

1. General

1.1 The parent company information

Doosan Corporation (the "Company") was incorporated on December 18, 1933, under the name of Sohwa-Kirin Beer, Ltd. to manufacture and sell beer. The Company has changed its name to Dongyang Beer, Ltd. in February 1948 and again to OB Beer, Ltd. in February 1996 and finally to Doosan Corporation on September 1, 1998. The consolidated financial statements of the Company and its subsidiaries (collectively, the "Group") have been prepared based on Korean International Financial Reporting Standards (KIFRS) 1110 *Consolidated Financial Statements*.

Since June 1973, the Company's shares have been listed on the KOSPI market of the Korea Exchange. After several capital issues, the Company's share capital as at December 31, 2017, is ₩134,846 million, including ₩26,984 million of preferred shares.

The Group's ordinary shares as at December 31, 2017, are owned as follows:

	Number of ordinary shares owned	Ownership percentage (%)
Related parties	9,369,395	48.80
Treasury shares	4,266,070	22.22
Others	5,562,538	28.98
	19,198,003	100.00

Meanwhile, 48.3% of preferred shares are owned by the related parties including the largest shareholder and 51.7% of preferred shares are owned by others entities and individual shareholders.

1.2 Consolidated subsidiaries information

1.2.1 Details of consolidated subsidiaries as at December 31, 2017 and 2016 are as follows:

Subsidiary	Type of business	Location	Ownership ratio of the Group (%) (*1)		Ownership ratio of non-controlling interests (%) (*1)		Financial closing date
			Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016	
Oricom Inc.	Advertising	Korea	65.5	65.5	34.5	34.5	December 31
Han Comm Inc.	Advertising	Korea	100	100	34.5	34.5	December 31
Doosan Bears, Inc.	Sports	Korea	100	100	-	-	December 31
Dootamall Co., Ltd.	Real estate	Korea	100	100	-	-	December 31
DIP Holdings Co., Ltd.	Holding company	Korea	100	100	-	-	December 31
DLI Co., Ltd.	Education	Korea	100	100	-	-	December 31
Doosan Robotics Co., Ltd (*4)	Software development	Korea	100	100	-	-	December 31
Doosan Mecatec Co., Ltd	Manufacturing	Korea	100	100	-	-	December 31

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Subsidiary	Type of business	Location	Ownership ratio of the Group (%) (*1)		Ownership ratio of non-controlling interests (%) (*1)		Financial closing date
			Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016	
DAE Co., Ltd.	R&D and manufacturing	Korea	100	100	-	-	December 31
Doosan Electro-Materials Singapore Pte Ltd.	Wholesale and retail	Singapore	100	100	-	-	December 31
Doosan Hong Kong Ltd.	Wholesale and retail	China	100	100	-	-	December 31
Doosan Electro-Materials (Shen Zhen) Limited.	Wholesale and retail	China	100	100	-	-	December 31
Doosan Shanghai Chemical Materials Co., Ltd.	Wholesale and retail	China	100	100	-	-	December 31
Doosan Electro-Materials (Changshu) Co., Ltd.	Manufacturing	China	100	100	-	-	December 31
Doosan Second Real Estate Securitization Specialty Ltd. (*2)	Specialized in securitization	Korea	100	100	-	-	December 31
Doosan Information and Communications America, LLC	IT service	USA	100	100	-	-	December 31
Doosan Information and Communications China, Co., Ltd.	IT service	China	100	100	-	-	December 31
Doosan Mottrol (Jiangyin) Co., Ltd.	Manufacturing	China	100	100	-	-	December 31
Doosan Information & Communications Europe	IT service	UK	100	100	-	-	December 31
Doosan Industrial Vehicle Europe N.A.	Wholesale and retail	Belgium	100	100	-	-	December 31
Doosan Industrial Vehicle U.K. Ltd.	Wholesale and retail	UK	100	100	-	-	December 31
Doosan Logistics Europe GmbH	Manufacturing	Germany	100	100	-	-	December 31
Doosan Industrial Vehicle America Corp.	Wholesale and retail	USA	100	100	-	-	December 31
Doosan Industrial Vehicle Yantai Co., Ltd.	Manufacturing	China	100	100	-	-	December 31
Genesis Forklift Trucks Limited	Manufacturing	UK	100	100	-	-	December 31
Rushlift Holdings Ltd.	Holding company	UK	100	100	-	-	December 31
Doosan Materials Handling UK Ltd.	Holding company	UK	100	100	-	-	December 31
Rushlift Ltd.	Forklift rental and sales	UK	100	100	-	-	December 31
Doosan Electro-Materials America, LLC	Marketing	USA	100	100	-	-	December 31
Doosan Electro-Materials Luxembourg Sarl	Holding company	Luxembourg	100	100	-	-	December 31
Circuit Foil Luxembourg	Manufacturing	Luxembourg	100	100	-	-	December 31
Circuit Foil Asia Pacific (Zhangjiagang)	Manufacturing	China	100	100	-	-	December 31
Circuit Foil Asia Pacific (Hong Kong)	Wholesale and retail	Hong Kong	100	100	-	-	December 31
CFT	Wholesale and retail	USA	100	100	-	-	December 31
Doosan Fuel Cell America, Inc.	Manufacturing	USA	100	100	-	-	December 31
Doosan Energy Solutions America, Inc.,	Electric power generation and sales	USA	100	-	-	-	December 31
Neo Plux Co.,Ltd.	Finance	Korea	97.1	-	2.9	-	December 31
Sunny Russel 8th Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
Doosan Heavy Industries & Construction Co., Ltd. ("DHC") (*3)	Other engine and turbine manufacture	Korea	37.8	37.8	62.2	62.2	December 31
Doosan Asset Management Company Co., Ltd.	Real estate development	Korea	100	100	62.2	62.2	December 31
Doosan Heavy Industries Vietnam Co., Ltd.	Other engine and turbine manufacture	Vietnam	100	100	64.0	64.1	December 31
HF Controls Corp.	Manufacturing	USA	100	100	62.2	62.2	December 31
Doosan HF Controls Asia Co., Ltd.	Manufacturing	Korea	100	100	62.2	62.2	December 31
PT. Doosan Heavy Industries Indonesia	Manufacturing	Indonesia	55	55	79.2	79.2	December 31
Doosan Heavy Industries Japan Corp.	Wholesale and retail	Japan	100	100	62.2	62.2	December 31
S.C. Doosan IMGB S.A.	Manufacturing	Romania	99.89	99.86	62.3	62.3	December 31

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			Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016	
Doosan Enpure Ltd.	Engineering and service	UK	100	100	62.2	62.2	December 31
Doosan Power Systems India Private Ltd.	Engineering and service	India	100	100	62.2	62.2	March 31
Doosan Heavy Industries Muscat LLC.	Manufacturing	Oman	70	70	73.6	73.6	December 31
Doosan Power Systems Arabia Company Limited	Manufacturing service	Saudi Arabia	51	51	80.7	80.7	December 31
Azul Torre Construction Corporation (*3)	Manufacturing	Philippines	40	40	84.9	84.9	December 31
Doosan Heavy Industries America Holdings Inc.	Holding company	USA	100	100	62.2	62.2	December 31
Doosan Heavy Industries America LLC	Wholesale and retail	USA	100	100	62.2	62.2	December 31
Doosan ATS America, LLC	Engineering and service	USA	100	100	62.2	62.2	December 31
Doosan Power Service America, LLC	Engineering and service	USA	100	100	62.2	62.2	December 31
Doosan Turbomachinery Services Inc.	Manufacturing	USA	95.9	-	63.8	-	December 31
Doosan GridTech Inc.	Software and systems engineering	USA	100	100	62.2	62.2	December 31
Doosan GridTech LLC	Software and systems engineering	USA	100	100	62.2	62.2	December 31
Doosan GridTech CA LLC	Software and systems engineering	USA	100	100	62.2	62.2	December 31
Doosan Skoda Power s.r.o	Manufacturing	Czech	100	100	62.2	62.2	December 31
Skoda Power Private Ltd.	Engineering	India	100	100	62.2	62.2	March 31
Doosan Power Systems Pension Trustee Company Ltd.	Specialized service	UK	100	100	62.2	62.2	December 31
Doosan Power Systems Overseas Investments Ltd.	Holding company	UK	100	100	62.2	62.2	December 31
Doosan Babcock Ltd.	Engineering and service	UK	100	100	62.2	62.2	December 31
Doosan Power Systems Europe Limited GmbH	Engineering and service	Germany	100	100	62.2	62.2	December 31
Doosan Power Systems Americas LLC	Engineering and service, Wholesale and retail	USA	100	100	62.2	62.2	December 31
Doosan Lentjes UK Limited	Specialized service	UK	100	100	62.6	62.6	December 31
Doosan Lentjes GmbH	Engineering and service	Germany	99	99	62.6	62.6	December 31
Doosan Power Systems S.A.	Holding company	Luxembourg	100	100	62.2	62.2	December 31
Doosan Babcock Energy Technologies (Shanghai) Ltd.	Engineering and service	China	100	100	62.2	62.2	December 31
Doosan Babcock Energy Services (Overseas) Ltd.	Engineering and service	UK	100	100	62.2	62.2	December 31
Doosan Babcock Energy Polska Sp z o.o.	Engineering and service	Poland	98.9	98.9	62.6	62.6	December 31
Doosan Babcock Energy Germany GmbH	Engineering and service	Germany	100	100	62.2	62.2	December 31
Doosan Lentjes Czech s.r.o	Specialized service	Czech	100	100	62.6	62.6	December 31
AE & E Lentjes Belgie N.V.	Dormant corporation	Belgium	100	100	62.6	62.6	December 31
Doosan Power Systems(Scotland) Ltd Partnership	Real estate	UK	100	100	62.2	62.2	December 31
Doosan Babcock General Maintenance Services LLC (*3)	Specialized service	UAE	49	49	81.5	81.5	December 31
Doosan Babcock WLL (*3)	Specialized service	Qatar	49	49	81.5	81.5	December 31
KDPP 1st Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
KDPP 2nd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
KDPP 3rd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
Happy Tomorrow 20th Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
Happy Tomorrow 25th Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31

