 million.

③ *Hedge Accounting*

Hedge accounting mechanics (fair value hedges, cash flow hedges and hedge of net investments in foreign operations) required by Korean IFRS 1039 remains unchanged in Korean IFRS 1109, however, the new hedge accounting rules will align the accounting for hedging instruments more closely with the Group's risk management practices. As a general rule, more hedge relationships might be eligible for hedge accounting, as the standard introduces a more principles-based approach. Korean IFRS 1109 allows more hedging instruments and hedged items to qualify for hedge accounting, and relaxes the hedge accounting requirement by removing two hedge effectiveness tests that are a prospective test to ensure that the hedging relationship is expected to be highly effective and a quantitative retrospective test (within range of 80-125%) to ensure that the hedging relationship has been highly effective throughout the reporting period.

With implementation of Korean IFRS 1109, volatility in profit or loss may be reduced as some items that were not eligible as hedged items or hedging instruments under Korean IFRS 1039 are now eligible under Korean IFRS 1109. With the application of hedge accounting as at December 31, 2017, the change in fair value of cash flow hedging instruments recognized in accumulated other comprehensive income amounts to ₩ 3,209 million (loss).

Furthermore, when the Group first applies Korean IFRS 1109, it may choose as its accounting policy choice to continue to apply all of the hedge accounting requirements of Korean IFRS 1039 instead of the requirements of Korean IFRS 1109.

- Korean IFRS 1115 *Revenue from Contracts with Customers*

Korean IFRS 1115 *Revenue from Contracts with Customers* issued on November 6, 2015 will be effective for annual reporting periods beginning on or after January 1, 2018 with early adoption permitted. This standard replaces Korean IFRS 1018 *Revenue*, Korean IFRS 1011 *Construction Contracts*, Interpretation 2031 *Revenue-Barter Transactions Involving Advertising Services*, Interpretation 2113 *Customer Loyalty Programs*, Interpretation 2115 *Agreements for the Construction of Real Estate* and Interpretation 2118 *Transfers of assets from customers*.

The Group must apply Korean IFRS 1115 *Revenue from Contracts with Customers* within annual reporting periods beginning on or after January 1, 2018, and will elect the modified retrospective approach which will recognize the cumulative impact of initially applying the revenue standard as an adjustment to retained earnings as at January 1, 2018, the period of initial application.

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

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

The Group performed an impact preliminary assessment to identify potential financial effects of applying Korean IFRS 1115. The assessment was performed based on available information as at December 31, 2017, and the results of the assessment are explained as below. The results of the preliminary assessment as at December 31, 2017 may change due to additional information that the Group may obtain after the assessment.

① *Product warranty*

The Group plans to identify separate performance obligations from extended warranty contracts and allocate the transaction price to such obligations. Based on results from the impact assessment of Korean IFRS 1115, the Company expects the enactment to have no effect on net assets in relation to the warranty performance obligation as at December 31, 2017.

② *Sale with a right of return*

With the implementation of Korean IFRS 1115, the Group estimates the variable consideration by using the expected value method, which the Group expects to better predict the amount of consideration to which the Group is entitled. The Group recognizes revenue with transaction price including variable consideration only to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the refund period has lapsed. The refund liability is measured at the amount of consideration received for which the Group does not expect to be entitled.

Based on results from the impact assessment of Korean IFRS 1115, the Group expects assets and liabilities in relation to return provisions to increase by ₩ 10,661 million, respectively, as at December 31, 2017.

③ *Providing transportation service and insurance subscription*

The Group is planning to identify the terms on providing transportation service and insurance subscription within export sales as separate performance obligations. The Group will allocate the transaction price to each performance obligations and the revenues will be deferred. As at December 31, 2017, the Group performed a preliminary evaluation and expects no effects on net assets in relation to obligation of providing transportation service and insurance subscription, as a result of the adoption of Korean IFRS 1115.

2.2 Consolidation

The consolidated financial statements incorporate the financial statements of the Parent and all of the subsidiaries controlled by the Parent (or its subsidiaries).

1) Subsidiaries

Subsidiaries are all entities over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power to direct the activities of the entity. The power refers to the current ability to direct relevant activities (i.e., the activities that significantly affect the investee's returns). Generally the power can be assessed by considering the voting rights from shareholdings, however, other factors including voting patterns at previous shareholders' meeting must also be considered. There are some cases when the power arise from a contractual agreement. The Group is exposed, or has rights, to variable returns from its involvement with the investee when the Group's returns from its involvement have the potential to vary as a result of the investee's performance.

Subsidiaries are fully consolidated from the date when control is transferred to the Group and deconsolidated from the date when control ceases to exist.

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

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

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

The Group treats transactions with non-controlling interests that do not result in a loss of control as transactions with equity owners of the Group. A changed in ownership interest results in an adjustment between the carrying amounts of the controlling and non-controlling interest to reflect their relative interest in the subsidiary. Any difference between the amount of the adjustment to non-controlling interest and any consideration paid or received is recognized in a separate reserve within equity attributable to owners of the Parent Company.

When the Group ceases to consolidate for a subsidiary because of a loss of control, any retained interest in the subsidiary is remeasured to its fair value with the changed in carrying amount recognized in profit or loss.

2) Investments in Associates and Joint Ventures

Associates are entities over which the Group has significant influence but not control or joint control, where the Group in general holds 20% or more and 50% or less of the voting rights. Investments in joint ventures are investees sharing control over its economic activities with the Group based on a contractual agreement. The contractually agreed sharing of control of an arrangement only exist when financial and operating policy decisions of the investee require the unanimous consent of the parties sharing control.

Investments in associates and joint ventures (collectively referred to as the "associates, etc.") are accounted for using the equity method of accounting, after initially being recognized at cost. The carrying amount of the investments contains the goodwill identified on initial recognition and is presented at the amount less accumulated impairment losses. The Group’s proportionate interest of the investee’s profit or loss and changes in other comprehensive income after the date of acquisition is respectively recognized in the Group’s profit or loss and other comprehensive income. Cumulative changes after acquisition are adjusted from the carrying amount of the investment. If the Group's share of losses of the associates, etc. is greater than or equal to the investment in the associate, etc., including other unsecured notes, the Group discontinues to recognize further losses, except where it is obligated or required to be paid on behalf of the associates, etc.

Unrealized gain resulting from transactions between the Group and its associates, etc. are eliminated to the extent of the Group’s interests in them. Unrealized loss is also eliminated identically unless evidence of impairment in assets transferred is provided.

Accounting policies of associate, etc. are changed if necessary for consistency with those of the Group.

For overseas investees whose financial statements are prepared in foreign currencies, the equity method is applied to financial statements translated in accordance with the accounting treatments of the translation of the financial statements of overseas’ subsidiaries. The amount of difference between the translated amount of assets less liabilities and translated amount of equity is recognized as changes in the investee's equity (accumulated other comprehensive income) to the extent equivalent to the Group’s interest.

2.3 Foreign Currency Translation

1) Functional and presentation currency

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

2) Transactions and balances

Foreign currency transactions are translated into the functional currency using the exchange rates at the dates of the transactions. Foreign exchange gain and loss resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies at year end exchange rates are generally recognized in profit or loss, whereas the gain and loss from qualified cash flow hedge and net investment hedge for foreign operations are deferred as an equity item.

3) Translation to the presentation currency

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

① assets and liabilities for each statement of financial position presented are translated at the closing rate at the end of the reporting period,
② income and expenses for each statement of profit or loss are translated at average exchange rates, unless this average is not reasonable approximation of the cumulative effect of the rates prevailing on the transaction dates, in which case income and expenses are translated at the rates on the dates of the transactions,
③ all resulting exchange differences are recognized in other comprehensive income.

Exchange differences from the net investment in the foreign operation and from borrowings and other foreign currency instruments designated as hedging instrument for such investment are recognized in other comprehensive income. On disposal of part or all foreign operation, which leads to the loss of control, all of the accumulated exchange differences in respect of that operation are reclassified to profit or loss. Goodwill and fair value adjustments arising from the acquisition of a foreign operation are recognized as assets and liabilities of the foreign operation and translated at the closing exchange rate.

2.4 Cash and Cash Equivalents

Cash and cash equivalents include cash on hand, bank deposits, and other short-term highly liquid investments that are readily convertible to a known amount of cash. Bank overdraft is classified as short-term borrowings in the consolidated statements of financial position.

2.5 Financial Assets

1) Classification

The Group classifies its financial assets into the following categories: financial assets at fair value through profit or loss, loans and receivables, available-for-sale financial assets, and held-to-maturity financial assets. The classification of financial asset is determined on the trade-date, the initial recognition date on which the Group commits to purchase or sell the assets.

① *Financial assets at fair value through profit or loss*

Financial assets at fair value through profit or loss include 1) contingent considerations paid by the acquirer in business combinations to which Korean IFRS 1103 applies and 2) financial assets designated to be measured at fair value through profit or loss at the initial recognition.
A financial asset is classified as held for trading financial assets, if it has been acquired principally for the purpose of selling or repurchasing in near term. Also, all derivative assets, including embedded derivatives separated from the host contracts and accounted for as derivatives, are classified as held for trading financial assets unless they are designated as effective hedging instruments. These categories of assets are classified as current assets or non-current assets depending on the timing of settlement.

A financial asset is classified as held for trading, if:

- It has been acquired principally for the purpose of selling it in the near term; or
- On initial recognition, it is part of a portfolio of identified financial instruments that the Group manages together and has a recent actual pattern of short-term profit taking; or
- It is a derivative that is not designated and effective as a hedging instrument.

A financial asset other than a financial asset held for trading or contingent consideration that may be paid by an acquirer as part of a business combination may be designated as at fair value through profit or loss upon initial recognition, if:

- Such designation eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise;
- The financial asset forms part of a group of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the Group's documented risk management or investment strategy, and information about the grouping is provided internally on that basis; or
- It forms part of a contract containing one or more embedded derivatives, and K-IFRS 1039 Financial Instruments: Recognition and Measurement permits the entire combined contract (asset or liability) to be designated as at fair value through profit or loss.

Financial assets at fair value through profit or loss are stated at fair value, with any gain or loss arising from remeasurement recognized in profit or loss. The net gain or loss recognized in profit or loss incorporates any dividend or interest earned on the financial asset and is included in the 'other non-operating gain or loss' category in the statements of comprehensive income.

② *Loans and receivables*

Loans and receivables are non-derivative financial assets with fixed or determinable payments which does not have quoted price in an active market. Unless residual maturities of loans and receivables are greater than 12 months, which is classified as non-current assets, as at December 31, 2017, they are classified as current assets.

③ *Available-for-sale financial assets*

Available-for-sale financial assets are non-derivative financial assets that are designated as available-for-sale or financial assets that could not be classified as the other categories. Available-for-sale financial assets are classified as non-current assets unless the management has intention to sell them within 12 months as at December 31, 2017.

④ *Held-to-maturity investments*

Held-to-maturity investments are non-derivative financial instruments with fixed maturity and fixed or determinable payments which the Group has both positive intention and ability to hold until maturity. Held-to-maturity investments, with maturities of more than 12 months from the end of the reporting period, are classified as non-current assets. Otherwise, they are classified as current assets.

2) Recognition and measurement

Apart from regular way purchases and sales of financial assets, recognized on the trade-date (date of sales agreement), most of financial assets are recognized when the Group becomes a party to the contract. All financial assets except for financial assets at fair value through profit or loss, which are initially measured at fair value and related transaction costs are recognized in income or loss, are measured at fair value of the initial recognition with the accompanying transaction costs added to their acquisition cost.

Financial assets at fair value through profit or loss and available-for-sale financial assets are subsequently measured at fair value. Loans and receivables and held-to-maturity investments are measured at amortized cost using the effective interest method. Gains or losses arising from changes in fair value of financial assets at fair value through profit or loss are recognized in the other non-operating income and expense line item in the consolidated statements of profit or loss. Dividends on financial assets at fair value through profit or loss are recognized in the finance income when the Group's right to receive the dividends is established.

Changes in fair value of monetary and non-monetary financial assets that are classified as available for sale financial assets are recognized in other comprehensive income. When the investment is disposed of or is determined to be impaired, the cumulative gain or loss previously accumulated in the equity is reclassified into other non-operating income and expense in the statement of profit or loss.

Interest from available for sale financial assets calculated using the effective interest method is recognized in finance income in the statement of profit or loss. Dividends on available-for-sale equity instruments are recognized in the finance income when the Group's right to receive the dividends is established.

3) Impairment

① *Financial assets measured at amortized cost*

The Group assesses at the end of each reporting period whether there is any objective evidence that a financial asset is impaired. Financial assets are considered to be impaired when there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial asset, the estimated future cash flows of the investment have been affected. Impairment loss is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest rate at initial recognition. The carrying amount of the financial asset is reduced by the impairment loss, and the amount of the loss is recognized in profit or loss. The Group measures impairment loss based on fair value of financial assets from observable market data.

If, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognized, the previously recognized impairment loss is reversed and recognized in profit or loss.

② Available-for-sale financial assets

The Group assesses at the end of each reporting period whether there is any objective evidence that a financial asset or group of financial assets is impaired. For equity investments classified as available-for-sale financial assets, a significant or prolonged decline in the fair value of the security below its cost is considered to be objective evidence of impairment. If there is objective evidence of impairment on available-for-sale financial assets, the cumulative loss that has been recognized in other comprehensive income less any impairment loss previously recognized in profit or loss is reclassified from equity to profit or loss. Impairment losses recognized in profit or loss for an investment in an equity instrument classified as available-for-sale financial assets are not reversed through profit or loss. Meanwhile, if, in a subsequent period, the fair value of a debt instrument classified as available-for-sale financial assets increases and the increase can be objectively related to an event occurring after the impairment loss was recognized in profit or loss, the impairment loss is reversed through profit or loss.

4) Derecognition

The Group derecognizes a financial asset only when the contractual rights to the cash flows from the asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity.

5) Offsetting financial assets and financial liabilities

Financial assets and financial liabilities are offset as a net amount in the statement of financial position when the Group has a legally enforceable right to set off the recognized amounts of the assets and liabilities and intends to settle them on a net basis, or to realize the assets and the liabilities simultaneously.

2.6 Financial Liabilities and Equity Instruments

1) Classification as debt or equity

Debt and equity instruments are classified as either financial liabilities or as equity in accordance with the substance of the contractual arrangement and the definitions of financial liability and an equity instrument.

2) Equity instruments

An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities. Equity instruments issued by the Group are recognized at the proceeds received, net of direct issue costs.

When the Group reacquires its own shares, those shares are deducted from equity. No gain or loss is recognized in profit or loss on the purchase, sale, issue or cancellation of an entity's own equity instruments.

3) Compound instruments

The component parts of compound instruments (convertible bonds) issued by the Group are classified separately as financial liabilities and equity in accordance with the substance of the contractual arrangement. The liability component of the compound instruments is recognized at the fair value of a similar liability on initial recognition and be measured at amortized cost by applying the effective interest rate until it is extinguished. The equity component is determined by deducting the amount of the liability component from the fair value of the compound instrument as a whole. This is recognized and included in equity, net of income tax effects, and is not subsequently remeasured. If it is classified not as equity component but as derivatives, it is regarded as embedded derivatives estimated at the fair value of the same derivatives or calculated from a reasonable valuation model. The subsequent gains or losses arising from its fair value fluctuation are recognized in profit or loss.

4) Financial liabilities

Financial liabilities are recognized when the Group becomes a party to the contractual provisions of the instruments. Financial liabilities are initially measured at fair value. Transaction costs that are directly attributable to the issue of financial liabilities are added to or deducted from the fair value of the financial liabilities, as appropriate, on initial recognition. Transaction costs that are directly attributable to acquisition of financial liabilities at fair value through profit or loss are recognized immediately in profit or loss.

Financial liabilities are classified as either financial liabilities at fair value through profit or loss or other financial liabilities.

5) Financial liabilities at fair value through profit or loss

Financial liabilities are classified as at fair value through profit or loss when the financial liability is contingent consideration that may be paid by an acquirer as part of a business combination to which Korean IFRS 1103 applies, or held for trading, or it is designated as at fair value through profit or loss.

A financial liability is classified as held for trading if:

- It has been acquired principally for the purpose of selling it in the near term; or
- On initial recognition, it is part of a portfolio of identified financial instruments that the Group manages together and has a recent actual pattern of short-term profit taking; or
- It is a derivative that is not designated and effective as a hedging instrument.