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			Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016	
Happy Tomorrow 27th Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
Seung Li 3rd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
U BEST 4th Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
New Star Power 1st Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
New Star Power 2nd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
Doosan Cuvex Co., Ltd.	Golf and condominium	Korea	100	100	50.4	53.1	December 31
DBC Co., Ltd.	Real estate development	Korea	100	-	56.7	-	December 31
Doosan Infracore Co., Ltd. ("DI") (*3)	Manufacturing, sales	Korea	36.3	36.4	86.3	86.3	December 31
Doosan Infracore China Co., Ltd.	Manufacturing, sales	China	80	80	89	89	December 31
Doosan Infracore (China) Investment Co., Ltd.	Holding company	China	100	100	86.3	86.3	December 31
Doosan Infracore North America LLC	Other service	USA	100	100	86.3	86.3	December 31
Doosan Infracore Japan Corp.	Purchases	Japan	100	100	86.3	86.3	December 31
Doosan (China) Financial Leasing Corp.	Finance	China	100	100	87.4	87.3	December 31
Doosan Bobcat Chile S.A.	Sales	Chile	100	100	86.3	86.3	December 31
Doosan Infracore (Shandong) Co., Ltd.	Sales	China	100	100	88.1	88	December 31
Doosan Infracore Norway AS	Manufacturing, sales	Norway	100	100	86.3	86.3	December 31
Doosan Infracore South America Industria E Comercio De Maquinas De Construcao LTDA	Sales	Brazil	100	100	86.3	86.3	December 31
Doosan Infracore Bobcat Ireland Ltd.	Other service	Ireland	100	100	86.3	86.3	December 31
Doosan Infracore Construction Equipment India Private Ltd.	Sales	India	100	100	86.3	86.3	March 31
Doosan Bobcat Inc.	Holding company	Korea	65.9	69.9	90.7	90.1	December 31
Doosan Bobcat Singapore Pte. Ltd. (*4)	Holding company	Singapore	100	100	90.7	90.1	December 31
Doosan Bobcat Korea Co., Ltd. (*4)	Sales	Korea	100	100	90.7	90.1	December 31
Doosan Bobcat Chile Compact SpA	Sales	Chile	100	100	90.7	90.1	December 31
Doosan Infracore India Private Ltd. (*4)	Manufacturing, sales	India	100	100	90.7	90.1	March 31
Bobcat Corp.	Sales	Japan	100	100	90.7	90.1	December 31
Doosan Bobcat Mexico S.A. de C.V. (*4)	Other service	Mexico	100	100	90.7	90.1	December 31
Doosan Bobcat China Co., Ltd. (*4)	Manufacturing, sales	China	100	100	90.7	90.1	December 31
Clark Equipment Co.	Manufacturing, sales	USA	100	100	90.7	90.1	December 31
Bobcat Equipment Ltd.	Sales	Canada	100	100	90.7	90.1	December 31
Doosan International Australia Pty Ltd.	Sales	Australia	100	100	90.7	90.1	December 31
Doosan Holdings Europe Ltd.	Holding company	Ireland	100	100	90.7	90.1	December 31
Doosan Infracore Europe S.A.	Sales	Belgium	100	100	90.7	90.1	December 31
Bobcat Bensheim GmbH.	Sales	Germany	100	100	90.7	90.1	December 31
Doosan Holdings France S.A.S.	Holding company	France	100	100	90.7	90.1	December 31
Doosan Techno Holding Co., Ltd. (Ireland)	Intellectual property right management	Ireland	100	100	90.7	90.1	December 31
Doosan Benelux SA.	Sales	Belgium	100	100	90.7	90.1	December 31
Doosan Infracore Europe B.V. (*5)	Sales	Netherlands	100	100	86.3	86.3	December 31
Doosan International Italia S.r.L.	Sales	Italy	100	100	90.7	90.1	December 31

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			Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016	
CJSC Doosan International Russia	Sales	Russia	100	100	90.7	90.1	December 31
Doosan International UK Ltd.	Sales	UK	100	100	90.7	90.1	December 31
Doosan International South Africa Ltd.	Sales	Republic of South Africa	100	100	90.7	90.1	December 31
Doosan Bobcat EMEA s.r.o.	Manufacturing, sales	Czech	100	100	90.7	90.1	December 31
Bobcat Lyon SAS	Sales	France	100	100	90.7	90.1	December 31
Bobcat France S.A.	Manufacturing	France	100	100	90.7	90.1	December 31
Geith International Ltd.	Sales	Ireland	100	100	90.7	90.1	December 31
Doosan International Luxembourg	Intellectual property right management	Luxembourg	100	100	90.7	90.1	December 31
Doosan Engineering & Construction Co., Ltd. ("DEC")	Construction	Korea	79.8	80.4	69.9	69.6	December 31
Valueworks Co., Ltd.	Real estate	Korea	100	-	42.6	-	December 31
Doosan Heavy Industries Vietnam Haiphong	Manufacturing	Vietnam	100	100	69.9	69.6	December 31
Pine tree 1st Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
Doosan E&C 2nd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
DM Best 2nd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
DM Best 3rd Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
DM Best 4th Co., Ltd. (*2)	Specialized in securitization	Korea	-	-	-	-	December 31
GMS 1st Co., Ltd.	Specialized in securitization	Korea	-	-	-	-	December 31
GMS 2nd Co., Ltd.	Specialized in securitization	Korea	-	-	-	-	December 31
Doosan E&C 3rd Co., Ltd.	Specialized in securitization	Korea	-	-	-	-	December 31
Doosan Engine Co., Ltd. ("DE") (*3)	Internal combustion engine manufacture	Korea	42.7	42.7	83.9	83.9	December 31
Doosan Marine Industry(Dalian) Co., Ltd	Manufacturing	China	100	100	83.9	83.9	December 31
Doosan Engine PNG Co., Ltd.	Diesel power plant	Papua new guinea	100	100	83.9	83.9	December 31
Treasury stock trust	Acquisition of Treasury Stock	Korea	100	100	-	-	December 31

(*1) The ownership interests held by the Company and its consolidated subsidiaries represent the aggregated total of ownership interests directly held by each entity within the Group. The ownership interests held by non-controlling interests represent the proportion of ownership interests that are not attributable, directly or indirectly, to the entities within the Group and it may differ from the aggregated total, less the effective ownership interest held by the Group. In other words, 'ownership interest held by non-controlling interests' is the percentage of ownership less the effective ownership interest of the entity in the Group at 100%.

(*2) Although the Group does not own the interest in the special-purpose company, in consideration of terms in the agreement of establishment, the Group concluded that it has control over the entity to substantially obtain all profits from the entity and to control business activities of the entity.

(*3) Although the Group owns less than 50% of voting right in obtaining control, but the Group concluded that the Group has de facto control over the subsidiaries.

(*4) For the year ended December 31, 2017, the name was changed from 'Doosan International South East Asia Pte. Ltd.' to 'Doosan Bobcat Singapore Pte. Ltd.' and from 'Doosan Infracore India Private Ltd.' to 'Doosan Bobcat India Private Ltd.' and 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.' and from 'DRA Co., Ltd.' to 'Doosan Robotics Co., Ltd.' and from 'Doosan Infracore Suzhou Co., Ltd.' to 'Doosan Bobcat China Co., Ltd.'.