A financial liability other than a financial liability held for trading or contingent consideration that may be paid by an acquirer as part of a business combination may be designated as at fair value through profit or loss upon initial recognition, if:

- Such designation eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise;
- The financial liability forms part of a group of financial assets or financial liabilities or both, which is managed and its performance is evaluated on a fair value basis, in accordance with the Group's documented risk management or investment strategy, and information about the grouping is provided internally on that basis; or
- It forms part of a contract containing one or more embedded derivatives, and Korean IFRS 1039 *Financial Instruments: Recognition and Measurement* permits the entire combined contract (asset or liability) to be designated as at fair value through profit or loss.

Financial liabilities at fair value through profit or loss are stated at fair value, with any gain or loss arising on remeasurement recognized in profit or loss. The net gain or loss recognized in profit or loss incorporates any interest paid on the financial liability.

6) Other financial liabilities

Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs.

Other financial liabilities are subsequently measured at amortized cost using the effective interest method, with interest expense recognized on an effective yield basis.

The effective interest method is a method of calculating the amortized cost of a financial liability and allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial liability, or (when appropriate) a shorter period, to the net carrying amount on initial recognition. When calculating the estimated future cash payments or receipts, certain factors, such as commission income and expense; points; transaction costs; and premiums and discounts, are factored into the calculation.

7) Financial guarantee contract liabilities

A financial guarantee contract is a contract that requires the issuer to make specified payments to reimburse the holder for a loss incurred because a specified debtor fails to make payments when due in accordance with the terms of debt instruments.

Financial guarantee contract liabilities are initially measured at their fair values and, if not designated as at fair value through profit or loss, are subsequently measured at the higher of:

① the amount of the obligation under the contract, as determined in accordance with Korean IFRS 1037 *Provisions, Contingent Liabilities and Contingent Assets*, and

② the amount initially recognized, less cumulative amortization recognized in accordance with the Korean IFRS 1018 *Revenue*

8) Derecognition of financial liabilities

The Group derecognizes financial liabilities when, and only when, the Group's obligations are discharged, canceled or expired. The difference between consideration paid and book value of financial liabilities derecognized is recognized in profit or loss.

2.7 Trade Receivables

Trade receivables are amounts owed by customer for products and services provided in the ordinary course of business. Receivables expected to be collected within one year are classified as current assets. Otherwise, they are classified as non-current assets. Trade receivables are initially measured at fair value and are presented as net of allowance for doubtful accounts, estimated on an individual basis based on past bad debt experience.

2.8 Inventories

Inventories are stated at the lower of cost or net realizable value. Cost of inventories includes fixed and variable manufacturing overheads allocated to inventories by the most appropriate method of each category. The cost of inventories is determined by the gross average method (the specific identification method for materials in transit). And during the year, perpetual inventory systems are used to value inventories, which are adjusted to physical inventory counts performed at the end of the year.

The Group periodically reviews changes in net realizable value of inventories (current replacement cost for raw materials) due to damage, obsolescence, decline in selling prices and others and recognizes loss on inventory valuation. Loss on inventory valuation is charged to cost of sales when it is ordinary and to other non-operating expense when it is extraordinary. When the previous circumstances that caused the loss on inventory valuation no longer exist and the new market value of inventories subsequently exceeds the carrying amount, the valuation loss is reversed to the extent not exceeding the initial carrying amount, and the reversal is deducted from cost of sales.

2.9 Property, Plant and Equipment

Property, plant and equipment are stated at cost, less subsequent accumulated depreciation and accumulated impairment losses except for lands to which the revaluation model is applied. When useful life of a certain part of property, plant and equipment is different compared to that of the whole asset, such part is recognized as a separate asset. The historical cost includes expenditure that is directly attributable to the acquisition of the item, including estimated costs of dismantling, removing or restoring the assets at the end of the expected useful life.

Subsequent costs, incurred to replace a part of previously recognized item of property, plant and equipment, are added to the carrying amount of an asset, or recognized as a separate asset, if it is probable that future economic benefits associated with the assets will flow into the Group and the cost of an asset can be measured reliably. In such cases, the carrying amount of what was replaced is derecognized accordingly. Routine maintenance and repairs are expensed as incurred through profit or loss.

Depreciation of all property, plant and equipment, except for land, is calculated using the straight-line method, which reflects the best estimate of the expected consumption pattern of future economic benefits inherent in the asset, to allocate their cost, net of their residual values, over their estimated useful lives as follows:

	Estimated useful life (years)
Buildings	20 – 40
Structures	10 – 20
Machinery	3 – 15
Vehicles	3 – 10
Tools	3 – 10
Office equipment	3 – 14

If a part of a property, plant and equipment has a cost that is significant in relation to the total cost of property, plant and equipment, it is depreciated separately.

The Group reviews the depreciation method, the estimated useful lives and residual values of property, plant and equipment at the end of each annual reporting period. If expectations differ from previous estimates, the changes are accounted for as a change in an accounting estimate.

When the carrying amount of property, plant and equipment is higher than the recoverable amount, the carrying amount is adjusted to the recoverable amount and the difference is recognized as an impairment loss. Meanwhile, when the recoverable amount subsequently exceeds the carrying amount of the impaired asset, the excess is recorded as a reversal of impairment loss to the extent that the reversed asset does not exceed the carrying amount before the previous impairment, as adjusted by depreciation. Upon derecognition of a property, plant and equipment, the difference between the net disposal amount and carrying amount of the item is recognized as other non-operating income or expense.

2.10 Intangible Assets

Intangible assets are initially measured at cost and are carried at cost, less accumulated amortization and accumulated impairment losses. Subsequent expenditure on an intangible asset is capitalized only when it is probable that the expected future economic benefits that are attributable to the asset will increase.

Intangible assets, expect for goodwill and those with indefinite useful lives, are amortized using the straight-line method with no residual value, with amortization beginning when the asset is available for use. However, Membership rights that have an indefinite useful life are not subject to amortization because there is no foreseeable limit to the period over which the assets are expected to be utilized. Instead of being amortized they are tested for impairment in each reporting period.

The Group amortizes intangible assets with a limited useful life using the straight-line method over the following periods:

	Estimated useful life (years)
Industrial rights	5 – 10
Development costs	3 – 12
Other intangible assets	3 – 7

Goodwill acquired through business combinations refers to the consideration paid in excess of the fair value of the Group's share of the identifiable net assets of the subsidiary on the date of acquisition. Goodwill recognized from the acquisition of certain subsidiary, is classified as intangible assets. Goodwill is tested for impairment annually and carried at the historical cost at the date of business acquisition, less accumulated impairment losses. Impairment loss recognized for goodwill is not reversed. For the purpose of impairment testing, goodwill is allocated to each of the Group's cash-generating units (or groups of cash-generating units) that is expected to benefit from the synergies of the combination.

Expenditures relating to development activities are capitalized when 1) the results of development plan were for new product developments or substantial improvement of functions of existing products, 2) there is technical and commercial feasibility of completing the development and 3) the Group has the ability to measure the expenditures attributable to the development with reliability. Capitalized development costs include expenditure on materials, salaries and related overhead cost that is reasonably allocated. Capitalized development costs are presented at the acquisition cost, less accumulated amortization and accumulated impairment losses. Capitalized development costs are amortized using the straight-line method over the estimated useful life and amortization expenses are included in cost of goods and selling and administrative expenses. The expenditure on research and development, which does not meet conditions noted above, is expensed through profit or loss when it is incurred.

The estimated useful life and amortization method for intangible assets with finite useful lives are reviewed at the end of each reporting period. For intangible assets with indefinite useful life, assessment is revisited each period, with the effect of any changes in estimate being accounted for as a change in accounting estimate.

2.11 Investment Property

Investment properties are properties held to earn rentals or for capital appreciation or both. Investment properties are measured initially at cost, including transaction costs incurred in acquiring the asset. Subsequent to initial recognition, the carrying amount of investment property is presented at cost, less accumulated depreciation and accumulated impairment. While land is not depreciated, all the other investment properties are depreciated using the straight-line method over 40 years.

The estimated useful lives, residual values and depreciation method are reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for as a change in accounting estimate.

2.12 Borrowing Costs

Borrowing costs that are directly attributable to the acquisition, construction or production of qualifying assets are capitalized during the period of time that is required to complete and prepare the asset for its intended use. Other borrowing costs are expensed in the period in which they are incurred.

2.13 Impairment of Non-financial Assets

Assets with indefinite useful lives, such as goodwill, are not amortized, but tested for impairment annually. Assets that are amortized or depreciated are tested for impairment to determine whether events or circumstances indicating those assets have suffered impairment exist. Impairment loss is the excess of the carrying amount over recoverable amount. Recoverable amount is the higher of fair value, less costs of sell, and value in use. When it is not possible to estimate the recoverable amount of an individual asset, the Group estimates the recoverable amount of the cash-generating unit to which the asset belongs. When a reasonable and consistent basis of allocation can be identified, corporate assets are also allocated to individual cash-generating units, or otherwise, they are allocated to the smallest group of cash-generating units for which a reasonable and consistent allocation basis can be identified. Except for goodwill, all non-financial assets that have incurred impairment are tested for reversal of impairment at the end of each reporting period.

2.14 Borrowings

Borrowings are measured initially at fair value, net of transaction costs and subsequently at amortized cost using the effective interest method, with interest expense being recognized on an effective yield basis. The difference between the amount received and the redemption amount is amortized using the effective interest method and recognized in profit or loss. Borrowings are classified as non-current liabilities when the Group has an unconditional right to defer settlement of the liability for at least 12 months after the end of the reporting period. Otherwise, borrowings are classified as current liabilities.

2.15 Retirement Benefit Obligation

The Group operates a defined benefit pension plan. In general, the Group funds its benefit obligation, calculated based on periodic actuarial estimates, through insurance companies who manage the Group's funds.

Defined benefit plans are postemployment benefit plans other than defined contribution plans. Generally under defined benefit plan, amounts to be paid as retirement benefits are determined by reference to a formula usually based on employees' earnings, years of service, ages and other. The retirement benefit obligation recognized in the consolidated statement of financial position represents the present value of the defined benefit obligation, less fair value of plan assets and adjustment for unrecognized past service cost. Defined benefit obligations are calculated by an actuary using the projected unit credit method. The present value of the defined benefit obligation is denominated in the same currency in which the benefits are expected to be paid, and calculated at the discount rate, which is the yield at the reporting date on high-quality corporate bonds that have maturity dates approximating the terms of the Group's obligation. Actuarial gain or loss from changes in actuarial assumptions or differences between actuarial assumptions and actual results are recognized in other comprehensive income, which is immediately recognized as retained earnings. Meanwhile, past service cost is directly recognized in profit or loss in the period of a plan amendment.

Contributions to defined contribution plans are recognized as an expense when employees have rendered service that entitles them to the contributions.

2.16 Provisions

Provisions are recognized when 1) the Group has a present obligation (legal or constructive) as a result of a past event, 2) it is probable that the Group will be required to settle the obligation 3) and a reliable estimate can be made for the amount of the obligation. The amount of the provision is measured as present value of the prospective cash flows estimated to settle the present obligation when the difference between the face value and present value is material. At the end of each reporting period, the remaining provision balance is reviewed and assessed to determine whether the current best estimate is being recognized. The increase in provision due to passage of time is recognized as interest expense. If the existence of an obligation to transfer economic benefit is no longer probable, the related provision is reversed during the period. When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, a receivable is recognized as an asset if it is virtually certain that reimbursement will be received and the amount of the receivable can be measured reliably. In this case, profit from reimbursement is offset against the expense incurred in the recognition of provision through profit or loss.

2.17 Derivative Financial Instruments

Derivatives are initially recognized at fair value at the date the derivative contract is entered into and are subsequently remeasured to their fair value at the end of each reporting period. The resulting gain or loss is generally recognized as profit or loss when it is incurred.

However, the effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognized in other comprehensive income. The gain or loss relating to the ineffective portion is recognized immediately in profit or loss.

2.18 Dividend

Dividend payable is recognized as liability when declaration of the dividend is approved at the shareholders' meeting.

2.19 Share-based Payment Arrangement

The Group recognizes share options granted to employees at the fair value at the grant date. The fair value determined at the grant date of the share option is expensed on a straight-line basis over the vesting period. The Group determines fair value of share option using the Black-Scholes model.

2.20 Revenue Recognition

Revenue is measured at the fair value of the consideration received or receivable for the sale of goods and rendering of services arising in the course of the ordinary activities of the Group. Revenue is reduced for value-added tax, estimated customer returns, rebates and trade discounts and is presented after eliminating intercompany transactions. The Group recognizes revenue when the amount of revenue can be measured reliably and it is probable that the economic benefits associated with the transaction will flow to the Group, and when transaction meets the revenue recognition criteria specified by activity. When measuring revenue, the Group reliably estimates on contingencies related to sales based on historical data, such as customer type, transaction type and trading terms.

1) Sale of goods

Revenue from the sale of goods is recognized when the Group has transferred the significant risks and rewards of ownership of the goods to the buyer. Revenue is recognized on initial delivery of the goods, as net of discounts and returns estimated, based on historical data. The Group estimates and recognizes provision for warranty and sales return arising from sale of goods.

2) Other revenue

Interest income from a financial asset is recognized when it is probable that the economic benefits will flow to the Group and the amount of income can be measured reliably. Interest income is recognized using the effective interest method. Revenues arising from dividends are recognized when the right to receive the dividend payment is established. Rental income is recognized on a straight-line basis. Royalty revenue is recognized on an accrual basis in accordance with the substance of the relevant agreement.

2.21 Government Grants

For the purpose of acquisition of certain assets, government grants related to assets are accounted for as a deduction from related assets on the date that the related assets are received.

If a government grant that will be received is not subject to specific conditions, government grants related to primary operating activity are recognized in operating income; otherwise, those are recognized in other non-operating income. Meanwhile, for those recognized in the other non-operating income, expenses incurred related to the government grants is to be offset before they are recognized in profit or loss.

2.22 Income Tax and Deferred Tax

Income tax expense consists current and deferred tax. Current and deferred tax is recognized in profit or loss, except to the extent that it relates to items recognized in other comprehensive income or directly in equity. In this case, the tax is also recognized in other comprehensive income or directly in equity, respectively.

Income tax expense is the sum of corporate tax for each fiscal year and tax added to corporate tax under corporate income tax law and other law, including the amount of income taxes or tax refunds for the prior periods recognized in the current period. The Group's liability for current tax is calculated using tax rates that have been enacted or substantively enacted by the end of the reporting period. Deferred tax is recognized on temporary differences between the carrying amounts of assets and liabilities in the consolidated financial statements and the corresponding tax bases used in the computation of taxable income. However, deferred tax assets and liabilities are not recognized if the temporary difference arises from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the taxable income nor the accounting income.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset is realized, based on tax rates and tax laws that have been enacted or will substantively be enacted by the end of the reporting period.

Deferred tax liabilities are recognized for taxable temporary differences associated with investments in subsidiaries, joint ventures and associates, except where the Group is able to control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. Deferred tax assets arising from deductible temporary differences associated with such investments and interests are only recognized to the extent that it is probable that there will be sufficient taxable income against which to utilize the benefits of the temporary differences and they are expected to reverse in the foreseeable future.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and it is reduced to the extent that it is no longer probable that sufficient taxable income will be available to allow all or part of the asset to be recovered.

2.23 Earnings per Share

Basic earnings per common share are computed by dividing net income attributable to owners of the Group by the weighted-average number of common shares outstanding during the period. Diluted earnings per common share are computed by dividing diluted net income attributable to the owners of the Group, which is adjusted by adding back the after-tax amount of expenses related to dilutive potential ordinary shares, by weighted-average number of common shares and dilutive potential ordinary shares outstanding during the period. Anti-dilutive potential ordinary shares are disregarded in the calculation of diluted earnings per share.

2.24 Assets Held for Sale

Non-current assets and disposal groups are classified as held for sale if their carrying amount will be recovered principally through a sale transaction rather than through continuing use. Non-current assets, or disposal groups, classified as held for sale are measured at the lower of their previous carrying amount and the fair value, less costs to sell and they are no longer depreciated or amortized.

If the fair value, less costs to sell, of the non-current assets, or disposal groups, held for sale decreases, impairment loss is recognized immediately through profit or loss. When it increases subsequently, the gain is recognized at the amount not exceeding the accumulated impairment loss.

2.25 Segment Reporting

Operating segments are reported on the same basis as financial information is reported to management. The management of the Group is responsible for deciding how to allocate resources to segments and assessing their performance.

2.26 Accounting Treatment Related to the Emission Rights Cap and Trade Scheme

The Group classifies the emission rights as intangible assets. The allowance received free of charge from the government are measured at zero, while those purchased are measured at acquisition cost. Also, if the emission rights granted free of charge by the government in relation to certain implementation year are sufficient to fulfill the obligation under the emission liability of current period, the emission liability is measured as zero. However, if there is a shortage, Emissions obligations are measured as the sum of the carrying amount of the allocated allowances that will be the best estimate of expenditure required to settle the obligation at the end of reporting period for any excess emission.

2.27 Approval of Financial Statements

The consolidated financial statements as at and for the year ended December 31, 2017, were approved by the Board of Directors on February 7, 2018, and will be finally approved by the shareholders at their Annual General Meeting on March 28, 2018.

3 Critical Accounting Estimates and Assumptions

The estimates and underlying assumptions are reviewed on an ongoing basis and they are based on historical experiences and other factors, including expectation on possible future events. Actual results may differ from estimates calculated based on such definition. The following are critical assumptions and key sources of estimation uncertainty at the end of reporting period that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year:

(1) Provisions for product warranty

The Group provides warranty for products when the related revenue is recognized. At the end of each reporting period, provisions are recorded at the best estimated costs to settle current and future warranty obligations. The Group continuously introduces new products using advanced complex technology, and accordingly, these estimates may change in future due to additional provisions required under local legislation and practice.

(2) Impairment of goodwill

The Group performs test for goodwill impairment testing annually. Recoverable amount of cash-generating units is based on calculation of value in use. The value-in-use calculation requires accounting estimates.

(3) Allowance for doubtful accounts

In order to calculate the impairment of receivables, the management of the Group estimates an expected bad debt considering the aging of receivables, past experience of bad debt and economic and industrial factors.

(4) Measurement of property, plant and equipment and intangible assets

If the Group acquires property, plant and equipment or intangible assets from business combination, it is required to estimate the fair value of these assets at the acquisition date. It is also required to estimate useful lives for depreciation and amortization. In these estimation processes, the management's judgments take an important role.

4 Financial Risk Management

The purpose of the Group's financial risk management is to improve financial structure and efficiency of fund management to create stable and sustainable management performance even under various financial risks such as market risk, credit risk and liquidity risk.

Financial risk management activities are mainly managed by the finance department, and, in close cooperation with the relevant departments, the department is engaged in activities such as identification, valuation and hedging of financial risks, and focusing on minimizing the impact of financial risks through regular monitoring.

(1) Market risk

1) Foreign exchange risk

The Group is exposed to foreign currency risk as it makes international transactions in foreign currencies. Foreign currency risk arises from forecast transactions, recognized assets and liabilities and net investments in foreign operations.

Foreign currency risk is managed by the Group's policy on foreign currencies. The Group's basis for foreign currency management is to reduce the volatility of profit or loss. The Group reduces exposure to foreign currency risk by matching the inflow and the outflow of foreign currencies (natural hedge), and manages foreign currency risk by using currency derivatives, such as currency forwards, for the remaining exposures.

The Group's monetary assets and liabilities denominated in foreign currencies and exposed to foreign currency risk as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017				
	USD	**EUR**	**CNY**	**Others** [1]	**Total**
Financial assets	₩ 1,234,931	₩ 218,587	₩ 104,650	₩ 227,695	₩ 1,785,863
Financial liabilities	(1,484,636)	(379,034)	(6,527)	(222,132)	(2,092,329)
Net assets (liabilities)	₩ (249,705)	₩ (160,447)	₩ 98,123	₩ 5,563	₩ (306,466)

(in thousands of USD)	2016				
	USD	**EUR**	**CNY**	**Others** [1]	**Total**
Financial assets	₩ 1,045,285	₩ 176,899	₩ 71,660	₩ 89,743	₩ 1,383,587
Financial liabilities	(2,050,565)	(304,242)	(9,296)	(74,810)	(2,438,913)
Net assets (liabilities)	₩ (1,005,280)	₩ (127,343)	₩ 62,364	₩ 14,933	₩ (1,055,326)

[1] Others are assets and liabilities denominated in foreign currencies other than USD, EUR and CNY.

A sensitivity analysis on the Group's net income before income tax expense, assuming a 10% increase and decrease in functional currency exchange rates (functional currency per foreign currency) of the respective entity holding the assets and liabilities, for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	2017		2016	
	10% increase in foreign exchange currency rate	**10% decrease in foreign exchange currency rate**	**10% increase in foreign exchange currency rate**	**10% decrease in foreign exchange currency rate**
Profit before income tax	₩ (30,647)	₩ 30,647	₩ (105,533)	₩ 105,533

2) Interest rate risk

The Group's interest rate risk is related to borrowings and bank deposits with floating interest rates, and the related interest income and expense are exposed to interest rate risk. The Group is exposed to interest rate risk mainly due to its borrowing with floating interest rates. Borrowings and bank deposits with fixed interest rates do not have influence on current profit or loss and equity due to the changes in market interest rates.

To manage the Group's interest rate risk in advance, the Group tries to minimize external borrowings by using internal funds, reducing borrowings with high interest rates, improving the structure of long-term and short-term borrowings, maintaining the appropriate balance between borrowings with floating interest rate, and fixed interest rate and regularly monitoring domestic and international interest rate changes with action plans.

Financial instruments with floating interest rates exposed to interest rate risk as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**2017**	**2016**
Financial liabilities	₩ 1,290,729	₩ 2,474,877

The table below summarizes the impact of increases/decreases of interest rate on the Group's profit (loss) before income tax. The analysis is based on the assumption that the interest rate has increased/decreased by 100 basis points with all other variables held constant.

(in millions of Korean won)	2017		2016	
	100 bp increase	**100 bp decrease**	**100 bp increase**	**100 bp decrease**
Income (expense) before income tax expense	₩ (12,907)	₩ 12,907	₩ (24,749)	₩ 24,749

3) Price risk

The Group is exposed to equity price risks, such as fair value or future cash flow changes, arising from its listed equity investments among available for sale equity investments. The Group periodically measures the risk that the fair value or future cash flows of equity investments may fluctuate due to the changes in market prices. Important investments in the Group's portfolio are individually managed and acquisition and disposal are approved by the management of the Group.

(2) Credit risk

Credit risk arises during the normal course of transactions and investing activities where customers or other parties are unable to comply with contractual obligations. The Group sets out and monitors credit limits for its customers and counterparts on a periodic basis considering financial conditions, historical experiences and other factors.

Credit risk arises from cash and cash equivalents, derivatives and deposits in banks and financial institutions, as well as the Group's receivables.

Main objectives of credit risk management are to efficiently manage credit risk based on the Group's credit policies, to promptly support decision-making processes and to minimize financial losses through safeguarding receivables. Where default is expected for receivables that represents impairment indicators or are past due at the end of reporting period, the Group assesses related credit risk and reflects it on allowances in its consolidated statement of financial position.

- Exposure to credit risk

Maximum exposures of financial assets of the Group exposed to credit risk as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		December 31, 2017	December 31, 2016
Cash and cash equivalents		₩ 943,481	₩ 538,578
Loans and receivables	Short-term and long-term financial instrument	160,177	150,037
	Trade and other receivables	1,197,047	1,030,594
	Long-term trade and other receivables	16,150	7,016
Derivative assets		6,256	6,220
Held-to-maturity investments		1,894	2,662
Total		₩ 2,325,005	₩ 1,735,107

Aging analysis of the Group's receivables as at December 31, 2017 and 2016 is as follows:

(in millions of Korean won)	December 31, 2017						
	Individually impaired receivables	Receivables assessed for impairment on a collective basis					
		Within due	0–3 months	3–6 months	6–12 months	Over 12 months	Total
Trade receivables	₩ 479,511	₩ 913,895	₩58,429	₩10,951	₩ 8,196	₩ 36,207	₩1,507,189
Other receivables	39,933	26,596	17,695	3,867	2,770	65,183	156,044
Accrued income	-	5,786	-	-	-	-	5,786
Short-term loans	14,922	334	-	-	-	-	15,256
Long-term trade receivables	-	14,879	-	-	-	-	14,879
Long-term other receivables	6,404	1,264	-	-	-	-	7,668
Long-term loans	-	169	-	-	-	-	169
Total	₩ 540,770	₩ 962,923	₩76,124	₩14,818	₩10,966	₩101,390	₩1,706,991

(in millions of Korean won)	December 31, 2016						
	Individually impaired receivables	Receivables assessed for impairment on a collective basis					
		Within due	0–3 months	3–6 months	6–12 months	Over 12 months	Total
Trade receivables	₩ 439,217	₩ 579,622	₩ 90,836	₩13,857	₩25,123	₩192,423	₩1,341,078
Other receivables	39,913	36,224	23,181	15,812	2,096	91,940	209,166
Accrued income	-	8,804	-	-	-	-	8,804
Short-term loans	15,798	103	-	-	-	-	15,901
Long-term trade receivables	-	4,842	-	-	-	-	4,842
Long-term other receivables	7,417 -	2,493	-	-	-	-	9,910
Total	₩ 502,345	₩ 632,088	₩114,017	₩29,669	₩27,219	₩284,363	₩1,589,701

Receivables with specific impairment indicators such as insolvency and bankruptcy are individually assessed using appropriate allowance rates. A group of financial assets with similar credit risk natures that are not individually significant is assessed on a collective basis based on aging analysis and the Group's historical experience on collection.

Available-for-sale financial assets, held-to-maturity financial assets, deposit in financial institution and derivative instruments are individually assessed for impairment.

(3) Liquidity risk

Liquidity risk represents the risk that the Group may encounter difficulties in fulfilling its obligations to repay financial liabilities or in being able to have additional funding for its normal business operations due to liquidity shortage.

The Group prepares cash flow budgets for a three-month period as well as annual fiscal year to forecast cash flows from operating, investing and financing activities. Through these forecasts, the Group secures and maintains an appropriate level of liquidity volume and accordingly manages liquidity risk in advance.

Details of the Group's liquidity risk analysis as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	December 31, 2017					
		Nominal cash flows				
	Book amount	Total	Less than 1 year	Less than 2 year	Less than 5 year	More than 5 years
Financial liabilities	₩5,957,263	₩6,733,627	₩3,604,932	₩686,887	₩1,109,629	₩1,332,179

(in millions of Korean won)	December 31, 2016					
		Nominal cash flows				
	Book amount	Total	Less than 1 year	Less than 2 year	Less than 5 year	More than 5 years
Financial liabilities	₩5,491,397	₩6,101,216	₩3,658,590	₩659,283	₩1,776,724	₩6,619

(4) Capital risk

The Group's objectives for capital risk management are to protect, as a going concern, its ability to continuously provide returns and benefits for shareholders and other stakeholders, and to maintain an optimum capital structure to reduce the cost of capital.

In order to maintain or adjust the capital structure, the Group may adjust the amount of dividends paid to shareholders, return capital to shareholders, issue new shares or sell assets to reduce debt. Similar to others in the industry, the Group monitors capital on the basis of the debt-to-equity ratio which is calculated as debt divided by equity.

Debt-to-equity ratios as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**December 31, 2017**	**December 31, 2016**
Debt	₩ 7,102,929	₩ 6,578,432
Equity	3,173,162	3,448,377
Debt-to-equity ratio	223.84%	190.77%

5 Restricted Financial Assets

Details of restricted financial instruments as at December 31, 2017 and 2016, are as follows

(in millions of Korean won)	**December 31, 2017**	**December 31, 2016**	**Description**
Short-term financial instruments	₩ 65,459	₩ 109,056	Pledged for borrowings and others
Long-term financial instruments	11	2,012	Bank transaction deposits and others
Total	₩ 65,470	₩ 111,068	

6 Investment Securities

(1) Investment securities as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**December 31, 2017**	**December 31, 2016**
Short-term:		
Financial assets at fair value through profit or loss	₩ 34,182	-
Current portion of available-for-sale financial assets	-	₩ 441
Current portion of held-to-maturity financial assets	-	2,590
Total	₩ 34,182	₩ 3,031
Long-term:		
Available-for-sale financial assets	₩ 91,793	₩ 148,049
Held-to-maturity financial assets	1,894	72
Total	₩ 93,687	₩ 148,121

(2) Available-for-sale financial assets

1) Available-for-sale financial assets as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	December 31, 2017	December 31, 2016
Current:		
Investments in non-listed company	₩ –	₩ 441
Non-current:		
Investments in non-listed company	₩ 937	₩ 236
Beneficiary certificates	87,310	145,254
Investments in funds	3,546	2,559
Total	₩ 91,793	₩ 148,049

(b) Changes in unrealized gain (loss) on available-for-sale financial assets for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017			
	Beginning balance	Valuation	Reclassification to profit or loss	Ending balance
Beneficiary certificates	₩ 9,869	₩ 19,158	₩ (26,035)	₩ 2,992
Income tax effect	(3,221)	(3,827)	6,300	(748)
Total	₩ 6,648	₩ 15,331	₩ (19,735)	₩ 2,244

	2016			
(in millions of Korean won)	Beginning balance	Valuation	Reclassification to profit or loss	Ending balance
Beneficiary certificates	₩ (949)	₩ 10,818	₩ -	₩ 9,869
Income tax effect	87	(3,308)	-	(3,221)
Total	₩ (862)	₩ 7,510	₩ -	₩ 6,648

(3) Held-to-maturity financial assets

Held-to-maturity financial assets as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	December 31, 2017	December 31, 2016
Current:		
Other debt securities	₩ –	₩ 2,590
Non-current:		
Government bonds and public bonds	94	72
Other debt securities	1,800	-
Total	₩ 1,894	₩ 72

7 Trade and Other Receivables

(1) Trade and other receivables as at December 31, 2017 and 2016, consist of the following:

(in millions of Korean won)	December 31, 2017		
	Gross amount[1]	Provision for impairment	Carrying amount
Current:			
Trade receivables	₩ 1,494,188	₩ (402,432)	₩ 1,091,756
Other receivables	156,044	(56,873)	99,171
Accrued income	5,786	-	5,786
Short-term loans	15,256	(14,922)	334
Total	₩ 1,671,274	₩ (474,227)	₩ 1,197,047
Non-current:			
Long-term trade receivables	₩ 14,879	₩ -	₩ 14,879
Long-term loans	169	-	169
Long-term other receivables	6,778	(5,676)	1,102
Total	₩ 21,826	₩ (5,676)	₩ 16,150

(in millions of Korean won)	December 31, 2016		
	Gross amount[1]	Provision for impairment	Carrying amount
Current:			
Trade receivables	₩ 1,328,086	₩ (427,410)	₩ 900,676
Other receivables	209,166	(88,155)	121,011
Accrued income	8,804	-	8,804
Short-term loans	15,901	(15,798)	103
Total	₩ 1,561,957	₩ (531,363)	₩ 1,030,594
Non-current:			
Long-term trade receivables	₩ 4,842	₩ -	₩ 4,842
Long-term other receivables	8,178	(6,004)	2,174
Total	₩ 13,020	₩ (6,004)	₩ 7,016

[1] The Group recognizes the transfer of trade receivable as collateralized borrowing for those that do not meet the requirements for the elimination of financial instruments (Note 16).

(2) Movements in provision for impairment of loans and receivables for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017			
	Beginning balance	Provision for (reversal of) allowance	Others[1]	Ending balance
Trade receivables	₩ 427,410	₩ (17,375)	₩ (7,603)	₩ 402,432
Other receivables	88,155	(409)	(30,873)	56,873
Short-term loans	15,798	-	(876)	14,922
Long-term other receivables	6,004	(328)	-	5,676
Total	₩ 537,367	₩ (18,112)	₩ (39,352)	₩ 479,903

[1] Includes gain or loss arising from changes in foreign exchange rates.

(in millions of Korean won)

	2016				
	Beginning balance	Provision for (reversal of) allowance	Disposal of operations	Others[1]	Ending balance
Trade receivables	₩ 482,431	₩ (8,363)	₩ (12,399)	₩ (34,259)	₩ 427,410
Other receivables	65,601	2,689	(174)	20,039	88,155
Short-term loans	16,274	-	-	(476)	15,798
Long-term other receivables	3,875	-	-	2,129	6,004
Total	₩ 568,181	₩ (5,674)	₩ (12,573)	₩ (12,567)	₩ 537,367

[1] Includes gain or loss arising from changes in foreign exchange rates.