(*5) For the year ended December 31, 2016, 'Doosan International Portable Power of Netherlands BV' changed its name to 'Doosan Infracore Customization Center Europe B.V.' and for the year ended December 31, 2017,

1.2.2 Changes in the scope of consolidation

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

Subsidiary	Change	Description
Neo Holdings Co., Ltd.	Included/Excluded	Newly acquired/Merger
Neo Plux Co., Ltd.	Included	Newly acquired
Seung Li 3rd Co., Ltd.	Included	Newly established
Doosan Feed & Livestock Co., Ltd.	Excluded	Disposal of shares
Doosan Power Systems Holdings Ltd.	Excluded	Liquidation
Doosan Energy Solutions America, Inc.	Included	Newly established
DBC Co., Ltd.	Included	Newly established
Valueworks Co., Ltd.	Included	Spin off
K Partners Doosan Co., Ltd.	Included/Excluded	Newly established/Redemption
U BEST 4th Co., Ltd.	Included	Newly established
New Star Power 1st Co., Ltd.	Included	Newly established
New Star Power 2nd Co., Ltd.	Included	Newly established
Yonginsamga Project 1st Co., Ltd	Excluded	Redemption
Doosan Hydro Technology LLC	Excluded	Disposal of shares
Doosan Turbomachinery Services Inc.	Included	Newly acquired
Dscentum 1st Co., Ltd.	Included/Excluded	Newly established/Redemption
The DS Way 1st Co., Ltd.	Excluded	Redemption
Doosan Construction Site Solutions Vietnam Company Limited	Excluded	Merger
Doosan Engineering & Services LLC	Excluded	Liquidation
Doosan Bobcat Engineering s.r.o.	Excluded	Merger
Doosan Trading Ltd.	Excluded	Merger
GMS 1st Co., Ltd.	Included	Newly established
GMS 2nd Co., Ltd.	Included	Newly established
Doosan E&C 3rd Co., Ltd.	Included	Newly established

1.2.2 Changes in the scope of consolidation (cont'd)

Doosan Heavy Industries & Construction Co., Ltd., a subsidiary of the parent company, decided to spin off the investment business from Doosan Engine Co., Ltd. into a new company, a subsidiary, and merge with Doosan Heavy Industries & Construction, and sell the business to the external, excluding the investment business of Doosan Engine Co., Ltd. by the resolution of the Board of Directors on March 13, 2018.

Doosan Corporation, a parent company, merged with DIP Holdings Co., Ltd. on March 1, 2018.

As at June 1, 2018, Doosan Corporation, a parent company, will merge with Dootamall Co., Ltd.

1.2.3 Condensed financial information of the Group's significant consolidated subsidiaries (or intermediate parent) as of and for the year ended December 31, 2017, is as follows (Korean won in millions):

Subsidiary	Assets	Liabilities	Sales	Net income (loss)	Total comprehensive income (loss)
Doosan Heavy Industries Co., Ltd.	₩ 11,745,019	₩ 7,276,816	₩ 4,336,699	₩ 15,780	₩ 197,262
Doosan Heavy Industries Vietnam Co., Ltd.	332,151	294,443	191,641	(27,216)	(27,216)
HF Controls Corp.	19,235	3,815	13,497	2,287	2,287
Doosan Heavy Industries Japan Corp.	14,202	11,233	2,478	201	201
S.C. Doosan IMGB S.A.	138,982	67,343	57,420	(5,947)	(5,947)
Doosan Enpure Ltd.	15,916	14,788	43,187	(28)	(28)
Doosan Power Systems India Private Ltd.	627,610	562,047	301,030	(31,945)	(31,756)
Doosan Heavy Industries Muscat LLC	30,558	32,698	45,622	(2,215)	(2,215)
Doosan Power Systems Arabia	17,545	10,882	10,269	581	581
Doosan Heavy Industries America Holdings Inc.	268,777	21,883	-	11,226	11,226
Doosan Turbomachinery Services	23,541	9,661	12,134	(637)	(637)
Doosan Heavy Industries America Corp.	16,336	10,552	3,479	485	485
Doosan GridTech Inc.	10,471	6,989	1,014	(6,062)	(6,062)
Doosan Skoda Power s.r.o	627,189	108,615	265,403	19,327	30,253
Doosan Power Systems Overseas Investments Ltd.	73,529	88,486	-	(2,181)	(2,181)
Doosan Babcock Ltd.	1,037,905	415,090	522,919	(13,589)	6,626
Doosan Power Systems Europe Limited GmbH	86,338	168,364	-	(5,155)	(5,155)
Doosan Lentjes GmbH	81,015	53,236	29,082	(18,826)	(17,969)
Doosan Power Systems S.A.	1,233,367	884,382	2,334	(57,629)	(57,629)
Doosan Babcock Energy Polska Sp z.o.o.	19,294	9,396	35,501	687	682
Doosan Babcock Energy Germany GmbH	25,795	24,248	19,721	(3,039)	(3,039)

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Subsidiary	Assets	Liabilities	Sales	Net income (loss)	Total comprehens- ive income (loss)
Doosan Power Systems (Scotland) Ltd. Partnership	31,326	1,723	-	1,749	1,749
Doosan Babcock General Maintenance Services LLC	26,448	42,074	28,917	(5,489)	(6,256)
Doosan Cuvex Co., Ltd.	215,456	102,572	37,672	(1,002)	149
DBC Co., Ltd.	262,805	-	-	(195)	(195)
Doosan Infracore Co., Ltd.	5,053,901	3,707,435	2,651,329	60,472	81,968
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 Customization Center Europe B.V.	84,556	84,663	186,954	(693)	(756)
Doosan Bobcat Co., Ltd. and subsidiaries	6,183,837	2,756,294	4,068,260	273,758	552,356
Doosan Engineering & Construction Co., Ltd.	2,809,829	1,862,656	1,475,260	(185,632)	(185,963)
Doosan Heavy Industries Vietnam Haiphong Co., Ltd	44,536	10,837	57,762	6,376	6,376
PINETREE City 1st Co., Ltd.	60,664	60,673	2,525	1	1
DM BEST 2nd Co., Ltd.	137,199	137,199	5,323	-	-
DM BEST 3rd Co., Ltd.	110,012	110,012	4,377	-	-
DM BEST 4th Co., Ltd.	100,011	100,011	4,074	-	-
GMS 1st Co., Ltd.	5,279	5,285	-	(6)	(6)
GMS 2nd Co., Ltd.	10,237	10,255	-	(18)	(18)
Doosan E&C 2nd Co., Ltd.	355	350	1,072	137	137
Doosan E&C 3rd Co., Ltd.	93,465	93,463	4,333	548	548
Valueworks Co., Ltd.	207,554	1,830	2,843	1,193	1,193
Doosan Engine Co., Ltd.	1,238,012	682,047	761,832	(14,160)	4,920
Doosan Marine Industry(Dalian) Co., Ltd	20,813	12,019	8,964	(788)	(788)
Doosan Engine PNG Co., Ltd.	459	6,393	8,019	1,818	1,818
Oricom Inc.	148,698	81,947	100,266	2,709	3,388
Hancomm Inc.	67,187	51,957	67,971	2,243	2,275
Doosan Mecatec Co., Ltd.	329,194	131,318	189,946	(1,399)	(928)
Dootamall Co., Ltd.	716,789	471,244	62,942	23,342	23,401
DIP Holdings Co., Ltd.	374,732	326	2,000	8,895	8,895
Doosan Industrial Vehicle America Corp.	66,907	39,368	151,135	1,012	1,012
Doosan Industrial Vehicle U.K. Ltd.	76,560	74,724	38,703	1,899	1,899
Doosan Industrial Vehicle Europe N.A.	37,213	22,724	79,687	183	183

Subsidiary	Assets	Liabilities	Sales	Net income (loss)	Total comprehensive income (loss)
Doosan Industrial Vehicle Yantai Co., Ltd.	42,327	32,188	48,631	1,285	1,285
Rushlift Ltd.	90,240	74,617	52,956	1,656	1,656
Doosan Bears, Inc.	60,935	52,144	55,636	5,928	6,544
Doosan Mottrol (Jiangyin) Co., Ltd.	71,441	48,846	154,887	6,401	6,401
Doosan Electro-Materials (Changshu) Co., Ltd.	119,447	104,252	186,233	13,613	13,613
Doosan Electro-Materials Luxembourg Sarl	57,679	24,725	-	7,747	7,747
Doosan Fuel Cell America, Inc.	257,698	209,485	241,054	571	571
Circuit Foil Luxembourg Sarl	143,407	55,639	141,136	13,013	14,129
Neo Plux Co., Ltd.	63,495	6,126	19,129	2,862	(2,785)

1.2.4 Summarized cash flows information of main subsidiaries for the year ended December 31, 2017, is as follows (Korean won in millions):

	DHC and subsidiaries	DI and subsidiaries	DEC and subsidiaries	DE and subsidiaries
Cash flows from operating activities	₩ (159,049)	₩ 665,691	₩ 55,254	₩ (69,385)
Cash flows from investing activities	(478,154)	(256,289)	(42,297)	12,651
Cash flows from financing activities	838,496	32,267	18,348	56,612
Effect of exchange rate changes on cash and cash equivalents	(38,946)	(36,766)	(368)	(463)
Net increase(decrease) in cash and cash equivalent	162,347	404,903	30,937	(585)
Cash and cash equivalents as at January 1	681,257	538,578	79,889	72,821
Cash and cash equivalents as at December 31	843,604	943,481	110,826	72,236

Above financial information of intermediate controlling company is based on consolidated financial information. However, financial information of DHC and its subsidiaries exclude financial information of DI, DEC, DE and their subsidiaries, respectively.

1.2.5 The ownership interests held by non-controlling interests and details of financial position, financial performance and dividends attributable to non-controlling interests by each of the major subsidiaries material to the Group, are as follows (Korean won in millions):

	<u>DHC and subsidiaries</u>	<u>DI and subsidiaries</u>	<u>DEC and subsidiaries</u>	<u>DE and subsidiaries</u>
Ownership interest held by non-controlling interests	62.2%	86.3%	69.9%	83.9%
Cumulative non-controlling interests	1,513,524	2,619,839	555,644	410,587
Net income (loss) vested in non-controlling interests	(120,271)	246,245	(92,414)	(29,289)
Dividends paid to non-controlling interests (*1)	(51,995)	(39,503)	-	-

(*1) Oricom Inc., in addition to the above subsidiaries, paid dividends of ₩844 million vested in non-controlling interests.