Overdue receivables and loans are deemed to be impaired. For receivables which the impairment indications are individually identifiable allowance for doubtful accounts are recognized by the specific identification method. For aggregate receivables, not individually significant but classified by similar nature, the allowance for doubtful accounts is estimated by the aging analysis method considering the past experience rate. The provisions for impaired receivables and loans are included in selling and administrative expenses and other non-operating expenses in the consolidated statement of profit or loss.

8 Inventories

Inventories as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	December 31, 2017		
	Acquisition cost	Valuation allowance	Carrying amount
Merchandise	₩ 229,763	₩ (24,465)	₩ 205,298
Finished goods	465,249	(29,107)	436,142
Semi-finished goods	45,953	(25)	45,928
Work in progress	42,193	(32)	42,161
Raw materials	355,065	(18,931)	336,134
Supplies	2,196	(180)	2,016
Materials in transit	187,285	-	187,285
Total	₩ 1,327,704	₩ (72,740)	₩ 1,254,964

(in millions of Korean won)

	December 31, 2016		
	Acquisition cost	Valuation allowance	Carrying amount
Merchandise	₩ 276,920	₩ (30,849)	₩ 246,071
Finished goods	414,830	(27,220)	387,610
Semi-finished goods	30,467	(2)	30,465
Work in progress	36,524	(4)	36,520
Raw materials	340,479	(18,181)	322,298
Supplies	1,679	(247)	1,432
Materials in transit	152,613	-	152,613
Total	₩ 1,253,512	₩ (76,503)	₩ 1,177,009

For the year ended December 31, 2017, cost of inventory charged to cost of sales amounted to ₩ 4,699,431 million (2016: ₩ 4,159,361 million). Reversal of loss on valuation of inventories added to cost of sales amounted to ₩ 3,763 million for the same period (2016: ₩ 34,202 million).

9 Derivatives

(1) Details of the Group's derivative contracts are as follows:

Purpose	Type of derivative instruments	Description
Cash flow hedge	Foreign currency forward	A contract to avoid cash flow risk arising from forecasted sales in foreign currencies
	Foreign currency swap	A contract to pay fixed interest rate in Korean Won and receive fixed interest rate in foreign currency on future interest and principal payment date to avoid the risk of cash flow fluctuations due to exchange rate fluctuations
	Interest rate swap	A contract to pay fixed interest rate in foreign currency and receive variable interest rate (linked to Libor) in foreign currency on future interest payment date to avoid the risk of cash flow fluctuations due to changes in interest rate (Libor) fluctuations
Purpose of sale	Foreign currency forward	Foreign currency forwards to avoid risk of cash flow fluctuations
	Foreign currency swap	Foreign currency swap to avoid risk of cash flow fluctuations

(2) Details of valuation of derivatives as at December 31, 2017 and 2016, are as follows:

(in thousands of foreign currencies and millions of Korean won)

	2017						
	Buy		Sell		Derivative assets (liabilities)	Valuation gain (loss)	Other comprehensive income (loss)
	Currency	Amount	Currency	Amount			
Foreign currency forward	JPY	4,056,000	KRW	40,096	₩ (1,266)	₩ -	₩ (1,266)
	USD	36,000	EUR	30,387	(568)	(2,390)	-
	EUR	34,153	GBP	30,496	(62)	-	(57)
	USD	15,228	CZK	330,060	(370)	-	(466)
Subtotal					(2,266)	(2,390)	(1,789)
Foreign currency swap	USD	600,000	KRW	677,910	(36,473)	-	(2,323)
	EUR	85,070	USD	100,000	(3,558)	(3,755)	-
Subtotal					(40,031)	(3,755)	(2,323)
Interest rate swap	USD	600,000	USD	600,000	2,817	-	903
Subtotal					2,817	-	903
Total					₩ (39,480)	₩ (6,145)	₩ (3,209)

(in thousands of foreign currencies and millions of Korean won)

	2016						
	Buy		Sell				
	Currency	Amount	Currency	Amount	Derivative assets	Valuation gain	Other comprehensive income
Foreign currency forward	KRW	196,229	USD	163,000	(641)	-	(641)
	KRW	48,022	EUR	36,000	2,152	-	2,152
	USD	140,000	EUR	131,281	1,785	827	-
	EUR	29,367	GBP	24,911	355	-	340
	USD	26,474	CZK	645,252	1,027	-	795
	Total				4,678	827	2,646

Derivatives are classified as non-current assets (liabilities) if their remaining maturities exceed 12 months from the end of the reporting period; otherwise, they are classified as current assets (liabilities).

Gain or loss relating to the ineffective portion is recognized in profit or loss in applying cash flow hedge.

10 Financial Instruments by Category

(1) Categorizations of financial assets and liabilities as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	December 31, 2017					
Financial assets	**Financial assets at fair value through profit or loss**	**Loans and receivables**	**Available-for-sale financial assets**	**Held-to-maturity financial assets**	**Derivatives designated as hedging instruments**	**Carrying amount**
Short-term financial instruments	₩ -	₩ 160,167	₩ -	₩ -	₩ -	₩ 160,167
Short-term investment securities	34,182	-	-	-	-	34,182
Trade and other receivables	-	1,197,047	-	-	-	1,197,047
Derivative assets	1,678	-	-	-	4,578	6,256
Long-term financial assets	-	11	-	-	-	11
Long -term investment securities	-	-	91,793	1,894	-	93,687
Long-term trade and other receivables	-	16,150	-	-	-	16,150
Other non-current assets	-	38,382	-	-	-	38,382
Total	₩ 35,860	₩ 1,411,757	₩ 91,793	₩ 1,894	₩ 4,578	₩1,545,882

(in millions of Korean won)	December 31, 2017			
Financial liabilities	**Financial liabilities at fair value through profit or loss**	**Financial liabilities at amortized cost**	**Derivatives designated as hedging instruments**	**Carrying amount**
Trade and other payables	₩ -	₩ 1,281,736	₩ -	₩ 1,281,736
Borrowings and bonds	-	4,649,001	-	4,649,001
Derivative liabilities	5,803	-	39,933	45,736
Other current liabilities	-	23,722	-	23,722
Other non-current liabilities	-	1,219	-	1,219
Financial guarantee liabilities	-	1,585	-	1,585
Total	₩ 5,803	₩ 5,957,263	₩ 39,933	₩ 6,002,999

(in millions of Korean won)	December 31, 2016					
Financial assets	**Financial assets at fair value through profit or loss**	**Loans and receivables**	**Available-for-sale financial assets**	**Held-to-maturity financial assets**	**Derivatives designated as hedging instruments**	**Carrying amount**
Short-term financial instruments	₩ -	₩ 148,026	₩ -	₩ -	₩ -	₩ 148,026
Short-term investment securities	-	-	441	2,590	-	3,031
Trade and other receivables	-	1,030,594	-	-	-	1,030,594
Derivative assets	1,784	-	-	-	4,436	6,220
Long-term financial assets	-	2,012	-	-	-	2,012
Long -term investment securities	-	-	148,049	72	-	148,121
Long-term trade and other receivables	-	7,016	-	-	-	7,016
Other non-current assets	-	56,622	-	-	-	56,622
Total	₩ 1,784	₩ 1,244,270	₩ 148,490	₩ 2,662	₩ 4,436	₩ 1,401,642

(in millions of Korean won)	December 31, 2016			
Financial liabilities	**Financial liabilities at fair value through profit or loss**	**Financial liabilities at amortized cost**	**Derivatives designated as hedging instruments**	**Carrying amount**
Trade and other payables	₩ -	₩ 1,041,876	₩ -	₩ 1,041,876
Borrowings and bonds	-	4,423,184	-	4,423,184
Derivative liabilities	-	-	1,542	1,542
Other current liabilities	-	23,101	-	23,101
Other non-current liabilities	-	1,254	-	1,254
Financial guarantee liabilities	-	1,982	-	1,982
Total	₩ -	₩ 5,491,397	₩ 1,542	₩ 5,492,939

(2) Fair value hierarchy classifications of financial instruments, based on the levels defined as below, that are measured at fair as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	December 31, 2017			
	Level 1 [1]	Level 2 [1]	Level 3 [1]	Total
Financial assets:				
Financial assets at fair value through profit or loss	₩ 34,182	₩ 1,678	₩ -	₩ 35,860
Available-for-sale financial assets	32	-	87,278	87,310
Hedge derivatives	-	4,578	-	4,578
Total	₩ 34,214	₩ 6,256	₩ 87,278	₩ 127,748
Financial liabilities:				
Financial liabilities at fair value through profit or loss	₩ -	₩ (5,803)	₩ -	₩ (5,803)
Hedge derivatives	-	(39,933)	-	(39,933)
Total	₩ -	₩ (45,736)	₩ -	₩ (45,736)

(in millions of Korean won)	December 31, 2016			
	Level 1 [1]	Level 2 [1]	Level 3 [1]	Total
Financial assets:				
Financial assets at fair value through profit or loss	₩ -	₩ 1,784	₩ -	₩ 1,784
Available-for-sale financial assets	45,082	-	100,172	145,254
Hedge derivatives	-	4,436	-	4,436
Total	₩ 45,082	₩ 6,220	₩ 100,172	₩ 151,474
Financial liabilities:				
Financial liabilities at fair value through profit or loss	₩ -	₩ -	₩ -	₩ -
Hedge derivatives	-	(1,542)	-	(1,542)
Total	₩ -	₩ (1,542)	₩ -	₩ (1,542)

[1] Level 1: (Unadjusted) quoted prices in active markets for identical assets or liabilities.
Level 2: Inputs that are observable for the asset or liability either directly or indirectly (except for quoted prices in level 1)
Level 3: Inputs that are not based on observable market data (unobservable inputs).

Some of financial instruments that are not included in the above table are not measured at fair value, but are recorded at book value that approximates fair value.

The valuation technique used to measure Level 3 fair value as at December 31, 2017 is the option pricing model, and significant non-observable input variables are interest rate volatility and stock price volatility.

For the year ended December 31, 2017, other comprehensive loss on financial assets that are classified to Level 3 of financial instruments measured at fair value is 1,608 million.

(3) Net gain (loss) on each category of financial instruments for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017						
	Interest income (expense)	Dividend income	Loss on valuation	Impairment reversal	Gain (loss) on disposal	Other	Other comprehensive income[1]
Financial assets:							
Cash and cash equivalents	₩ 4,980	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -
Financial assets at fair value through profit or loss	-	-	(7,271)	-	(817)	-	-
Loans and receivables	5,419	-	-	18,124	(13,407)	-	-
Available-for-sale financial assets	-	2,109	-	-	25,178	-	(6,877)
Held-to-maturity financial assets	360	-	(464)	-	-	-	-
Total	**₩ 10,759**	**₩ 2,109**	**₩ (7,735)**	**₩ 18,124**	**₩ 10,954**	**₩ -**	**₩ (6,877)**
Financial liabilities:							
Financial liabilities at fair value through profit or loss	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -
Financial liabilities at amortized cost	(199,358)	-	-	-	(21,538)	(9,775)	-
Total	**₩ (199,358)**	**₩ -**	**₩ -**	**₩ -**	**₩ (21,538)**	**₩ (9,775)**	**₩ -**

(in millions of Korean won)	2016						
	Interest income (expense)	Dividend income	Loss on valuation	Impairment reversal	Loss on disposal	Other	Other comprehensive income[1]
Financial assets:							
Cash and cash equivalents	₩ 7,028	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -
Financial assets at fair value through profit or loss	-	-	-	-	-	-	-
Loans and receivables	4,908	-	-	5,694	(8,913)	-	-
Available-for-sale financial assets	-	5	(497)	-	-	-	10,818
Held-to-maturity financial assets	134	-	(910)	-	-	-	-
Total	**₩ 12,070**	**₩ 5**	**₩ (1,407)**	**₩ 5,694**	**₩ (8,913)**	**₩ -**	**₩ 10,818**
Financial liabilities:							
Financial liabilities at fair value through profit or loss	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -
Financial liabilities at amortized cost	(230,540)	-	-	-	(5,769)	(6,032)	-
Total	**₩ (230,540)**	**₩ -**	**₩ -**	**₩ -**	**₩ (5,769)**	**₩ (6,032)**	**₩ -**

[1] The amounts are not adjusted for deferred income tax effect.

Among the financial instruments above, the loss of ₩ 5,855 million from derivatives designated as a cash flow hedge was recognized as other comprehensive income for the year ended December 31, 2017 (2016: gain of ₩ 22,879 million)(Note 9).

In addition, foreign exchange differences, either realized or not, related to foreign currency transactions (other than derivative contracts) mostly resulted from loans and receivables and financial liabilities measured at amortized cost.

11 Investments in Associates and Joint Ventures

(1) Investments in associates and joint ventures as at December 31, 2017, are summarized as follows:

Company	Type of business	Location	Financial closing date
- Investments in associates:			
Doosan Cuvex Co., Ltd.	Operation of resort and golf club	Republic of Korea	December 31
DBC Co., Ltd [1]	Property leasing	Republic of Korea	December 31
- Investments in joint ventures			
Doosan PSI LLC	Manufacturing	USA	December 31
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	Sales	China	December 31

[1] For the year ended December 31, 2017, the Group acquired 23.20% of ownership interest in DBC Co., Ltd. for ₩ 61,016 million.

(2) Details of investments in associates and joint ventures as at December 31, 2017 and 2016, are summarized as follows:

Company	Percentage of ownership (%)	Acquisition cost		Carrying amount		Proportionate share of net assets	
		2017	2016	2017	2016	2017	2016
-Investments in associates							
Doosan Cuvex Co., Ltd.	28.64	₩ 32,068	₩ 27,582	₩ 29,367	₩ 27,707	₩ 29,367	₩ 27,707
DBC Co., Ltd.	23.20	61,016	-	60,971	-	60,971	-
Subtotal		₩ 93,084	₩ 27,582	₩ 90,338	₩ 27,707	₩ 90,338	₩ 27,707
- Investments in joint ventures							
Doosan PSI LLC	50.00	₩ 1,108	₩ 1,108	₩ 1,091	₩ 1,189	₩ 1,091	₩ 1,189
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	43.00	718	355	411	134	411	134
Subtotal		1,826	1,463	1,502	1,323	1,502	1,323
Total		₩ 94,910	₩ 29,045	₩ 91,840	₩ 29,030	₩ 91,840	₩29,030

(3) Changes in investment in associates and joint ventures for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

	2017						
Company	January 1, 2017	Acquisition	Share of profit (loss)	Share of associates' other changes in net assets	Share of associates' changes in retained earnings	Others	December 31, 2017
Doosan Cuvex Co., Ltd.	₩ 27,707	₩ 4,486	₩ (3,211)	₩ 456	₩ (71)	₩ -	₩ 29,367
DBC Co., Ltd.		61,016	(45)	-	-	-	60,971
Doosan PSI LLC	1,189	-	39	-	-	(137)	1,091
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	134	363	(78)	-	-	(9)	410
Total	₩ 29,030	₩ 65,865	₩ (3,295)	₩ 456	₩ (71)	(146)	₩ 91,839

(in millions of Korean won)

Company	January 1, 2016	Acquisition	Share of profit (loss)	Share of other comprehensive income of associates	Others	December 31, 2016
	2016					
Doosan Cuvex Co., Ltd.	₩ -	₩ 27,582	₩ 179	₩ -	₩ (54)	₩ 27,707
Doosan PSI LLC	1,254	-	(99)	-	34	1,189
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	-	355	(232)	-	11	134
Total	₩ 1,254	₩ 27,937	₩ (152)	₩ -	₩ (9)	₩ 29,030

(4) The condensed financial information of the investment in associates and joint ventures as at and for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

Company	Total assets	Total liabilities	Sales	Profit (loss) for the year	Total comprehensive income
	2017				
Doosan Cuvex Co., Ltd.	₩ 215,456	₩ 102,572	₩ 37,672	₩ (1,002)	₩ 149
DBC Co., Ltd.	262,805	-	-	(195)	(195)
Doosan PSI LLC	10,165	7,980	10,160	82	82
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	₩ 1,913	₩ 671	₩ 12,311	₩ (4)	(4)

(in millions of Korean won)