Above financial information of intermediate controlling company is based on consolidated financial information. However, financial information of DHC and its subsidiaries exclude financial information of DI, DEC, DE and their subsidiaries, respectively.

2. Summary of significant accounting policies

The Group maintains its official accounting records in Korean won and prepares the consolidated financial statements in conformity with KIFRS, in the Korean language (Hangul).

2.1 Basis of preparation

The consolidated financial statements have been prepared in accordance with Korean International Financial Reporting Standards ("KIFRS"), as prescribed in the *Act on External Audit of Stock Companies* in the Republic of Korea.

The significant accounting policies, under KIFRS 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 revalued amount or fair values at the end of each reporting period. Historical cost is generally based on the fair value of the consideration given in exchange for assets.

2.1.1 Amendments to KIFRS and new interpretations that are mandatorily effective for the current year

The Group apply amendments to KIFRS effective as at January 1, 2017. The nature and the impact of each new standard amendment are described below:

Amendments to KIFRS 1007 *Statement of Cash Flows: Disclosure Initiative*

The amendments require entities to provide disclosure of changes in their liabilities arising from financing activities.

Amendments to KIFRS 1012 *Income Taxes: Recognition of Deferred Tax Assets for Unrealised Losses*

The amendments are: 1) temporary differences arise when the book amount of a fixed rate financial instrument measured at fair value decreases but the tax basis price remains at cost, regardless of the expected recovery method, such as sale or use; 2) future taxable income for the purpose of reviewing the realization of the temporary difference to be deducted can be estimated as an amount exceeding the book amount of the asset; and 3) when examining whether future taxable income is sufficient, we should compare future taxable income before deducting temporary differences and deductible effects of deductible temporary differences.

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Amendments to KIFRS 1112 *Disclosure of Interests in Other Entities*

The amendments clarify that the disclosure requirements in KIFRS 1112, other than those in paragraphs B10–B16, apply to an entity's interest in a subsidiary, a joint venture or an associate (or a portion of its interest in a joint venture or an associate) that is classified (or included in a disposal group that is classified) as held for sale.

2.1.2 New and revised K-IFRS in issue but not yet effective

The standards and interpretations that are issued, but not yet effective, up to the date of issuance of the Group's financial statements are disclosed below.

KIFRS 1109 *Financial Instruments*

In September 2015, the KASB adopted the new standard, KIFRS 1109 *Financial Instruments*, which replaces KIFRS 1039 *Financial Instruments: Recognition and Measurement*. KIFRS 1109 brings together all three aspects of the accounting for financial instruments project: classification and measurement, impairment and hedge accounting. KIFRS 1109 is effective for annual periods beginning on or after January 1, 2018, with early application permitted. Except for hedge accounting, retrospective application is required but providing comparative information is not compulsory. For hedge accounting, the requirements are generally applied prospectively, with some limited exceptions.

The effective implementation of the standard will likely require analyses on financial effects, establishment of accounting policies, development of an accounting system, and stabilization of the system. The effect on the financial statements for the first-time adoption of the standard may differ depending on the selection and judgment of accounting policies in accordance with the standard, as well as the Group's financial instruments and economic conditions during the period.

Based on the available information as at December 31, 2017, the Group has analyzed the impact on the 2017 financial statements to assess financial impact of adopting KIFRS 1109. This assessment is based on currently available information and may be subject to changes arising from further reasonable and supportable information being made available to the Group in 2018 when the Group will adopt KIFRS 1109. The Group expects no significant impact on its statement of financial position and equity except for the effect of applying the classification requirements of KIFRS 1109.

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

KIFRS 1109 *Financial Instruments* (cont'd)

(1) Classification and measurement of financial assets

KIFRS 1109 requires financial instruments to be classified as financial instruments subsequently measured at amortized cost, fair value through other comprehensive income (FVOCI), or fair value through profit or loss (FVTPL), on the basis of the holder's business model and instrument's contractual cash flow characteristics as shown below. Hybrid contracts with hosts that are assets, are classified in their entirety instead of bifurcating the embedded derivatives.

Objective of the business model	Characteristics of contractual cash flows	
	Composed solely of principal and interest	Others
Collecting contractual cash flows	Subsequently measured at amortized cost ^(*1)	FVTPL ^(*2)
Collecting contractual cash flows and selling	FVOCI ^(*1)	
Selling or other purposes	FVTPL	

(*1) An entity may irrevocably designate a financial asset as measured at FVTPL if doing so eliminates or reduces an accounting mismatch.

(*2) An entity may make an irrevocable election to present in other comprehensive income changes in the fair value of an investment in an equity instrument that is not held for trading.

The Group holds ₩6,915,749 million of loans and receivables and ₩281,380 million of financial assets available for sale as at December 31, 2017.

(2) Classification and measurement of financial liabilities

Under KIFRS 1109, changes in the fair value of a financial liability designated as measured at FVTPL that arise from changes in the liability's credit risk are presented in other comprehensive income, instead of profit or loss. The changes in the liability's credit risk are recognized in profit or loss if the changes create or enlarge an accounting mismatch had it been presented in other comprehensive income.

The Group owns debt investment carries at amortized cost of ₩17,412,301 million as at December 31, 2017.

(3) Impairment: financial assets and contract assets

Under KIFRS 1039, impairment losses are recognized when there is objective evidence of impairment based on the incurred loss model. However, under KIFRS 1109, impairment losses are recognized on debt instruments, lease receivables, contract assets, loan commitment, and financial guarantee contracts that were accounted for at amortized cost, or FVOCI, based on the expected credit loss (ECL) impairment model.

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

KIFRS 1109 *Financial Instruments* (cont'd)

KIFRS 1109 outlines a three-stage model for 12-month expected credit losses, or lifetime expected credit losses based on changes in credit risk since initial recognition of financial assets. As a result, credit losses can be recognized earlier than the current KIFRS 1039.

Classification (*1)		Loss allowance
Stage 1	Credit risk on a financial instrument has not increased significantly since initial recognition. (*2)	12-month ECL: Expected credit losses that result from default events on a financial instrument that are possible within 12 months after the reporting date
Stage 2	Credit risk on a financial instrument has increased significantly since initial recognition.	Lifetime ECL: Expected credit losses that result from all possible default events over the expected life of a financial instrument
Stage 3	Credit-impaired	

(*1) For trade receivables or contract assets that arise from transactions within the scope of KIFRS 1115 *Revenue from Contracts with Customers* and that do not contain a significant financing component, loss allowance is measured at an amount equal to lifetime expected credit losses. If the trade receivables or contract assets contain a significant financial component, a policy election may be made such that the loss allowance is measured at an amount equal to lifetime expected credit losses. Also, for lease receivables, a policy election may be made such that the loss allowance is measured at an amount equal to lifetime expected credit losses.

(*2) Low credit risk at the reporting date may be deemed as no significant increase in credit risk.

Under KIFRS 1109, the cumulative changes in lifetime expected credit losses since initial recognition are recognised as loss allowance for a financial asset that is considered credit-impaired at initial recognition.

The Group holds loans and receivables measured at amortized cost and loss allowance for these assets is ₩2,485,085 million as at December 31, 2017.

(4) Hedge accounting

KIFRS 1109 applies mechanics of hedge accounting (fair value hedge accounting, cash flow hedge, foreign entities net investment hedge) specified in the current KIFRS 1039; however, the Group changed from the complex and rule-based hedge accounting requirements of KIFRS 1039 to the principle-based approach which focuses on the risk management activities. Requirements for application of hedge accounting are relaxed by enlarging items designated as hedges and hedging instruments, evaluating the high risk avoidance effects, and eliminating the quantitative criteria (80 ~ 125%).

Based on the transitional provisions, the Group may elect to continue to apply the requirements of hedge accounting under KIFRS 1039 upon initial application of KIFRS 1109.

The Group has applied hedge accounting and recognized ₩37,353 million as other comprehensive loss related to cash flow hedges.

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

KIFRS 1115 *Revenue from Contracts with Customers*

The amended standard KIFRS 1115 *Revenue from Contracts with Customers*, which was enacted on November 6, 2015, is effective for annual periods beginning on or after January 1, 2018, with early application permitted. The new standard will supersede the following KIFRS: KIFRS 1011 *Construction Contracts*, KIFRS 1018 *Revenue*, KIFRS 2113 *Customer Loyalty Programmes*, KIFRS 2115 *Agreements for the Construction of Real Estate*, KIFRS 2118 *Transfers of Assets from Customers*, and KIFRS 2031 *Revenue-Barter Transactions Involving Advertising Services*.

The Group will apply the standard for the annual period beginning on or after January 1, 2018 to the extent that the cumulative effect of the first application of this standard is reflected in the retained earnings (or, if appropriate, other capital element), and will only retrospectively apply the standard to contracts that are not completed on the initial application date in accordance with the applicable rules.