Company	Total assets	Total liabilities	Sales	Profit (loss) for the year	Total comprehensive income
	2016				
Doosan Cuvex Co., Ltd.	₩ 219,043	₩ 79,613	₩ 27,242	₩ 173	₩ 173
DBC Co., Ltd.	-	-	-	-	-
Doosan PSI LLC	8,306	5,928	2,482	(199)	(199)
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	₩ 869	₩ 242	₩ 3,348	₩ (415)	₩ (415)

12 Property, Plant and Equipment

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

(in millions of Korean won)	2017								
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Construction in progress	Total
Beginning	₩775,658	₩ 431,440	₩ 38,487	₩ 439,541	₩ 2,442	₩ 51,960	₩ 9,876	₩ 73,696	₩ 1,823,100
Acquisition & capital expenditure	5,495	6,274	642	13,493	2,002	16,707	4,412	63,259	112,284
Revaluation	45,372	-	-	-	-	-	-	-	45,372
Transfer	2,084	5,457	108	47,509	32	8	68	(57,229)	(1,963)
Disposal	(845)	(3,644)	(275)	(2,299)	(490)	(59)	(266)	(20,688)	(28,566)
Depreciation	-	(18,291)	(3,395)	(94,086)	(1,346)	(19,829)	(4,122)	-	(141,069)
Impairment loss(gains)	(6,994)	-	-	10,872	93	4,550	157	-	8,678
Others	(3,483)	(12,828)	(677)	(11,317)	(82)	(253)	(301)	(1,991)	(30,932)
Ending	₩817,287	₩ 408,408	₩ 34,890	₩ 403,713	₩ 2,651	₩ 53,084	₩ 9,824	₩ 57,047	₩ 1,786,904
Acquisition cost	₩552,238	₩ 689,583	₩ 82,769	₩1,066,283	₩12,984	₩240,140	₩ 74,300	₩ 57,047	₩ 2,775,344
Accumulated depreciation	-	(215,886)	(41,677)	(640,918)	(9,698)	(177,641)	(62,162)	-	(1,147,982)
Accumulated impairment losses	(6,089)	(61,022)	(6,202)	(18,285)	(635)	(9,415)	(2,314)	-	(103,962)
Accumulated gain on revaluation	271,138	-	-	-	-	-	-	-	271,138
Government subsidy	-	(4,267)	-	(3,367)	-	-	-	-	(7,634)

(in millions of Korean won)	2016								
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Construction in progress	Total
Beginning	₩ 1,079,002	₩ 492,054	₩ 56,784	₩ 455,309	₩ 2,340	₩ 62,425	₩ 17,048	₩ 89,103	₩2,254,065
Acquisition & capital expenditure	1,424	13,636	403	15,005	1,219	18,102	2,196	121,959	173,944
Transfer	(10,802)	33,455	237	93,299	282	588	638	(134,281)	(16,584)
Disposal	(23,445)	(11,124)	(929)	(3,800)	(345)	(900)	(242)	(3,108)	(43,893)
Depreciation	-	(19,357)	(4,160)	(95,108)	(947)	(21,959)	(5,947)	-	(147,478)
Impairment loss(gains)	-	(21)	(1,554)	377	(78)	84	-	-	(1,192)
Disposal of operations	(273,829)	(78,399)	(11,869)	(28,900)	(256)	(6,448)	(3,054)	(320)	(403,075)
Others	3,308	1,196	(425)	3,359	227	68	(763)	343	7,313
Ending	₩ 775,658	₩ 431,440	₩ 38,487	₩ 439,541	₩ 2,442	₩ 51,960	₩ 9,876	₩ 73,696	₩1,823,100
Acquisition cost	₩ 550,157	₩ 710,179	₩ 85,531	₩ 1,087,093	₩14,878	₩230,160	₩ 84,167	₩ 73,696	₩2,835,861
Accumulated depreciation	-	(207,617)	(40,483)	(610,333)	(11,629)	(163,170)	(71,610)	-	(1,104,842)
Accumulated impairment losses	(1,715)	(66,722)	(6,561)	(33,497)	(807)	(15,030)	(2,681)	-	(127,013)
Accumulated gain on revaluation	227,216	-	-	-	-	-	-	-	227,216
Government subsidy	-	(4,400)	-	(3,722)	-	-	-	-	(8,122)

Land, after initial recognition, is measured using a revaluation model. As at December 31, 2017, the carrying amount of land would be ₩ 552,238 million if measured based on a cost model.

Certain land, buildings and machinery are pledged as collaterals as at December 31, 2017 in connection with the borrowings from Korea Development Bank. Certain land, buildings and machinery of the Group included above are pledged as collateral in connection with private bonds (Note 34).

(2) The Group revalued its land assets as follows:

For the year ended December 31, 2013, the Group initially remeasured all land assets using fair value at the date of the revaluation. As at December 31, 2017, the fair values of land assets are determined from appraisal that is undertaken by independently qualified valuators, KYUNGIL APPRAISAL CO., LTD. ("KYUNGIL") and others on November 30, 2017. KYUNGIL and others are members of Korea Association of Property Appraisers and comprise certified professionals that have a significant amount of industry experience.

Fair value of a land is determined by reference to Officially Assessed Reference Land Price ("OARLP"), announced by the Ministry of Land, Infrastructure, and Transport, and recent market transactions of similar and recently sold parcels nearby the subject land in order to derive an indication of the most probable sales price (or value) of the land.

(3) Fair value measurements of land asset by fair value hierarchy level as at December 31, 2017, are as follows:

(in millions of Korean won)

Type	Level 1	Level 2	Level 3	Total
Land	₩ -	₩ -	₩ 817,287	₩ 817,287

(4) Valuation methodologies and inputs used for fair value measurements of land assets are as follows:

Valuation methodology	Significant inputs that are not based on observable market data (unobservable inputs)	Correlation between unobservable inputs and fair value arguments
Officially Assessed Reference Land Price OARLP of similar parcels nearby the subject land, reflating corrections necessary for differences between the subject and the comparable	Fluctuation rate of land price and others	Fair value increases (decreases) if rate of land price increases (decreases)
	Parcel conditions and others	Fair value increases (decrease) if corrections of parcel conditions and others increase (decrease)
	Land conditions affecting the sales price and others	Fair value increases (decreases) if correction of land conditions affecting the sales price increases (decreases)

(5) The effect of applying revaluation model for the year ended December 31, 2017, is as follows:

(in millions of Korean won)

Beginning	Acquisition	Increase	Decrease	Disposal	Other	Ending
₩ 775,658	₩ 5,495	₩ 45,372	₩ (6,994)	₩ (845)	₩ (1,399)	₩ 817,287

(6) Borrowing costs added to the cost of property, plant and equipment for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		2017		2016
Borrowing costs added to the cost of property, plant and equipment	₩	716	₩	1,836
Interest rate (%)		4.10%		4.47%

(7) Classification of depreciation expense for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)		2017		2016
Cost of sales	₩	111,498	₩	118,143
Selling and administrative expenses		10,466		10,886
Research and development expenses		19,105		18,449
Total	₩	141,069	₩	147,478

13 Intangible Assets

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

(in millions of Korean won)	2017									
		Goodwill		Industrial rights		Development costs		Others		Total
Beginning	₩	2,948,134	₩	1,158,270	₩	236,435	₩	97,859	₩	4,440,698
Internal development		-		-		58,785		-		58,785
Acquisition		-		-		-		18,676		18,676
Transfer		-		634		4,546		5,997		11,177
Disposal		-		-		-		(1,176)		(1,176)
Amortization		-		(13,778)		(69,301)		(30,341)		(113,420)
Impairment loss		-		-		-		(458)		(458)
Impairment gains		-		-		-		1,867		1,867
Others		(151,713)		(82,034)		(9,922)		(3,198)		(246,867)
Ending	₩	2,796,421	₩	1,063,092	₩	220,543	₩	89,226	₩	4,169,282
Acquisition cost	₩	2,831,294	₩	1,226,270	₩	723,908	₩	418,684	₩	5,200,156
Accumulated amortization		-		(163,178)		(423,556)		(298,346)		(885,080)
Accumulated impairment loss		(34,873)		-		(79,809)		(31,112)		(145,794)

(in millions of Korean won)	2016				
	Goodwill	**Industrial rights**	**Development costs**	**Others**	**Total**
Beginning	₩ 2,893,033	₩ 1,155,232	₩ 284,210	₩ 91,214	₩ 4,423,689
Internal development	-	-	43,649	-	43,649
Acquisition	-	4	-	20,581	20,585
Disposal	-	(4)	-	(1,064)	(1,068)
Amortization	-	(15,250)	(62,164)	(32,156)	(109,570)
Impairment loss	-	-	(27,842)	(2,237)	(30,079)
Disposal of operations	-	(856)	(4,038)	(4,463)	(9,357)
Others	55,101	19,144	2,620	25,984	102,849
Ending	₩ 2,948,134	₩ 1,158,270	₩ 236,435	₩ 97,859	₩ 4,440,698
Acquisition cost	₩ 2,985,662	₩ 1,319,074	₩ 685,267	₩ 390,629	₩ 5,380,632
Accumulated amortization and impairment loss	(37,528)	(160,804)	(448,832)	(292,770)	(939,934)

The aggregated carrying amount of goodwill and others with indefinite useful lives in other intangible assets item is ₩ 3,864,933 million and ₩ 4,097,736 million as at December 31, 2017 and 2016, respectively.

(2) Details of development costs as at December 31, 2017, are as follows:

(in millions of Korean won)		**Balance**	**Remaining amortization period**[1]
Heavy product development (relating to new models and emission regulations)	Before amortization	₩ 5,528	-
	Being amortized	28,336	36 months
Engine product development (relating to new models and emission regulations)	Before amortization	30,527	
	Being amortized	59,887	32 months
Compact product development (relating to new models and emission regulations)	Before amortization	31,027	
	Being amortized	50,913	33 months
Portable Power product development (relating to new models and emission regulations)	Before amortization	9,640	
	Being amortized	4,685	32 months
Total		₩ 220,543	

[1] As the remaining amortization periods for each project are different, the remaining amortization periods as at December 31, 2017, are weighted on average.

(3) Details of intangible asset that recognized impairment loss for the year ended December 31, 2017 are as follows:

			Impairment loss[1]		**Recoverable amount**
(in millions of Korean won)	**Individual asset**	**Book value**	**2017**	**Accumulated**	**Valuation methodology**
Others	Golf membership	₩ 9,099	₩ 458	₩ 15,047	Fair value

[1] Impairment loss amount was estimated based on the fair value of the individual asset.

(4) Details of intangible asset that recognized reversal of impairment loss for the year ended December 31, 2017 are as follows:

(in millions of Korean won)

			Reversal of Impairment loss[1]		Recoverable amount
(in millions of Korean won)	**Individual asset**	**Book value**	**2017**	**Accumulated**	**Valuation methodology**
Others	Software	₩ 82,354	₩ 1,867	₩ -	Value-in-use

[1] The Group estimated the recoverable amount based on the operating results of individual assets and the medium- to long-term business plan of the Group

(5) Classification of impairment loss for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	**2017**	**2016**
Other non-operating expenses:	₩ 458	₩ 30,079
Other non-operating income	₩ 1,867	₩ -

(6) Borrowing costs added to the cost of intangible assets for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**2017**	**2016**
Borrowing costs added to the cost of intangible assets	₩ 1,349	₩ 2,136
Interest rate (%)	4.10%	4.47%

(7) Classification of amortization expenses for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	**2017**	**2016**
Cost of sales	₩ 68,115	₩ 63,168
Selling and administrative expenses	44,987	46,002
Research and development expenses	318	400
Total	₩ 113,420	₩ 109,570

(8) Expenditures on research and development recognized as expenses amounted to ₩ 143,428 million for the year ended December 31, 2017 (2016: ₩ 145,434 million).

(9) Impairment test of goodwill

The segments of Group where goodwill is allocated as at December 31, 2017, are as follows:

(in millions of Korean won)

Classification	**Doosan Bobcat Inc. and subsidiaries**	**Doosan Infracore Norway AS**	**Total**
Others	₩ 2,793,704	₩ 2,717	₩ 2,796,421

The Group uses cash flow projections based on financial budgets approved by the directors covering five-year periods for a value-in-use calculation. The financial budgets are determined based on historical result and expectation of market growth. The assumptions for the calculation of value-in-use, as at December 31, 2017, are as follows:

Classification	Doosan Bobcat Inc. and subsidiaries	Doosan Infracore Norway AS
Growth rate	1.5%	2.0%
Discount rate	9.1%	9.5%

Cash flows beyond that five-year periods have been extrapolated using the fifth-year cash flow. The growth rate does not exceed long-term average growth rate of market, and the discount rates used reflect relevant risks specific to the cash-generating units.

The Group calculated recoverable amount for each cash-generating unit based on value-in-use, and concluded that there was no impairment loss to recognize for the year ended December 31, 2017, since the total carrying amount did not exceed the recoverable amount.

14 Investment Properties

Changes in investment properties for the years ended December 31, 2017 and 2016, are as follows:
(in millions of Korean won)

	2017		
	Land	Buildings	Total
Beginning	₩ 47,550	₩ 3,826	₩ 51,376
Transfer	(2,225)	2,225	-
Disposal	(11,731)	(3,334)	(15,065)
Depreciation	-	(291)	(291)
Impairment loss	(15,121)	-	(15,121)
Others	(227)	(62)	(289)
Ending	₩ 18,246	₩ 2,364	₩ 20,610
Acquisition cost	₩ 33,085	₩ 5,542	₩ 38,627
Accumulated depreciation	-	(2,104)	(2,104)
Accumulated impairment losses	(14,839)	(1,074)	(15,913)

(in millions of Korean won)

	2016		
	Land	Buildings	Total
Beginning	₩ 26,200	₩ 4,074	₩ 30,274
Transfer	20,547	-	20,547
Depreciation	-	(248)	(248)
Others	803	-	803
Ending	₩ 47,550	₩ 3,826	₩ 51,376
Acquisition cost	₩ 47,550	₩ 9,180	₩ 56,730
Accumulated depreciation	-	(4,278)	(4,278)
Accumulated impairment losses	-	(1,076)	(1,076)

The fair values of investment properties are ₩ 18,246 million and ₩ 46,111 million as at December 31, 2017 and 2016, respectively. The recognized amount of rental income from investment property for the years ended December 31, 2017 and 2016, is ₩ 759 million and ₩ 747 million, respectively.

15 Trade and Other Payables

Trade and other payables as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**December 31, 2017**		**December 31, 2016**
Current:				
Trade payables	₩	857,644	₩	585,758
Other payables		220,559		237,227
Accrued expenses		203,533		218,891
Total	₩	1,281,736	₩	1,041,876
Non-current:				
Other payables	₩	1,219	₩	1,254

16 Borrowings and Bonds

(1) Bonds as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)

Type	**Annual interest rate (%)**		**2017**		**2016**
Public bonds	2.375~5.27	₩	1,002,724	₩	1,272,434
Private bonds	1.684~5.73		195,000		215,000
Bond with warrants	2.00		495,714		-
Subtotal			1,693,438		1,487,434
Less: present value of discount			(10,549)		(8,051)
Less: present value of discount on bonds with warrants			(7,730)		-
Less: Redemption Premium on bonds with warrants			76,427		-
Adjustment on bonds with warrants			(121,988)		-
Subtotal			1,629,598		1,479,383
Less: current portion			(474,642)		(764,734)
Total		₩	1,154,956	₩	714,649

(2) Long-term and short-term borrowings as at December 31, 2017 and 2016, are as follows

1) Short-term borrowings

(in millions of Korean won)

Type	**Lender**	**Annual interest rate (%)**		**2017**		**2016**
Short-term borrowings in Korean won	Korea Exim Bank and others	3.75~4.95	₩	988,200	₩	483,027
Short-term borrowings in foreign currencies	Korea Development Bank and others	3.97~5.96		307,262		294,014
Usance	Shinhan Bank and others	0.39~1.97		83,534		81,219
Transferred receivables [1]	KEB Hana Bank and others	-		30,291		93,904
Total			₩	1,409,287	₩	952,164

[1] Financial liabilities related to transferred trade receivables that do not meet the derecognition criteria amounted to ₩ 30,291 million and ₩ 93,904 million as at December 31, 2017 and 2016, respectively. Trade receivables are pledged as collaterals for these liabilities.