The current KIFRS 1018 provides the criteria for the recognition of revenue relating to: sale of goods, rendering of services, interest, royalties, dividends and construction contracts; however, under the new KIFRS 1115, revenue is recognized by applying a five-stage revenue recognition model (① Identify a contract with a customer → ② Identify the separate performance obligations in the contract → ③ Determine the transaction price → ④ Allocate the transaction price to the separate performance obligations in the contract → ⑤ Recognize revenue when the entity satisfies a performance obligation) to its all contracts with customers

For the purpose of adopting KIFRS 1115, the financial accounting department of the Group has selected the representative contracts for each type of sales until the end of 2017 through the collaboration with external accounting experts. The financial impact and preliminary analysis based on the adoption of KIFRS 1115 has been carried out and detailed analysis of all the contracts has been made to reveal the major differences due to the changes in the main standards. The results of the analysis were as follows.

(1) Identification of separate performance obligations

The Group is engaged in the construction of power generation facilities, industrial facilities, construction machinery, engines, main forging and general construction business.

In applying KIFRS 1115, the Group is required to identify performance obligations that are differentiated in its contract with customers, so that performance obligations as revenue recognition units can be further distinguished or combined. The timing of revenue recognition of the Group may vary depending on whether each identified performance obligation is fulfilled at one time or over a period of time.

In applying KIFRS 1115, different performance obligation is identified if customer benefits from goods or service or customer benefits from goods or service with other resources that are readily available and promise to customer to transfer goods or service is separately identified from another promise within a contract. Also, with regards to the performance obligation, individual selling price is estimated based on the purpose of allocation and transaction prices are allocated thereafter if transaction price is allocated based on the individual selling price or selling price cannot be individually observable.

The Group will identify (1) EPC contract and (2) O&M engagement as separate performance obligation in an integrated contract and estimate individual selling price for each performance obligation, allocate transaction price and recognize revenue. In addition, the Group will recognize the warranty of which the Group has the option to purchase, transportation included in the trade receivables and insurance provisions as separate performance obligations, and allocate transaction price and recognize the revenue.

As a result of the preliminary impact assessment, the adoption of KIFRS 1115 is not expected to have a material impact on the Group's financial statements.

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

(2) Performance obligation satisfied over a period of time

The development and industrial sectors of the Group are engaged in the production and sales of power generation equipment ordered by the customer. The Group considers the contract to be a construction contract, estimates the progress according to the input method, and recognizes revenue according to the progress.

According to KIFRS 1115, control over goods or service is deemed to be transferred over a period of time and revenue can be recognized based on the percentage-of-completion to the extent that an entity holds right to charge the payment which may enforce the fulfillment of the performance obligation up to date and the entity does not generate assets to replace the performance obligation performed.

The Group has determined that it is necessary to recognize revenue by applying the progress as a result of reviewing the possibility of replacement and the right to charge payment for each contract. The adoption of KIFRS 1115 is not expected to have a material effect on the financial statements.

(3) Percentage-of-completion measurement using input method

The development sector of the Group will enter into a plant construction contract including purchasing, manufacturing and installation of power generation related equipment such as boilers and turbines, and will generally proceed for a long period of time.

According to KIFRS 1115, the method of recognizing the revenue as the cost of goods used to perform the obligation thoroughly presents the entity's progress of performance if goods are not distinguished at the commencement of contract, it is likely that the customer will significantly control the goods before the goods or service are provided, costs of goods to be transferred are significant compared to the total costs of performing the obligation, and the entity procures goods from the third party but does not significantly participate in the design and production of those goods.

As a result of the analysis of the projected cost for each contract, the adoption of KIFRS 1115 did not have a material impact on the financial statements.

(4) Variable consideration

Under KIFRS 1115, the Group uses the expected value method to estimate the variable consideration which better predicts the amount of variable consideration to which the Group will be entitled. When the refund period is over, the Group will recognize revenue by including the variable consideration in the transaction price to the extent it is highly likely that a significant portion of recognized cumulative revenue will not be reversed. The Group accounts for the consideration received or receivable to which it will not be entitled as refund liability.

(5) Allocation of transaction price

In applying KIFRS 1115, the Group allocates transaction prices based on the relative individual selling prices for the different performance obligations identified in one contract. The Group will use 'the adjusted market assessment approach' to estimate the individual selling price of each performance obligation and will use 'the expected cost plus a margin approach', which exceptionally predicts the anticipated costs and adds the appropriate profits for some transactions.

As a result of the transaction price allocation, the Group did not expect to have a material impact on its financial statements as a result of the adoption of KIFRS 1115.

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

Amendments to KIFRS 1110 and KIFRS 1028: *Sale or Contribution of Assets between an Investor and its Associate or Joint Venture*

The amendments address the conflict between KIFRS 1110 and KIFRS 1028 in dealing with the loss of control of a subsidiary that is sold or contributed to an associate or joint venture. The amendments clarify that the gain or loss resulting from the sale or contribution of assets that constitute a business, as defined in KIFRS 1103, between an investor and its associate or joint venture, is recognized in full. Any gain or loss resulting from the sale or contribution of assets that do not constitute a business, however, is recognized only to the extent of unrelated investors' interests in the associate or joint venture. The KASB has deferred the effective date of these amendments indefinitely, but an entity that early adopts the amendments must apply them prospectively.

KIFRS 1102 *Classification and Measurement of Share-based Payment Transactions*

The KASB issued amendments to KIFRS 1102 *Share-based Payment* that address three main areas: the effects of vesting conditions on the measurement of a cash-settled share-based payment transaction; the classification of a share-based payment transaction with net settlement features for withholding tax obligations; and accounting where a modification to the terms and conditions of a share-based payment transaction changes its classification from cash settled to equity settled. On adoption, entities are required to apply the amendments without restating prior periods, but retrospective application is permitted if elected for all three amendments and other criteria are met. The amendments are effective for annual periods beginning on or after January 1, 2018, with early application permitted.

KIFRS 1116 *Leases*

KIFRS 1116 *Leases* replaces KIFRS 1017 *Leases*, KIFRS 2104 *Determining Whether an Arrangement Contains a Lease*, KIFRS 2015 *Operating Leases-Incentives* and KIFRS 2027 *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*. KIFRS 1116 sets out the principles for the recognition, measurement, presentation and disclosure of leases and requires lessees to account for all leases under a single on-balance sheet model similar to the accounting for finance leases under KIFRS 1017. The standard includes two recognition exemptions for lessees – leases of low-value assets (e.g., personal computers) and short-term leases (i.e., leases with a lease term of 12 months or less). At the commencement date of a lease, a lessee will recognise a liability to make lease payments (i.e., the lease liability) and an asset representing the right to use the underlying asset during the lease term (i.e., the right-of-use asset). Lessees will be required to separately recognise the interest expense on the lease liability and the depreciation expense on the right-of-use asset.

Lessees will be also required to remeasure the lease liability upon the occurrence of certain events (e.g., a change in the lease term, a change in future lease payments resulting from a change in an index or rate used to determine those payments). The lessee will generally recognise the amount of the remeasurement of the lease liability as an adjustment to the right-of-use asset. Lessor accounting under KIFRS 1116 is not significantly changed from today's accounting under KIFRS 1017. Lessors will continue to classify all leases using the same classification principle as in KIFRS 1017 and distinguish between two types of leases: operating and finance leases.

KIFRS 1116 also requires lessees and lessors to make more extensive disclosures than under KIFRS 1017.

KIFRS 1116 is effective for annual periods beginning on or after January 1, 2019. Early application is permitted, but not before an entity applies KIFRS 1115. A lessee can choose to apply the standard using either the full retrospective approach or the cumulative catch-up transition method. The standard's transition provisions permit certain reliefs.

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

Amendments to KIFRS 1040 *Transfers of Investment Property*

The amendments clarify when an entity should transfer property, including property under construction or development into, or out of investment property. The amendments state that a change in use occurs when the property meets, or ceases to meet, the definition of investment property and there is evidence of the change in use. Entities should apply the amendments prospectively to changes in use that occur on or after the beginning of the annual reporting period in which the entity first applies the amendments. An entity should reassess the classification of property held at that date and, if applicable, reclassify property to reflect the conditions that exist at that date. Retrospective application in accordance with KIFRS 1008 is only permitted if it is possible without the use of hindsight. These amendments are effective for annual periods beginning on or after January 1, 2018, with early application permitted.

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KIFRS 1101 *First-time Adoption of International Financial Reporting Standards - Deletion of short-term exemption for first-time adopters*

Short-term exemptions in paragraphs E3–E7 of KIFRS 1101 were deleted. The amendment is effective from January 1, 2018.

KIFRS 1028 *Investments in Associates and Joint Ventures - Clarification that measuring investees at fair value through profit or loss is an investment-by-investment choice*

The amendments clarify that:

- An entity that is a venture capital organisation, or other qualifying entity, may elect, at initial recognition on an investment-by-investment basis, to measure its investments in associates and joint ventures at fair value through profit or loss.
- If an entity, that is not itself an investment entity, has an interest in an associate or joint venture that is an investment entity, the entity may, when applying the equity method, elect to retain the fair value measurement applied by that investment entity associate or joint venture to the investment entity associate's or joint venture's interests in subsidiaries. This election is made separately for each investment entity associate or joint venture, at the later of the date on which: (a) the investment entity associate or joint venture is initially recognised; (b) the associate or joint venture becomes an investment entity; and (c) the investment entity associate or joint venture first becomes a parent.