2) Long-term borrowings

(in thousands of foreign currencies and millions of Korean won)

Type	Lender	Annual interest rate (%)	2017	2016
Borrowings in Korean won	Korea Development Bank	3.90~4.98	₩ 38,333	₩ 55,000
Borrowings in foreign currencies	AKA Bank	-	-	EUR 740
	Korea Development Bank	-	-	USD 19,000
	Korea Exim Bank	3MLibor+2.24	USD 147,000	USD 147,000
	Korea Exim Bank	-	-	USD 30,000
	Korea Exim Bank	-	-	USD 400,000
	JP Morgan and three others	3MLibor+2.50	USD 1,234,913	USD 947,500
	Innovasjon Norge	3.15	NOK 23,617	NOK 24,383
	BNP Paribas	2.60	USD 19,094	-
	Bank of New York	8.00	USD 4,250	USD 4,250
	Minsheng Financial Leasing Co., Ltd.	5.70	CNY 7,188	CNY 106,703
	Ping An Bank	-	-	CNY 2,822
	Everbright Financial Leasing Co., Ltd.	-	-	CNY 6,965
	Cinda Financial Leasing Co., Ltd.	5.22~5.70	CNY 75,557	CNY 138,408
	Industrial and Commercial Bank of China	4.75	CNY 14,974	CNY 40,034
	China Development Bank Leasing Co., Ltd.	-	-	CNY 5,572
	Jungcheolgun Financial Leasing Co., Ltd.	4.79~4.99	CNY 348,827	CNY 180,000
	Subtotal		-	EUR 740
			USD 1,405,257	USD 1,547,750
			CNY 446,546	CNY 480,504
			NOK 21,367	NOK 24,383
Korean won equivalent			1,619,700	2,013,087
Less: present value of discount			(9,584)	(21,451)
Subtotal			1,610,116	1,991,636
Less: current portion			(96,310)	(540,098)
Total			₩ 1,513,806	₩ 1,451,538

(3) Detailed terms of bonds with warrants as at December 31, 2017 are as follows:

1) Details of changes and issuance conditions of bonds with warrants issued by the Group as at December 31, 2017 are as follows:

Date of issue	Maturity date	Coupon rate(%)	YTM(%)	Exercisable period	Exercise price	Issuing price
2017-08-01	2022-08-01	2.00	4.75	From one month after date of issue to one month before maturity	₩ 8,030 per share	₩ 500,000 million

① Early redemption clause
The early redemption right is exercisable as a whole or in part against the par value of bond with stock warrants at the interest payment date in 3 years after the date of issuance of bonds.

② Maturity redemption
The coupon rate for the bond is 2.0% and for bonds not converted until maturity, 115.4175% of the principal amount will be paid on August 1, 2022 with a yield to maturity rate of 4.75% compounded quarterly.

③ Calculation of the exercise price
The exercise price will be adjusted when there is an increase in paid-in capital through issuance of shares at a price lower than the market price, stock dividends, or capitalization of reserves, before exercising the stock warrants or when there is an issuance of stock purchase warrants or debt securities with warrants.

2) Details of bonds with warrants as at December 31, 2017 are as follows:

(in millions of Korean won)

Type	Beginning	Issue	Exercise/Amortization	Ending
Bonds with warrants	₩ -	₩ 500,000	₩ (4,286)	₩ 495,714
Call premium on bonds	-	77,088	(661)	76,427
Present value of discount	-	(8,393)	663	(7,730)
Stock warrants adjustment	-	(132,466)	10,478	(121,988)
Book value	₩ -	₩ 436,229	₩ 6,194	₩ 442,423
Compensation for stock warrants(other additional capital)	₩ -	₩ 41,977	₩ (381)	₩ 41,596

Due to the exertion of stock warrant, As at December 31, 2017, 0.87% of the outstanding balance of 31st warrant were exercised and 0.86% of the principal amount of the bonds was paid. The cumulative number of shares issued as a result of the exertion of stock warrants for 31st warrants is 544,805.

17 Net Defined Benefit Liabilities

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

(in millions of Korean won)	December 31, 2017	December 31, 2016
Present value of funded defined benefit obligations	₩ 1,022,237	₩ 1,056,809
Fair value of plan assets[1]	(570,379)	(546,708)
Net defined benefit liabilities	₩ 451,858	₩ 510,101

[1] The contributions to the National Pension Fund of ₩ 153 million are included in the fair value of plan assets as at December 31, 2017 (December 31, 2016: ₩156 million).

(2) Profit and loss recognized for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**2017**		**2016**
Current service cost	₩	33,866	₩	35,813
Past service cost and (gains) or losses on settlements		(2,027)		(2,137)
Net interest cost		21,533		23,845
Total	₩	53,372	₩	57,521

(3) Details of total expenses recognized in consolidated statements of profit or loss for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**2017**		**2016**
Cost of sales	₩	28,194	₩	23,300
Selling and administrative expenses		20,546		27,927
Research and development expenses		4,632		6,294
Total	₩	53,372	₩	57,521

(4) Changes in defined benefit obligation for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**2017**		**2016**
Beginning balance	₩	1,056,809	₩	1,077,547
Current service cost		33,866		35,813
Past service cost and (gains) or losses on settlements		(2,027)		(2,137)
Transfer in		1,520		1,012
Transfer out		(1,077)		(2,058)
Business combinations and business transfer		-		(74,650)
Interest expense		36,788		38,273
Remeasurements:				
Actuarial loss (gain) from change in demographic assumptions		5,304		(1,692)
Actuarial loss from change in financial assumptions		42,429		26,926
Other		8,903		(5,531)
Contributions by employees		2,723		2,496
Benefits paid		(60,227)		(57,802)
Foreign exchange differences		(102,774)		18,612
Ending balance	₩	1,022,237	₩	1,056,809

(5) Changes in plan assets for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**2017**		**2016**
Beginning balance	₩	546,708	₩	523,002
Expected return on plan assets		15,256		14,428
Transfer in		758		516
Transfer out		(568)		(751)
Business combinations and business transfer		-		(43,989)
Remeasurements		46,945		21,579
Contributions:				
Employees		25		2,496
Employers		51,690		77,632
Benefits paid		(38,859)		(55,046)
Foreign exchange differences		(51,576)		6,841
Ending balance	₩	570,379	₩	546,708

Actual gain on plan assets is recognized as ₩ 62,201 million and ₩ 36,007 million for the years ended December 31, 2017 and 2016, respectively. The Group plans to contribute ₩ 43,500 million to the defined benefit plans in 2018.

(6) Assumptions used on actuarial valuation as at December 31, 2017 and 2016, are as follows:

(in percentage, %)	**2017**	**2016**
Discount rate	1.90~3.70	2.42~4.10
Expected rate of salary increase	2.40~4.80	3.20~4.80

(7) Details of plan assets as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**December 31, 2017**		**December 31, 2016**
Time deposit	₩	113,497	₩	87,240
Equity instruments		164,258		164,260
Debt instruments		266,193		268,895
Others		26,431		26,313
Total	₩	570,379	₩	546,708

(8) Sensitivity analysis as at December 31, 2017 and 2016, showing how the defined benefit obligation would have been affected by changes in the relevant actuarial assumption is as follows:

(in millions of Korean won)	2017		2016	
	Amount	**Rate**	**Amount**	**Rate**
Discount rate:				
1% increase	₩ (123,261)	(12.06%)	₩ (111,510)	(10.55%)
1% decrease	158,645	15.52%	141,410	13.38%
Salary increase rate:				
1% increase	21,888	2.14%	17,071	1.62%
1% decrease	₩ (19,514)	(1.91%)	₩ (15,657)	(1.48%)

The weighted average maturity of the defined benefit obligations as at December 31, 2017, is 13.79 years.

18 Provisions

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

(in millions of Korean won)	2017						
	Beginning balance	**Increase**	**Decrease**	**Others**	**Ending balance**	**Less: Current**	**Non-current**
Product warranties	₩ 138,855	₩ 302,082	₩ (259,062)	₩ (16,160)	₩ 165,715	₩ (156,131)	₩ 9,584
Returned goods	2,361	1,272	(906)	2,609	5,336	(5,336)	-
Others	31,736	4,903	(27,964)	(3,082)	5,593	(5,593)	-
	₩ 172,952	₩ 308,257	₩ (287,932)	₩ (16,633)	₩ 176,644	₩ (167,060)	₩ 9,584

(in millions of Korean won)	2016							
	Beginning balance	**Increase**	**Decrease**	**Disposal of operations**	**Others**	**Ending balance**	**Less: Current**	**Non-current**
Product warranties	₩ 144,048	₩ 82,212	₩ (71,862)	₩ (6,563)	₩ (8,980)	₩ 138,855	₩ (113,688)	₩ 25,167
Returned goods	2,080	1,140	(859)	-	-	2,361	(2,361)	-
Others	15,130	27,400	(10,432)	-	(362)	31,736	(31,736)	-
	₩ 161,258	₩ 110,752	₩ (83,153)	₩ (6,563)	₩ (9,342)	₩ 172,952	₩ (147,785)	₩ 25,167

The Group estimates provision expense amounts that may be liable by the Group in relation to product warranty, exchange or refund, maintenance services and any after services based on warranty period and historical experience. Meanwhile, the Group recognizes provisions as other liabilities for pending litigations amounting to ₩ 22,026 million which includes quoted litigation regarding the ordinary wages amounting to ₩ 4,229 million.

19 Share Capital and Share Premium

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

(in millions of Korean won and in shares)

Date	Description	Number of common stocks issued	Share capital	Share premium	Consideration for Stock Warrants	Other capital surplus
2017.01.01	Beginning balance	207,455,314	₩ 1,037,277	₩ 228,729	₩ −	₩ 20,759
2017.03.16	Cancellation of share options	-	-	-	-	320
2017.03.31	Transfer to retained earnings	-	-	(82,200)	-	-
2017.04.01	Cancellation of share options	-	-	-	-	122
2017.06.20	Cancellation of share options	-	-	-	-	611
2017.08.01	Issuance of bonds with warrants	-	-	-	41,977	-
2017.09.30	Exercise of stock warrants	38,631	193	114	(27)	-
2017.10.31	Exercise of stock warrants	26,312	132	74	(23)	-
2017.11.30	Exercise of stock warrants	477,306	2,386	1,417	(329)	-
2017.12.31	Exercise of stock warrants	2,556	13	4	(2)	-
2017.12.31	Ending balance	208,000,119	₩ 1,040,001	₩ 148,138	₩ 41,596	₩ 21,812

The Parent Company is authorized to issue up to 400,000,000 common stocks with a par value of ₩ 5,000 per share. As at December 31, 2017, 208,000,119 common stocks (as at December 31, 2016, 207,455,314 common stocks) are issued and 505 common stocks (as at December 31, 2016, 505 common stocks) of which voting rights are restricted under the Korean Commercial Law.

20 Hybrid Capital Securities

Details of hybrid capital securities as at December 31, 2016, are as follows:

	Description
Issuing price (Korean won equivalent)	- $500,000,000 (₩ 556,650 million)
Date of Maturity	- 30 years and automatic revolving
Conditions for Dividends	- Amount: 3.25% at par value, resets every five years - According to a “Step-up” clause, 5% will be added up after five years and 2% will be added up after seven years additionally. - Distribution: semiannually in arrears; optional deferral of distributions is available
Others	- The Parent Company can call the capital securities at five years and semiannually afterwards - Investor can exercise put option to Core Partners Limited, a special-purpose entity (“SPE”), if the Parent Company does not exercise its call option

If investors exercise their put option and Core Partners Limited, an SPE, acquires the hybrid capital securities after five years since issue date, the SPE has the right to put the hybrid capital securities back to the Parent Company (the “Stock Exchange Right”) under which the SPE can exchange the capital securities with a par value of USD 15.4 for a share of the Parent Company’s common stocks.

The hybrid capital securities are classified as equity as at December 31, 2017, as they do not contain a contractual financial obligation for the Parent Company to settle in cash, and because the Stock Exchange Right confers a right to receive a fixed number of the Parent Company’s treasury stock.

The Parent Company exercised call option to the hybrid capital securities on October 5, 2017.

21 Other Components of Equity

(1) Other components of equity as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**December 31, 2017**		**December 31, 2016**
Treasury share	₩	(2)	₩	(2)
Loss on disposal of treasury share		(7,909)		(7,909)
Share options		3,044		4,097
Other capital adjustments		(103,590)		(38,627)
Total	₩	(108,457)	₩	(42,441)

(2) Share-based payment

The Group granted share options number of times to its directors. Methods to grant share options, issuance of new shares, issuance of treasury shares or cash settlement, are decided by the Board of Directors at their meeting to be held on stock exercise date. These share options carry a two-year service vesting condition, subsequent to the resolution made at the shareholders’ meeting. The number of granted options as at December 31, 2017, is as follows:

(in Korean won except for share data)

Date of grant	**Description**	**Number of granted options**	**Exercisable period**	**Exercisable price**	**Expected fair value at the date of grant**
2008.03.21	4th grant	41,400	2011.03.21~2018.03.20	₩ 28,700	₩ 15,709
2009.03.27	5th grant	12,050	2012.03.27~2019.03.26	15,600	7,674
2010.03.26	6th grant	33,170	2013.03.26~2020.03.25	19,400	10,543
2011.03.25	7th grant	18,000	2014.03.25~2021.03.24	30,700	16,800
2012.03.30	8th grant	49,300	2015.03.30~2022.03.29	22,300	11,951
2013.03.29	9th grant	52,000	2016.03.29~2023.03.28	15,700	8,477
2014.03.21	10th grant	96,100	2017.03.21~2024.03.20	13,600	6,436
Total		302,020			

Changes in share option for the year ended December 31, 2017, are as follows:

	Number of common stocks to be issued			Valuation amount (in millions of Korean won)		
	January 1, 2017	Forfeited	December 31, 2017	January 1, 2017	Change	December 31, 2017
3rd grant	39,300	(39,300)	-	₩ 320	₩ (320)	₩ -
4th grant	41,400	-	41,400	651	-	651
5th grant	12,050	-	12,050	93	-	93
6th grant	35,670	(2,500)	33,170	376	(26)	350
7th grant	19,500	(1,500)	18,000	327	(25)	302
8th grant	52,500	(3,200)	49,300	627	(38)	589
9th grant	55,800	(3,800)	52,000	473	(32)	441
10th grant	191,100	(95,000)	96,100	1,230	(612)	618
	447,320	(145,300)	302,020	₩ 4,097	₩ (1,053)	₩ 3,044

Expense recognized related to the share option granted amounted to ₩ 135 million for the year ended December 31, 2016. There are no compensation cost to be recognized for the year ended December 31, 2017, and for prospective period.

The Group calculated the compensation costs by applying fair value approach. Assumptions used in determining fair value of share options are as follows:

	Risk-free interest rate [1]	Expected exercisable period	Expected volatility	Expected dividend yield ratio
4th grant	5.19%	6.5 years	47.94%	1.47%
5th grant	4.74%	6.5 years	59.76%	1.67%
6th grant	4.53%	6.5 years	58.82%	1.34%
7th grant	4.19%	6.5 years	58.01%	1.07%
8th grant	3.80%	6.5 years	57.96%	0.44%
9th grant	2.57%	6.5 years	54.12%	0.21%
10th grant	3.27%	6.5 years	42.29%	0.00%

[1] Risk-free interest rate is based on 5-year and 10-year treasury bond yield rate.