The amendments should be applied retrospectively and are effective from January 1, 2018, with earlier application permitted. If an entity applies those amendments for an earlier period, it must disclose that fact.

KIFRS 2122 *Foreign Currency Transactions and Advance Consideration*

The Interpretation clarifies that, in determining the spot exchange rate to use on initial recognition of the related asset, expense or income (or part of it) on the derecognition of a non-monetary asset or non-monetary liability relating to advance consideration, the date of the transaction is the date on which an entity initially recognises the non-monetary asset or non-monetary liability arising from the advance consideration. If there are multiple payments or receipts in advance, then the entity must determine the transaction date for each payment or receipt of advance consideration. Entities may apply the amendments on a fully retrospective basis. Alternatively, an entity may apply the Interpretation prospectively to all assets, expenses and income in its scope that are initially recognised on or after:

2.1.2 New and revised KIFRS in issue but not yet effective (cont'd)

- (i) The beginning of the reporting period in which the entity first applies the interpretation, or
- (ii) The beginning of a prior reporting period presented as comparative information in the financial statements of the reporting period in which the entity first applies the interpretation.

The impact of the interpretation on the consolidated financial statements of the Group is not material.

2.2 Basis of consolidation

The consolidated financial statements comprise the financial statements of the Company and its subsidiaries as at December 31, 2017. Control is achieved when the Group is exposed, or has rights, to variable returns from its involvement with the investee and has the ability to affect those returns through its power over the investee. Specifically, the Group controls an investee if, and only if, the Group has:

- Power over the investee (i.e. existing rights that give it the current ability to direct the relevant activities of the investee)
- Exposure, or rights, to variable returns from its involvement with the investee
- The ability to use its power over the investee to affect its returns

When the Group has less than a majority of the voting or similar rights of an investee, the Group considers all relevant facts and circumstances in assessing whether it has power over an investee, including:

- The contractual arrangement between investors and other vote holders
- Rights arising from other contractual arrangements
- The Group's voting rights and potential voting rights

The Group re-assesses whether or not it controls an investee if facts and circumstances indicate that there are changes to one or more of the three elements of control. Consolidation of a subsidiary begins when the Group obtains control over the subsidiary and ceases when the Group loses control of the subsidiary. Assets, liabilities, income and expenses of a subsidiary acquired or disposed of during the year are included in the consolidated statement of comprehensive income from the date the Group gains control until the date the Group ceases to control the subsidiary.

Profit or loss and each component of other comprehensive income (OCI) are attributed to the equity holders of the parent of the Group and to the non-controlling interests, even if this results in the non-controlling interests having a deficit balance. When necessary, adjustments are made to the financial statements of subsidiaries to bring their accounting policies into line with the Group's accounting policies. All intra-group assets and liabilities, equity, income, expenses and cash flows relating to transactions between members of the Group are eliminated in full on consolidation.

A change in the ownership interest of a subsidiary, without a loss of control, is accounted for as an equity transaction.

If the Group loses control over a subsidiary, it derecognizes the related assets (including goodwill), liabilities, non-controlling interest and other components of equity while any resultant gain or loss is recognized in profit or loss. Any investment is recognized at fair value.

2.3 Business combinations

Acquisitions of businesses are accounted for using the acquisition method. The consideration transferred in a business combination is measured at fair value, which is calculated as the sum of the fair values of the assets transferred by the Group, liabilities incurred by the Group to the former owners of the acquiree and the equity interests issued by the Group in exchange for control of the acquiree. Acquisition-related costs are generally recognized in profit or loss as incurred.

At the acquisition date, the identifiable assets acquired and the liabilities assumed are recognized at their fair value at the acquisition date, except that:

- Deferred tax assets or liabilities and liabilities or assets related to employee benefit arrangements are recognized and measured in accordance with KIFRS 1012, *Income Taxes*, and KIFRS 1019, *Employee Benefits*, respectively.
- Liabilities or equity instruments related to share-based payment arrangements of the acquiree or share-based payment arrangements of the acquiree are measured in accordance with KIFRS 1102 at the acquisition date.
- Assets (or disposal groups) that are classified as held for sale in accordance with KIFRS 1105, *Non-current Assets Held for Sale and Discontinued Operations*, are measured in accordance with that standard.

Goodwill is measured as the excess of the sum of a) the consideration transferred, b) the amount of any non-controlling interests in the acquiree and c) the fair value of the acquirer's previously held equity interest in the acquiree (if any) over the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed. If, after reassessment, the net of the acquisition-date amounts of the identifiable assets acquired and liabilities assumed exceeds the sum of a) the consideration transferred, b) the amount of any non-controlling interests in the acquiree and c) the fair value of the acquirer's previously held interest in the acquiree (if any), the excess is recognized immediately in profit or loss as a bargain purchase gain.

Non-controlling interests that are present ownership interests and entitle their holders to a proportionate share of the entity's net assets in the event of liquidation may be initially measured either at fair value or at the non-controlling interests' proportionate share of the recognized amounts of the acquiree's identifiable net assets. The choice of measurement basis is made on a transaction-by-transaction basis. Other types of non-controlling interests are measured at fair value or, when applicable, on the basis specified in another KIFRS.

When the consideration transferred by the Group in a business combination includes assets or liabilities resulting from a contingent consideration arrangement, the contingent consideration is measured at its acquisition-date fair value and included as part of the consideration transferred in a business combination. Changes in the fair value of the contingent consideration that qualify as measurement period adjustments are adjusted retrospectively, with corresponding adjustments against goodwill. Measurement period adjustments are adjustments that arise from additional information obtained during the 'measurement period' (which cannot exceed one year from the acquisition date) about facts and circumstances that existed at the acquisition date.

The subsequent accounting for changes in the fair value of the contingent consideration that do not qualify as measurement period adjustments depends on how the contingent consideration is classified. Contingent consideration that is classified as equity is not remeasured at subsequent reporting dates and its subsequent settlement is accounted for within equity. Contingent consideration that is classified as an asset or a liability is remeasured at subsequent reporting dates in accordance with KIFRS 1039 or KIFRS 1037, *Provisions, Contingent Liabilities and Contingent Assets*, as appropriate, with the corresponding gain or loss being recognized in profit or loss.

When a business combination is achieved in stages, the Group's previously held equity interest in the acquiree is remeasured to fair value at the acquisition date and the resulting gain or loss, if any, is recognized in profit or loss. Amounts arising from interests in the acquiree prior to the acquisition date that have previously been recognized in other comprehensive income are reclassified to profit or loss where such treatment would be appropriate if that interest were disposed of.

If the initial accounting for a business combination is incomplete by the end of the reporting period in which the combination occurs, the Group reports provisional amounts for the items for which the accounting is incomplete. Those provisional amounts are adjusted during the measurement period (see above), or additional assets or liabilities are recognized, to reflect new information obtained about facts and circumstances that existed at the acquisition date that, if known, would have affected the amounts recognized at that date.

2.4 Investment in associates and joint ventures

An associate is an entity over which the Group has significant influence. Significant influence is the power to participate in the financial and operating policy decisions of the investee, but is not control or joint control over those policies.

A joint venture is a joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint arrangement. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control.

The results and assets and liabilities of associates or joint ventures are incorporated in these consolidated financial statements using the equity method of accounting, except when the investment is classified as held for sale, in which case it is accounted for in accordance with KIFRS 1105. Under the equity method, an investment in an associate or a joint venture is initially recognized in the consolidated statements of financial position at cost and adjusted thereafter to recognize the Group's share of the profit or loss and other comprehensive income of the associate or joint venture. When the Group's share of losses of an associate or a joint venture exceeds the Group's interest in that associate or joint venture (which includes any long-term interests that, in substance, form part of the Group's net investment in the associate or joint venture), the Group discontinues recognizing its share of further losses. Additional losses are recognized only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate or joint venture.

Any excess of the cost of acquisition over the Group's share of the net fair value of the identifiable assets, liabilities and contingent liabilities of an associate or a joint venture recognized at the date of acquisition is recognized as goodwill, which is included within the book amount of the investment. Any excess of the Group's share of the net fair value of the identifiable assets, liabilities and contingent liabilities over the cost of acquisition, after reassessment, is recognized immediately in profit or loss.

Upon disposal of an associate or a joint venture that results in the Group losing significant influence over that associate or joint venture, any retained investment is measured at fair value at that date and the fair value is regarded as its fair value on initial recognition as a financial asset in accordance with KIFRS 1039. The difference between the previous book amount of the associate or joint venture attributable to the retained interest and its fair value is included in the determination of the gain or loss on disposal of the associate or joint venture. In addition, the Group accounts for all amounts previously recognized in other comprehensive income in relation to that associate or joint venture on the same basis the Group would be required if that associate or joint venture had directly disposed of the related assets or liabilities. Therefore, if a gain or loss previously recognized in other comprehensive income by that associate or joint venture would be reclassified to profit or loss on the disposal of the related assets or liabilities, the Group reclassifies the gain or loss from equity to profit or loss (as reclassification adjustment) when it loses significant influence over that associate or joint venture.