22 Accumulated Other Comprehensive Income

(1) Changes in accumulated other comprehensive income for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won):	2017					
	Unrealized gain on available-for-sale securities	Increase in equity of associates	Loss on translation of foreign operation	Unrealized gain (loss) on valuation of derivatives	Gain on revaluation of property, plant and equipment	Total
Beginning balance	₩ 6,648	₩ 59	₩ (415,688)	₩ 660	₩ 137,950	₩ (270,371)
Increase	-	369	-	-	30,475	30,844
Decrease	(4,404)	-	(85,254)	(4,866)	-	(94,524)
Ending balance	₩ 2,244	₩ 428	₩ (500,942)	₩ (4,206)	₩ 168,425	₩ (334,051)

(in millions of Korean won):	2016					
	Unrealized gain on available-for-sale securities	**Increase in equity of associates**	**Loss on translation of foreign operation**	**Unrealized gain (loss) on valuation of derivatives**	**Gain on revaluation of property, plant and equipment**	**Total**
Beginning balance	₩ (862)	₩ 59	₩ (419,111)	₩ (15,139)	₩ 227,383	₩ (207,670)
Increase	7,510	-	3,423	15,799	-	26,732
Decrease	-	-	-	-	(89,433)	(89,433)
Ending balance	₩ 6,648	₩ 59	₩ (415,688)	₩ 660	₩ 137,950	₩ (270,371)

(1) Income tax effects directly recognized in accumulated other comprehensive income (loss) as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017		
Description	**Before tax**	**Deferred tax assets (liabilities)**	**After tax**
Unrealized gain on AFS securities	₩ 2,992	₩ (748)	₩ 2,244
Increase in equity of associates	428	-	428
Loss on translation of foreign operation	(500,942)	-	(500,942)
Unrealized loss on valuation of derivatives	(3,209)	(997)	(4,206)
Gain on revaluation of property, plant and equipment	261,727	(93,302)	168,425
Total	₩ (239,004)	₩ (95,047)	₩ (334,051)

(in millions of Korean won)	2016		
Description	**Before tax**	**Deferred tax assets (liabilities)**	**After tax**
Unrealized gain on AFS securities	₩ 9,869	₩ (3,221)	₩ 6,648
Increase in equity of associates	78	(20)	58
Loss on translation of foreign operation	(415,193)	(495)	(415,688)
Unrealized gain on valuation of derivatives	2,642	(1,981)	661
Gain on revaluation of property, plant and equipment	225,501	(87,551)	137,950
Total	₩ (177,103)	₩ (93,268)	₩ (270,371)

23 Retained Earnings

(1) Details of retained earnings as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**December 31, 2017**	**December 31, 2016**
Retained earnings before appropriation (accumulated deficit before disposal)	₩ 784,702	₩ 578,246

(2) Changes in retained earnings for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		2017		2016
Beginning balance	₩	578,246	₩	475,598
Profit for the year		148,594		63,181
Remeasurements recognized in retained earnings and others		(5,908)		(345)
Revaluation and disposal of property, plant and equipment		-		58,155
Dividends		(18,366)		(18,289)
Change in retained earnings of equity method investment securities		(64)		(54)
Transfer from capital surplus		82,200		-
Ending balance	₩	784,702	₩	578,246

24 Segment Information

The Group's operating segments are as follows:

Business segment	Main products
Engines ("EG")	Engine of the commercial cars and buses; engine parts
Construction Equipment ("CE")	Crawler excavator, excavator parts and others
Construction Equipment ("Bobcat")	Compact (Skid Steer Loader, Compact Track Loader, Mini Excavator), Heavy Excavator, and Portable Power

(1) The information for each business segment as at and for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	2017							
		Total-sales		Intersegment transaction		Net-sales		Operating profit
EG	₩	879,348	₩	(377,556)	₩	501,792	₩	75,837
CE		3,888,191		(1,883,764)		2,004,427		165,465
Bobcat		4,068,260		(6,582)		4,061,678		419,467
Subtotal		8,835,799		(2,267,902)		6,567,897		660,769
Consolidation adjustments		(2,267,902)		2,267,902		-		-
Total	₩	6,567,897	₩	-	₩	6,567,897	₩	660,769

	2016			
(in millions of Korean won)	**Total-sales**	**Intersegment transaction**	**Net-sales**	**Operating profit**
EG	₩ 833,996	₩ (335,297)	₩ 498,699	₩ 58,781
CE	3,174,928	(1,823,210)	1,351,718	18,031
Bobcat	3,949,929	(70,796)	3,879,133	414,006
Subtotal	7,958,853	(2,229,303)	5,729,550	490,818
Consolidation adjustments	(2,229,303)	2,229,303	-	-
Total	₩ 5,729,550	₩ -	₩ 5,729,550	₩ 490,818

(2) Total assets of business segment as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**2017**	**2016**
EG	₩ 831,553	₩ 864,249
CE	3,574,722	3,325,790
Bobcat	6,183,837	6,326,067
Other	(314,022)	(489,297)
Total	₩ 10,276,090	₩ 10,026,809

(3) Total liabilities of business segment as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**2017**	**2016**
EG	₩ 741,907	₩ 804,322
CE	2,916,600	2,668,376
Bobcat	2,756,294	2,974,229
Other	688,128	131,505
Total	₩ 7,102,929	₩ 6,578,432

(4) The sales information by geographical segment for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	**2017**	**2016**
Asia Pacific & Emerging Market	₩ 1,786,523	₩ 1,595,833
China	947,803	461,811
Europe	1,112,949	1,064,316
North America & Oceania	2,720,622	2,607,590
Total	₩ 6,567,897	₩ 5,729,550

25 Sales

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

(in millions of Korean won)		2017		2016
Sales of goods				
-Manufactured products	₩	5,943,769	₩	5,182,047
-Merchandise		485,240		419,186
Others		138,888		128,317
Total	₩	6,567,897	₩	5,729,550

26 Expenses by Nature

Expenses classified by nature for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		2017		2016
Purchases of inventories (raw materials and merchandise)	₩	3,287,138	₩	2,887,404
Changes in inventories		(87,168)		39,270
Employee welfare benefits		732,798		682,769
Depreciation and amortization		254,780		251,138
Other expenses		1,719,580		1,378,151
Total	₩	5,907,128	₩	5,238,732

27 Selling and Administrative Expenses

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

(in millions of Korean won)		**2017**		**2016**
Salaries	₩	243,572	₩	212,986
Post-employment benefits		21,936		29,009
Employee benefits		53,593		51,111
Printing		1,092		1,204
Freight and custody		1,668		2,113
Communications		9,859		8,561
Utilities		4,820		4,973
Maintenance		3,348		2,372
Insurance		16,785		15,326
Depreciation		10,543		10,907
Amortization		44,987		46,002
Research and development		143,428		145,434
Advertising expenses		46,536		38,618
Sales commission		67,768		54,997
Taxes and dues		12,284		9,884
Travel expenses		33,083		31,419
Commission expenses		135,827		132,442
Education and training expenses		5,613		5,675
Bad debt reversal		(17,375)		(8,363)
Others		42,762		39,603
Total	₩	882,129	₩	834,273

28 Finance Income and Costs

Finance income and costs for the years ended December 31, 2017 and 2016, are summarized as follows:

(in millions of Korean won)		**2017**		**2016**
Finance income:				
Interest income	₩	10,759	₩	12,070
Dividend income		2,109		5
Gain on foreign currency transactions		58,400		82,192
Gain on foreign currency translation		224,019		63,859
Gain on derivative transactions		1,355		16,609
Gain on valuation of derivatives		-		827
Gain on repayment of bonds		-		41
Income on financial guarantee		24		560
Subtotal (A)	₩	296,666	₩	176,163
Finance expenses:				
Interest expenses	₩	(199,358)	₩	(230,540)
Loss on foreign currency transactions		(60,473)		(91,032)
Loss on foreign currency translation		(144,144)		(85,609)
Loss on derivative transactions		(13,080)		(6,308)
Loss on valuation of derivatives		(6,145)		-
Expense on financial guarantee		(9,800)		(6,592)
Loss on bond repayment		(20,654)		(5,143)
Loss on debt repayment		(884)		(667)
Others		(1,197)		(1,759)
Subtotal (B)		(455,735)		(427,650)
Net finance expenses (C=A+B)	₩	(159,069)	₩	(251,487)

29 Other Non-Operating Income and Expenses

(1) Other non-operating income and expenses for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017	2016
Other non-operating income:		
Rental income	₩ 33	₩ 55
Gain on disposal of long-term investment securities	25,374	-
Gain on disposal of property, plant and equipment	2,188	14,306
Reversal of impairment loss on property, plant and equipment	15,672	871
Gain on disposal of long-term intangible assets	71	293
Reversal of impairment loss on intangible assets	1,867	-
Gain on disposal of investment properties	189	-
Gain on debt exemption	537	-
Gain on disposal of other non-current assets	25	-
Gain on revaluation of land	6	-
Others	18,191	40,657
Total	₩ 64,153	₩ 56,182
Other non-operating expenses:		
Loss on disposal of trade receivables	₩ (13,407)	₩ (8,913)
Loss on disposal of short -term investment securities	(817)	-
Loss on valuation of short-term investment securities	(7,271)	(497)
Loss on valuation of long-term investment securities	(464)	(910)
Other bad debt expenses (reversal)	749	(2,679)
Loss on disposal of property, plant and equipment	(2,550)	(7,739)
Loss on disposal of intangible assets	(20)	(55)
Loss on disposal of investment properties	(2,166)	-
Impairment loss on property plant and equipment	(5,179)	(2,063)
Impairment loss on intangible assets	(458)	(30,079)
Impairment loss on investment properties	(15,121)	-
Donations	(8,848)	(3,441)
Others	(17,380)	(156,936)
Total	(72,932)	(213,312)
Net other non-operating expense	₩ (8,779)	₩ (157,130)

30 Income Tax Expense

(1) Components of income tax expense for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)		**2017**		**2016**
Current tax	₩	54,574	₩	(22,430)
Changes in deferred tax assets and liabilities		130,150		196,309
Total income tax expense		184,724		173,879
Deferred tax charged directly to equity		8,260		(11,239)
Income tax expense	₩	192,984	₩	162,640

(2) The Group offsets deferred tax assets and deferred tax liabilities if the Group has a legally enforceable right to set off current tax assets against current tax liabilities and the deferred tax assets and the deferred tax liabilities relate to income taxes levied by the same taxation authority. Changes in deferred tax assets and liabilities for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017					
		Beginning		**Variation**		**Ending**
Advances from government	₩	1,537	₩	(146)	₩	1,391
Allowance for doubtful accounts		88,558		25,991		114,549
Provision for product warranties		26,474		(3,901)		22,573
Net defined benefit liabilities		147,228		(37,771)		109,457
Investment in associates		659		(19,771)		(19,112)
Provision for temporary depreciation		(3,734)		-		(3,734)
Reserve for research and development		(27,427)		18,553		(8,874)
Gain on revaluation of land		(119,959)		(1,360)		(121,319)
Derivative assets		(366)		1,234		868
Net loss carryforwards		5,511		1,900		7,411
Others		169,204		(114,879)		54,325
Total	₩	287,685	₩	(130,150)	₩	157,535

(in millions of Korean won)	2016		
	Beginning	**Variation**	**Ending**
Advances from government	₩ 1,721	₩ (184)	₩ 1,537
Allowance for doubtful accounts	84,649	3,909	88,558
Provision for product warranties	25,783	691	26,474
Net defined benefit liabilities	134,171	13,057	147,228
Investment in associates	(14,004)	14,624	620
Provision for temporary depreciation	(6,161)	2,427	(3,734)
Reserve for research and development	(55,660)	28,233	(27,427)
Gain on revaluation of land	(176,631)	56,672	(119,959)
Derivative assets (liabilities)	5,095	(5,461)	(366)
Net loss carryforwards	27,987	(22,476)	5,511
Others	480,869	(311,626)	169,243
Total	₩ 507,819	₩ (220,134)	₩ 287,685

(3) Temporary differences which have not been recognized as deferred tax assets as at December 31, 2017 and 2016, are as follows (except for investments in subsidiaries and associates):

(in millions of Korean won)	**2017**	**2016**
Tax loss carryforwards	₩ 1,523,956	₩ 1,462,379
Deductible temporary differences	110,654	244,054
Tax credits carryover	29,284	23,928

The probability of deferred tax assets being realized depends on the Group's ability to generate taxable income in future years, the economic situation and industry forecast. The Group periodically reviews such matters.

(4) Temporary differences from investments in subsidiaries, joint ventures and associates, which are not recognized as deferred tax assets (liabilities) are as follows:

(in millions of Korean won)	**2017**	**2016**
Subsidiaries	₩ (63,360)	₩ 71,662

(5) A reconciliation of income tax expense and profit before income tax expense of the Group for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	**2017**	**2016**
Profit before income tax expense	₩ 489,627	₩ 82,050
Income tax expense at statutory income tax rate	194,107	184,882
Adjustment:		
Non-temporary difference	2,409	(35,920)
Effect of change in recognition of deferred income tax	101,977	38,110
Tax credits	(9,181)	(14,906)
Additional income tax and tax refund for prior periods	1,124	1,232
Others	(97,452)	(10,758)
Income tax expense	₩ 192,984	₩ 162,640
Average effective tax rate (Income tax expense / Profit before income tax)	39.4%	[1]

[1] Average effective tax rate for the year ended December 31, 2016 was not calculated due to the effect of reduction of deferred income tax.

31 Earnings Per Share

(1) Basic earnings (loss) per share

Basic earnings(loss) per share is computed by dividing the profit attributable to owners of the Group by the weighted-average number of common stocks outstanding during the year, excluding treasury shares.

Earnings per share attributable to owners of the Group for the years ended December 31, 2017 and 2016, are computed as follows:

(in millions of Korean won and in shares)	**2017**		**2016**	
	Continuing and discontinued operations	**Continuing operations**	**Continuing and discontinued operations**	**Continuing operations**
Profit (loss) attributable to owners of Group	₩ 130,228	₩ 130,228	₩ 44,323	₩ (152,252)
Weighted average number of common stocks outstanding [1]	207,541,601	207,541,601	207,454,997	207,454,997
Basic earnings (loss) per share	₩ 627	₩ 627	₩ 214	₩ (734)

[1] The weighted-average number of common stocks outstanding is calculated as follows:

(in shares)	**2017**	**2016**
Common stocks at the beginning	207,454,809	207,455,314
Acquisition of treasury stock	-	(317)
Exercise of stock warrants	86,792	-
Weighted average number of common stocks outstanding	207,541,601	207,454,997

(2) Diluted earnings per share

There is no item related to dilution for the year ended December 31, 2016. Diluted earnings per share for the year ended December 31, 2017 are as follows:

(in millions of Korean won and in shares)		**2017**
Profit attributable to common stocks before adjustment	₩	130,228
Adjustment:		-
Profit attributable to common stocks after adjustment		130,218
Weighted average number of common stocks outstanding after adjustment [1]		209,948,297
Diluted earnings per share	₩	620

[1] The details of weighted-average number of common stocks outstanding after adjustment used to calculate diluted earnings per share is as follows:

(in shares)	**2017**
Weighted average number of common stocks outstanding before adjustment	207,541,601
Bonds with warrants	2,406,696
Weighted average number of common stocks outstanding after adjustment	209,948,297

Share options that could be used to dilute basic earnings per share in the future, which were not considered in the calculation of diluted earnings per share due to an anti-dilutive effect for the years ended December 31, 2017 and 2016, are as follows:

(in shares)	**2017**	**2016**
Share options	302,020	447,320

32 Dividend

For the year ended December 31, 2017, the Parent Company paid dividends amounting to ₩ 18,367 million for holders of capital securities.

33 Commitments and Contingencies

(1) Pending litigations

As at December 31, 2017, the Group is involved in pending lawsuits as a defendant with total claims amounting to ₩ 86,568 million, including the stock trading lawsuit stated below. The outcome of the lawsuit and its effects cannot be reasonably estimated as at December 31, 2017.

In 2011, an external investor acquired 20% of interest in Doosan Infracore China Co., Ltd., a subsidiary of the Group, for ₩ 380 billion. According to the shareholders' agreement entered into with the Group, both parties have the right to request the counterparty to jointly sell their respective shares to a third party. Although, in principal, the Group has to jointly sell its stake in case the external investor request for such sale, the Group also has the right to purchase the external investor's share first at the price proposed by the external investor.

In 2014, the external investor requested for due diligence information to initiate its sale of shares. However, as the potential buyer was not confirmed yet, the Group could not provide such information which included confidential proprietary information. The external investor filed a claim to the Seoul Central District Court to obtain the due diligence information but it was dismissed on March 2, 2015 based on the ruling that the Group was not obligated to provide such information to the external investor.

In November 2015, the external investor filed a lawsuit claiming partial payment of stock purchase price (i.e. ₩ 10 billion among ₩ 709.3 billion) contending that a share purchase agreement shall be deemed to be executed following the Group's purported failure to cooperate with the external investor's request for due diligence information. The external investor's claim was dismissed at the first ruling on January 12, 2017 stating that the Group did not breach its obligation to cooperate with the external investor's sale of its shares. However, on February 21, 2018 the Seoul High Court overturned the 1st ruling and recognized the Group's breach of duty and ruled the Group to pay the claim amount of ₩ 10 billion.