When the Group reduces its ownership interest in an associate or a joint venture but continues to use the equity method, the Group reclassifies the proportion of the gain or loss that had previously been recognized in other comprehensive income to profit or loss relating to that reduction in ownership interest if that gain or loss would be reclassified to profit or loss on the disposal of the related assets or liabilities. In addition, the Group applies KIFRS 1105 to a portion of investment in an associate or a joint venture that meets the criteria to be classified as held for sale.

The requirements of KIFRS 1039 are applied to determine whether it is necessary to recognize any impairment loss with respect to the Group's investment in an associate or a joint venture. When necessary, the entire book amount of the investment (including goodwill) is tested for impairment in accordance with KIFRS 1036 by comparing its recoverable amount (higher of value in use and fair value, less costs to sell) with its book amount, and any impairment loss recognized forms part of the book amount of the investment. Any reversal of that impairment loss is recognized in accordance with KIFRS 1036 to the extent that the recoverable amount of the investment subsequently increases.

The Group continues to use the equity method when an investment in an associate becomes an investment in a joint venture or an investment in a joint venture becomes an investment in an associate. There is no remeasurement to fair value upon such changes in ownership interests.

When a group entity transacts with an associate or a joint venture of the Group, profits and losses resulting from the transactions with the associate or joint venture are recognized in the Group's consolidated financial statements only to the extent of interests in the associate or joint venture that are not related to the Group.

2.5 Interests in joint operations

A joint operation is a joint arrangement whereby the parties that have joint control of the arrangement have rights to the assets, and obligations for the liabilities, relating to the arrangement. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control.

When a group entity undertakes its activities under joint operations, the Group as a joint operator recognizes in relation to its interest in a joint operation:

- its assets, Including its share of any assets held jointly
- its liabilities, Including its shares of any liabilities incurred jointly
- its revenue from the sale of its share of the output arising from the joint operation
- its share of the revenue from the sale of the output by the joint operation
- its expenses, Including its share of any expenses incurred jointly

The Group accounts for the assets, liabilities, revenues and expenses relating to its interest in a joint operation in accordance with the KIFRS applicable to the particular assets, liabilities, revenues and expenses.

When a group entity transacts with a joint operation in which a group entity is a joint operator (such as a sale or contribution of assets), the Group is considered to be conducting the transaction with the other parties to the joint operation, and gains and losses resulting from the transactions are recognized in the Group's consolidated financial statements only to the extent of other parties' interests in the joint operation.

When a group entity transacts with a joint operation in which a group entity is a joint operator (such as a purchase of assets), the Group does not recognize its share of the gains and losses until it resells those assets to a third party.

2.6 Goodwill

Goodwill arising on an acquisition of a business is carried at cost as established at the date of acquisition of the business less accumulated impairment losses, if any.

For the purpose of impairment testing, goodwill is allocated to each of the Group's CGUs (or groups of CGUs) that is expected to benefit from the synergies of the combination.

A CGU to which goodwill has been allocated is tested for impairment annually, or more frequently when there is indication that the unit may be impaired. If the recoverable amount of the CGU is less than its book amount, the impairment loss is allocated first to reduce the book amount of any goodwill allocated to the unit and then to the other assets of the unit on a pro rata basis based on the book amount of each asset in the unit. Any impairment loss for goodwill is recognized directly in profit or loss. An impairment loss recognized for goodwill is not reversed in subsequent periods.

On disposal of the relevant CGU, the attributable amount of goodwill is included in the determination of the profit or loss on disposal. The Group's policy for goodwill arising on the acquisition of an associate is described in Note 2.4.

2.7 Non-current assets held for sale

Non-current assets and disposal groups are classified as held for sale if their book amount will be recovered principally through a sale transaction rather than through continuing use. This condition is regarded as met only when the sale is highly probable and the non-current asset (or disposal group) is available for immediate sale in its present condition. Management must be committed to the sale, which should be expected to qualify for recognition as a completed sale within one year from the date of classification.

When the Group is committed to a sale plan involving loss of control of a subsidiary, all of the assets and liabilities of that subsidiary are classified as held for sale when the criteria described above are met, regardless of whether the Group will retain a non-controlling interest in its former subsidiary after the sale.

When the Group is committed to a sale plan involving disposal of an investment, or a portion of an investment, in an associate or joint venture, the investment or the portion of the investment that will be disposed of is classified as held for sale when the criteria described above are met, and the Group discontinues the use of the equity method in relation to the portion that is classified as held for sale. Any retained portion of an investment in an associate or a joint venture that has not been classified as held for sale continues to be accounted for using the equity method. The Group discontinues the use of the equity method at the time of disposal when the disposal results in the Group losing significant influence over the associate or joint venture.

After the disposal takes place, the Group accounts for any retained interest in the associate or joint venture in accordance with KIFRS 1039, unless the retained interest continues to be an associate or a joint venture, in which case the Group uses the equity method.

Non-current assets (and disposal groups) classified as held for sale are measured at the lower of their previous book amount and fair value, less costs to sell.

2.8 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.

2.8.1 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.

2.8.2 Rendering of services

Revenue from a contract to provide services is recognized by reference to the stage of completion of the contract. Depending on the nature of the transaction, the Group determines the stage of completion by reference to surveys of work performed, services performed to date as a percentage of total services to be performed or the proportion that costs incurred to date bear to the estimated total costs of the transaction, as applicable.

2.8.3 Dividend income and interest income

Dividend income from investments is recognized when the shareholders' right to receive payment has been established.

Interest income is accrued on a timely basis, by reference to the principal outstanding and at the effective interest rate applicable, which is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset to that asset's net book amount on initial recognition.

2.8.4 Rental income

The Group's policy for recognition of revenue from operating leases is described in Note 2.10.

2.9 Construction contract

Where the outcome of a construction contract can be estimated reliably, revenue and costs are recognized by reference to the stage of completion of the contract activity at the end of the reporting period, measured based on the proportion of contract costs incurred for work performed to date relative to the estimated total contract costs, except where this would not be representative of the stage of completion. Variations in contract work, claims and incentive payments are included to the extent that the amount can be measured reliably and its receipt is considered probable.

Where the outcome of a construction contract cannot be estimated reliably, contract revenue is recognized to the extent of contract costs incurred that it is probable will be recoverable. Contract costs are recognized as expenses in the period in which they are incurred.

When it is probable that total contract costs will exceed total contract revenue, the expected loss is recognized as an expense immediately.

When contract costs incurred to date plus recognized profits less recognized losses exceed progress billing, the surplus is shown as amounts due from customers for contract work. For contracts where progress billings exceed contract costs incurred to date plus recognized profits less recognized losses, the surplus is shown as the amounts due to customers for contract work. Amounts received before the related work is performed are included in the consolidated statements of financial position, as a liability, as advances received. Amounts billed for work performed but not yet paid by the customer are included in the consolidated statements of financial position under trade and other receivables.

2.10 Lease

Leases are classified as finance leases whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee. All other leases are classified as operating leases.

2.10.1 The Group as lessor

Amounts due from lessees under finance leases are recognized as receivables at the amount of the Group's net investment in the leases. Finance lease income is allocated to accounting periods, so as to reflect a constant periodic rate of return on the Group's net investment outstanding in respect to the leases.

Rental income from operating leases is recognized on a straight-line basis over the term of the relevant lease. Initial direct costs incurred in negotiating and arranging an operating lease are added to the book amount of the leased asset and recognized on a straight-line basis over the lease term.

2.10.2 The Group as lessee

Assets held under finance leases are initially recognized as assets of the Group at their fair value at the inception of the lease or, if lower, at the present value of the minimum lease payments. The corresponding liability to the lessor is included in the consolidated statements of financial position as a finance lease obligation.

Lease payments are apportioned between finance expenses and reduction of the lease obligation so as to achieve a constant rate of interest on the remaining balance of the liability. Finance expenses are recognized immediately in profit or loss, unless they are directly attributable to qualifying assets, in which case they are capitalized in accordance with the Group's general policy on borrowing costs (see Note 2.12). Contingent rentals are recognized as expenses in the periods in which they are incurred.

Operating lease payments are recognized as an expense on a straight-line basis over the lease term, except where another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed. Contingent rentals arising under operating leases are recognized as an expense in the period in which they are incurred.

2.11 Foreign currencies

The individual financial statements of each group entity are presented in the currency of the primary economic environment in which the entity operates (its functional currency). For the purpose of the consolidated financial statements, the results and financial position of each group entity are expressed in Korean won, which is the functional currency of the entity and the presentation currency for the consolidated financial statements.

In preparing the financial statements of the individual entities, transactions in currencies other than the entity's functional currency (foreign currencies) are recognized at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Non-monetary items carried at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Non-monetary items that are measured in terms of historical cost in a foreign currency are not retranslated.

Exchange differences are recognized in profit or loss in the period in which they arise, except for:

- Exchange differences on foreign currency borrowings relating to assets under construction for future productive use, which are included in the cost of those assets when they are regarded as an adjustment to interest costs on those foreign currency borrowings
- Exchange differences on transactions entered into in order to hedge certain foreign currency risks (see Note 2.25 below for hedging accounting policies)
- Exchange differences on monetary items receivable from or payable to a foreign operation for which settlement is neither planned nor likely to occur (therefore, forming part of the net investment in the foreign operation), which are recognized initially in other comprehensive income and reclassified from equity to profit or loss on disposal or partial disposal of the net investment.