The Group appealed against the 2nd ruling and took it to the Supreme Court on February 26, 2018. The Seoul High Court, on February 28 2018, ruled that the Group's application for suspension of enforcement was valid and suspended the 2nd ruling's court order of payment.

Even supposing that the Supreme Court ordered in the final ruling that the Group pay the litigation amount and acquire the external investor's stake, that assumption does not sufficiently allow the Group to produce reliable estimation for the prospective losses as of December 31, 2017.

(2) As at December 31, 2017, the Group has entered into bank overdraft agreements amounting to ₩ 3,410,512 million with various financial institutions.

(3) Financial covenant

For the years ended December 31, 2016 and 2017, the Group issued 28th and 32nd series bonds denominated in USD 300 million, respectively. In accordance with the agreement for issuing the 28th and 32nd series bonds, an early redemption clause exists for when and if the Group's guarantor, the Korea Development Bank, becomes privatized. In addition, the Group has pledged its 11,178,538 and 10,882,765 shares of Doosan Bobcat Inc. as collaterals and, if the price falls below par, additional shares or deposits equivalent to the difference should be secured.

The Group has pledged 25,433,532 shares of Doosan Bobcat Inc. as collateral for borrowings of 550,000 million from the Korea Development Bank and 11 other financial institutions. In relation to the borrowings, if the ratio does not meet the certain collateral limit predetermined in the agreement, additional shares or deposits must be secured as collaterals. Also, in case the Group receives a credit rating equal to or lower than BB0 from more than one of the domestic credit rating agencies, NICE Investors Service Co., Ltd., Korea Investor Service Inc., and Korea Ratings Corporation, it will be a trigger for the financial institutions to collect the loans before the maturity.

(4) The financial liabilities related to the transferred receivables that the Group continues to recognize because the Group substantially retains all of the risks and rewards of ownership as at December 31, 2017, amount to ₩ 30,291 million.

(5) As at December 31, 2017, guarantees provided by the Group for third parties are as follows:

(in thousands of foreign currencies and millions of Korean won):

Guarantor	Beneficiary	Guaranteed amount		Korean won equivalent
Doosan Infracore China Co., Ltd.	End User	CNY	367,525	₩ 60,145
Clark Equipment Co. and others	End User	USD	107,549	115,228
Doosan Holdings Europe Ltd. and others	End User	USD	2,868	3,073
Doosan Bobcat Korea Co., Ltd.	End User	USD	2,590	2,774
Total				₩ 181,220

Meanwhile, as at December 31, 2017, the Group entered into agreements with the Korea Development Bank for the guarantees of 28th and 31st foreign currency-denominated bonds of USD 300,000 thousand respectively, and with Korea Exim Bank for the guarantees of 27th bond of ₩ 115,000 million. In addition, the company entered into agreements with various banks for performance guarantees of USD 1,154 thousand regarding exports and imports, and with Seoul Guarantee Insurance Company and Machinery Financial Cooperative for performance and payment guarantees of ₩ 26,465 million in total. Regarding guarantees provided by Machinery Financial Cooperative, equity investment of ₩ 200 million in Machinery Financial Cooperative is also pledged as a collateral.

(6) Operating lease

Total minimum lease payments in relation to non-cancellable operating leases that are payable as at December 31, 2017 are as follows:

(in millions of Korean won)	Less than 1 year	1-5 years	More than 5 years	Total
Minimum lease payments	₩ 14,864	₩ 25,601	₩ 3,580	₩ 44,045

34 Pledged Assets

(1) The Group's assets pledged as collaterals for long-term and short-term borrowings as at December 31, 2017, are as follows:

(in thousands of foreign currencies and millions of Korean won)

Pledger	Collateralized asset	Amount of Borrowings		Collateralized amount	
KDB	Land, buildings and machinery[1]	KRW	148,000	KRW	371,112
		USD	19,000	USD	95,026
		EUR	4,863	DM	84,000
		JPY	74,707		
Ubest 4th Co.,Ltd	Land and buildings	KRW	80,000	KRW	96,000

[1] The Parent Company's rights to property and inventory insurance benefits are pledged as collaterals to the Korea Development Bank.

The Parent Company has pledged the total shares of both of its subsidiaries, Doosan Infracore

North America LLC and Doosan Infracore Norway AS, as collaterals to Korea Exim Bank for borrowings of USD 147,000 thousand.
(2) The Group's subsidiary, Clark Equipment Co., repaid the borrowings, borrowed on May 28, 2014 in conjunction with Doosan Holdings Europe Ltd., in full, and entered into a new borrowing of USD 1,345,000 thousand and a limit loan agreement of USD 150,000 thousand, on May 18, 2017. The Group has pledged 1,980 shares of Clark Equipment Co. (carrying amount: ₩ 446,483,250 thousand), 38,447 shares of Doosan Holdings Europe Ltd. (carrying amount: ₩ 2,520,951,505 thousand), and 110,071,219 shares of Doosan Bobcat Singapore Pte. Ltd. (carrying amount: ₩ 104,402,525 thousand), as collaterals for the borrowing and loan commitment, and the balance of the related borrowings at the end of the reporting period is USD 1,234,913 thousand.

35 Related Party Transactions

The Group's related party disclosures for the years ended December 31, 2017 and 2016, are as follows:

(1) Nature of relationship

Relationship	Name
Ultimate parent	Doosan Corporation
Next most senior parent	Doosan Heavy Industries and Construction Co., Ltd.
Associates and joint ventures	Doosan Cuvex Co., Ltd., DBC Co., Ltd., Doosan PSI LLC, Doosan Infracore Liaoning Machinery Sales Co., Ltd.
Other related parties[1]	Doosan Engine Co., Ltd., Doosan Construction & Engineering Co., Ltd., Doota Mall Co., Ltd., Oricom Inc., Doosan Bears Inc., Doosan Heavy Industries America Holdings Inc., Neoplux Co., Ltd. and others

[1] Other related parties include entities which belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act, although the entities are not the related party of the Group in accordance with Korean IFRS 1024.

(2) Significant transactions with related parties for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	2017					
Relationship	Sales	Disposal of property, plant and equipment and intangible assets	Other income	Purchases	Acquisition of property, plant and equipment and intangible assets	Other expenses
Ultimate parent	₩ 59,404	₩ -	₩ 60	₩ 69,516	₩ 2,832	₩ 70,868
Next most senior parent	788	592	-	-	-	-
Associates and joint ventures	7	18,547	-	4	-	2,518
Others	408	199	2,290	179	1,099	86,354
Total	₩ 60,607	₩ 19,338	₩ 2,350	₩ 69,699	₩ 3,931	₩ 159,740

(in millions of Korean won)	2016					
Relationship	**Sales**	**Disposal of property, plant and equipment and intangible assets**	**Other income**	**Purchases**	**Acquisition of property, plant and equipment and intangible assets**	**Other expenses**
Ultimate parent	₩ 52,063	₩ 23,614	₩ 191	₩ 48,990	₩ 7,990	₩ 68,392
Next most senior parent	1,211	-	3	-	-	-
Associates and joint ventures	-	-	-	-	-	761
Others	2,100	4	178	-	34,909	62,733
Total	₩ 55,374	₩ 23,618	₩ 372	₩ 48,990	₩ 42,899	₩ 131,886

(3) Outstanding balances as at December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	December 31, 2017			
Relationship	**Trade receivables**	**Other receivables**	**Trade payables**	**Other payables**
Ultimate parent	₩ 19,543	₩ 1,029	₩ 6,941	₩ 9,382
Next most senior parent	-	72	-	2,148
Associates and joint ventures	-	4,147	15	361
Others	-	35,798	5,685	7,692
Total	₩ 19,543	₩ 41,046	₩ 12,641	₩ 19,583

(in millions of Korean won)	December 31, 2016			
Relationship	**Trade receivables**	**Other receivables**	**Trade payables**	**Other payables**
Ultimate parent	₩ 4,116	₩ 689	₩ 5,113	₩ 35,254
Next most senior parent	142	72	-	2,148
Associates and joint ventures	-	3,798	-	2
Others	-	35,518	-	13,633
Total	₩ 4,258	₩ 40,077	₩ 5,113	₩ 51,037

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

		2017							
		Loans		**Borrowings**		**Investment**		**Dividends**	
(in millions of Korean won)		**Loan**	**Collection**	**Borrowing**	**Repayment**	**Capital increase(*1)**	**Investment**	**Income**	**Payment**
Next most-senior parent	Doosan Heavy Industries and Construction Co., Ltd.	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -	₩ 2,109	₩ -
Joint ventures and associate	Doosan Infracore Liaoning Machinery Sales Co., Ltd	-	-	-	-	-	363	-	-
	DBC Co., Ltd.	-	-	-	-	-	61,016	-	-

	Doosan Cuvex Co., Ltd.	-	-	-	-	-	4,486	-	-
Others	Doosan Engine Co., Ltd.	-	-	-	-	-	-	-	7,405

		2016							
		Loans		Borrowings		Investment		Dividends	
(in millions of Korean won)		Loan	Collection	Borrowing	Repayment	Capital increase[1]	Investment	Income	Payment
Next most-senior parent	Doosan Heavy Industries and Construction Co., Ltd.	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -	₩ 1,844	₩ -
Joint ventures and associate	Doosan Infracore Liaoning Machinery Sales Co., Ltd	-	-	-	-	-	355	-	-
	Doosan Heavy Industries America Holdings LLC	-	-	-	21,096	-	112,000	-	-
Others	Doosan Construction & Engineering Co., Ltd. [1]	-	-	-	-	-	27,582	-	-
	Doosan Engine Co., Ltd. [2]	-	-	-	-	616,876	-	-	-

[1] The Parent Company acquired 19.87% of the equity shares of Doosan Cuvex Co., Ltd. from Doosan Engineering & Construction Co., Ltd. amounting to ₩ 27,582 million during the year ended December 31, 2016.

[2] For the year ended December 31, 2016, Doosan Engine Co., Ltd. contributed its shares of Clark Equipment Co. and Doosan Holdings Europe Ltd., which were assessed in total at ₩ 617,289 million, to DBI in exchange for DBI's shares, which were assessed at ₩ 616,876 million, and ₩ 413 million of cash.

(5) As at December 31, 2017, there are neither guarantees by the Group for related parties nor guarantees by related parties for the Group.

(6) The parent defines key management personnel, including registered officer and non-registered officer (including outside director), who have the authority and responsibility for planning, operation and control and are in charge of business or division unit. Compensation to key management personnel of the Group for the years ended December 31, 2017 and 2016, is as follows:

(in millions of Korean won)	2017	2016
Employee benefits	₩ 10,651	₩ 11,562
Post-employment benefits	839	932
Share-based payment	-	135
	₩ 11,490	₩ 12,629

36 Consolidated Statements of Cash Flows

(1) Details of adjustments and changes in operating assets and liabilities in the consolidated statement of cash flows for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**2017**	**2016**
Adjustments:		
Income tax expense	₩ 192,984	₩ 235,358
Finance income	(99,304)	(68,476)
Finance costs	289,759	300,625
Post-employment benefits (defined benefit plan)	53,372	57,521
Depreciation	141,360	147,725
Amortization	113,420	109,570
Gain on disposal of property, plant and equipment	(2,188)	(14,313)
Gain on disposal of intangible assets	(71)	(293)
Gain on disposal of investment properties	(189)	-
Loss on disposal of property, plant and equipment	2,550	7,810
Loss on disposal of intangible assets	20	55
Loss on disposal of investment properties	2,166	-
Reversal of impairment loss on property, plant and equipment	(15,672)	(871)
Reversal of impairment loss on intangible assets	(1,867)	-
Impairment loss on property, plant and equipment	5,179	2,063
Impairment loss on intangible assets	458	30,079
Impairment loss on investment properties	15,121	-
Loss on valuation of short-term investment securities	7,271	497
Loss on valuation of long-term investment securities	464	910
Loss on equity method investments	3,295	152
Gain on disposal of discontinued operations	-	(255,231)
Others	(24,300)	100,169
Total	₩ 683,828	₩ 653,350

(in millions of Korean won)	**2017**	**2016**
Changes in operating assets and liabilities:		
Changes in trade receivables	₩ (384,316)	₩ 81,203
Changes in other receivables	22,872	(3,411)
Changes in derivative assets	(12,816)	26,708
Changes in inventories	(142,171)	33,287
Changes in other current assets	(29,111)	(2,014)
Changes in other non-current assets	35,294	(16,424)
Changes in trade payables	417,616	165,313
Changes in other payables	43,330	(142,929)
Changes in derivative liabilities	9,123	(23,945)
Changes in provisions	(19,907)	17,768
Changes in other current liabilities	29,466	(36,900)
Payment of defined benefit obligations	(57,504)	(57,802)
Transferred out to affiliates	253	(811)
Changes in plan assets	(12,856)	(25,082)
Changes in other non-current liabilities	16,996	5,062
Total	₩ (83,731)	₩ 20,023

(2) Significant non-cash transactions for the years ended December 31, 2017 and 2016, are as follows:

(in millions of Korean won)	**2017**	**2016**
Other payables related to property, plant and equipment acquisition	₩ (21,914)	₩ -

(3) Details of adjustments in liabilities arising from financing activities for the period ended December 31, 2017, are as follows:

	Beginning balance	**Cash flows**	**Changes in exchange rates**	**Changes in fair value**	**Others**	**Ending balance**
Short-term borrowings	₩ 952,164	₩ 472,436	₩ (15,313)	₩ -	₩ -	₩ 1,409,287
Long-term borrowings (including current portion of long-term borrowings)	1,991,636	(206,845)	(200,272)	4,059	21,538	1,610,116
Bonds (including current portion of bonds)	1,479,383	(241,284)	(54,540)	4,868	(1,252)	1,187,175
Bonds with warrants	-	491,667	-	663	(49,907)	442,423
Liabilities to avoid risks arising from bonds	-	-	35,070	1,420	(2,834)	33,656
Total	₩ 4,423,183	₩ 515,974	₩ (235,055)	₩ 11,010	₩ (32,455)	₩ 4,682,657

37 Discontinued Operations

(1) Disposal of machine tools business and related management rights

The Group disposed of machine tools business and related management rights on April 29, 2016. The Group expects that the disposal will help to increase revenue and improve profitability by establishing a suitable decision-making process for each business segment and enhancing competitiveness resulting from efficient allocation of management resources.

(2) The carrying amounts of assets and liabilities as at the date of transfer for the year ended December 31, 2016, are as follows:

(in millions of Korean won)

	Carrying amount of the assets			Carrying amount of the liabilities			
	Current assets	**Non-current assets**	**subtotal**	**Current liabilities**	**Non-current liabilities**	**subtotal**	**Carrying amount of net assets**
MT business	₩ 586,510	₩ 427,903	₩ 1,014,413	₩ 325,201	₩ 34,212	₩ 359,413	₩ 655,000

(3) Calculation of business transfer profit for the year ended December 31, 2016, is as follows:

(in millions of Korean won)

	Transfer price	(-) Net book value	(-) Sale cost	Business transfer profit
MT business	₩ 1,023,721	₩ 655,000	₩ 113,490	₩ 255,231

(4) Net cash flows from discontinued operations for the year ended December 31, 2016, are as follows:

(in millions of Korean won):

	Transfer price received in cash	(-) Transferred out cash assets	(-) Disposal cost	Total
MT business	₩ 1,023,721	₩ 72,864	₩ 21,437	₩ 929,420

(5) Analysis of profit from discontinued operations

Details of profit or loss from the discontinued operations included in the consolidated statements of profit or loss for the years ended December 31, 2017 and 2016, are as follows. Profit and loss from discontinued operations that were presented comparatively in order to include operations classified as discontinued were re-presented.

<Discontinued operating profit>

(in millions of Korean won)	**2017**		**2016**	
Sales	₩	-	₩	313,348
Cost of sales		-		(241,571)
Selling and administrative expenses		-		(48,909)
Operating profit		-		22,868
Non-operating expense		-		(8,807)
Profit before income tax		-		14,061
Income tax expense		-		(5,944)
Subtotal		-		8,117
Gain from disposal of discontinued operations		-		255,231
Income tax expense related to disposal of discontinued operations		-		(66,773)
Profit from discontinued operations	₩	-	₩	196,575

<Cash flows from discontinued operations>

(in millions of Korean won)	**2017**		**2016**	
Cash flows from operating activities	₩	-	₩	2,209
Cash flows from investing activities		-		923,928
Cash flows from financing activities		-		(30,714)
Net cash flow	₩	-	₩	895,423