For the purpose of presenting consolidated financial statements, the assets and liabilities of the Group's foreign operations are expressed in Korean won using exchange rates prevailing at the end of the reporting period. Income and expense items are translated at the average exchange rates for the period, unless exchange rates fluctuated significantly during that period, in which case the exchange rates at the dates of the transactions are used. Exchange differences arising, if any, are recognized in other comprehensive income and accumulated in

2.11 Foreign currencies (cont'd)

equity (attributed to non-controlling interests as appropriate).

On the disposal of a foreign operation (i.e., a disposal of the Group's entire interest in a foreign operation or a disposal involving loss of control over a subsidiary that includes a foreign operation or partial disposal of an interest in a joint arrangement or an associate that includes a foreign operation of which the retained interest becomes a financial asset), all of the accumulated exchange differences in respect to that operation attributable to the owners of the Company are reclassified to profit or loss. Any exchange differences that have previously been attributed to non-controlling interests are derecognized, but they are not reclassified to profit or loss.

In the case of a partial disposal (i.e., no loss of control) of a subsidiary that includes a foreign operation, the proportionate share of accumulated exchange differences are reattributed to non-controlling interests in equity and are not recognized in profit or loss. For all other partial disposals (i.e., partial disposals of associates or joint arrangements that do not result in the Group losing significant influence or joint control), the proportionate share of the accumulated exchange differences is reclassified to profit or loss.

Goodwill and fair value adjustments arising on the acquisition of a foreign operation are treated as assets and liabilities of the foreign operation and translated at the closing rate. Exchange differences arising are recognized in other comprehensive income.

2.12 Borrowing costs

Borrowing costs directly attributable to the acquisition, construction or production of qualifying assets, which are assets that necessarily take a substantial period of time to get ready for their intended use or sale, are added to the cost of those assets, until such time as the assets are substantially ready for their intended use or sale.

Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying assets is deducted from the borrowing costs eligible for capitalization.

All other borrowing costs are recognized in profit or loss in the period in which they are incurred.

2.13 Post-employment benefit costs and termination benefits

The Group operates a defined benefit pension plan. For post-employment benefit obligation, the cost of providing benefits is determined using the projected unit credit method, with actuarial valuations being carried out at the end of each reporting period. Remeasurement, comprising actuarial gains and losses, the effect of the changes to the asset ceiling (if applicable) and the return on plan assets (excluding interest), is reflected immediately in the consolidated statements of financial position with a charge or credit recognized in other comprehensive income for the period in which they occur. Remeasurement recognized in other comprehensive income is reflected immediately in retained earnings and will not be reclassified to profit or loss. Past service cost is recognized in profit or loss for the period of a plan amendment. Net interest is calculated by applying the discount rate at the beginning of the period to the net defined benefit liability or asset. Defined benefit costs are composed of service cost (including current service cost, past service cost, as well as gains and losses on curtailments and settlements), net interest expense (income) and remeasurement.

The Group presents the service cost and net interest expense (income) components in profit or loss, and the remeasurement component in other comprehensive income. Curtailment gains and losses are accounted for as past service costs.

The post-employment benefit obligation recognized in the consolidated statements of financial position represents the actual deficit or surplus in the Group's defined benefit plans. Any surplus resulting from this calculation is limited to the present value of any economic benefits available in the form of refunds from the plans or reductions in future contributions to the plans.

A liability for a termination benefit is recognized at the earlier of when the entity can no longer withdraw the offer of the termination benefit and when the entity recognizes any related restructuring costs.

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

2.14 Share-based payment arrangements

Equity-settled share-based payments to employees are measured at the fair value of the equity instruments at the grant date.

The fair value determined at the grant date of the equity-settled share-based payments is expensed on a straight-line basis over the vesting period, based on the Group's estimate of equity instruments that will eventually vest. At the end of each reporting period, the Group revises its estimate of the number of equity instruments expected to vest. The impact of the revision of the original estimates, if any, is recognized in profit or loss such that the cumulative expense reflects the revised estimate, with a corresponding adjustment in other component of equity.

2.15 Current and deferred tax

Income tax expense represents the sum of the tax currently payable and deferred tax.

2.15.1 Current tax

The tax currently payable is based on taxable profit for the period. Taxable profit differs from profit as reported in the consolidated statement of profit or loss and comprehensive income because of items of income or expense that are taxable or deductible in other years and items that are never taxable or deductible. 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.

2.15.2 Deferred tax

Deferred tax is recognized on temporary differences between the book amounts of assets and liabilities in the consolidated financial statements and the corresponding tax bases used in the computation of taxable profit. Deferred tax liabilities are generally recognized for all taxable temporary differences. Deferred tax assets are generally recognized for all deductible temporary differences to the extent that it is probable that taxable profits will be available against which those deductible temporary differences can be utilized. Such deferred tax assets and liabilities are not recognized if the temporary difference arises from goodwill or from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the taxable profit nor the accounting profit.

Deferred tax liabilities are recognized for taxable temporary differences associated with investments in subsidiaries and associates, and interests in joint ventures, 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 profits against which to utilize the benefits of the temporary differences and they are expected to reverse in the foreseeable future.

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

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 realized, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Group expects, at the end of the reporting period, to recover or settle the book amount of its assets and liabilities.

Deferred tax assets and liabilities are offset if, and only if, the Group has a legally enforceable right to set off current tax assets against current tax liabilities, and the deferred tax assets and liabilities relate to income taxes levied by the same taxation authority on either the same taxable entity or different taxable entities, which intend either to settle current tax liabilities and assets on a net basis, or to realize the assets and settle the liabilities simultaneously, in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered.

For the purpose of measuring deferred tax liabilities and deferred tax assets for investment properties that are measured using the fair value model, the book amounts of such properties are presumed to be recovered entirely through sale, unless the presumption is rebutted. The presumption is rebutted when the investment property is depreciable and is held within a business model, whose objective is to consume substantially all of the economic benefits embodied in the investment properties over time, rather than through sale.

2.15.3 Current and deferred taxes for the year

Current tax and deferred tax are recognized in profit or loss, except when they relate to items that are recognized in other comprehensive income or directly in equity, in which case, the current tax and deferred tax are also recognized in other comprehensive income or directly in equity, respectively. Where current tax or deferred tax arises from the initial accounting for a business combination, the tax effect is included in the accounting for the business combination.

2.16 Government grants

Government grants are not recognized until there is reasonable assurance that the Group will comply with the conditions attaching to them and that the grants will be received.

The benefit of a government loan at a below-market rate of interest is treated as a government grant, measured as the difference between proceeds received and the fair value of the loan based on prevailing market interest rates.

Government grants related to assets are presented in the consolidated statements of financial position by deducting the grant from the book amount of the asset. The related grant is recognized in profit or loss over the life of a depreciable asset as a reduced depreciation expense.

Government grants related to income are recognized in profit or loss on a systematic basis over the periods in which the Group recognizes as expenses the related costs for which the grants are intended to compensate. Government grants that are receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to the Group with no future-related costs are recognized in profit or loss in the period in which they become receivable.

2.17 Property, plant and equipment

Property, plant and equipment are initially stated at cost and subsequently recorded at cost, less accumulated depreciation, and accumulated impairment losses, except for land, which is recorded using revaluation model. The cost of an item of property, plant and equipment is directly attributable to their purchase or construction, which includes any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. It also includes the initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located.

Subsequent costs are recognized in book amount of an asset or 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. Routine maintenance and repairs are expensed as incurred.

The Group does not depreciate land. Depreciation expense is computed using the straight-line method, based on the estimated useful lives of the assets as follows:

	<u>Estimated useful lives (in years)</u>
Buildings	4-50
Structures	2-40
Machinery	2-20
Others	2-20

If each part of an item of property, plant and equipment has a cost that is significant in relation to the total cost of the item, then 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.

An item of property, plant and equipment is derecognized upon disposal or when no future economic benefits are expected to arise from the continued use of the asset. Any gain or loss arising on derecognition of the property (calculated as the difference between the net disposal proceeds and the book amount of the asset) is included in profit or loss for the period in which the property is derecognized.

2.18 Investment properties

Investment properties are properties held to earn rentals and/or for capital appreciation (including property under construction for such purposes). Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, investment properties are stated at fair value, with any gains or losses arising on fair value fluctuation recognized in profit or loss.

Subsequent costs are recognized in book amount of an asset or 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. Routine maintenance and repairs are expensed as incurred.

An investment property is derecognized upon disposal or when the investment property is permanently withdrawn from use and no future economic benefits are expected from the disposal. Any gain or loss arising on derecognition of the property (calculated as the difference between the net disposal proceeds and the book amount of the asset) is included in profit or loss for the period in which the property is derecognized.

2.19 Intangible assets

2.19.1 Intangible assets acquired separately

Intangible assets with finite useful lives that are acquired separately are carried at cost, less accumulated amortization and accumulated impairment losses. Amortization is recognized on a straight-line basis over their estimated useful lives. The estimated useful life and amortization method are reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for on a prospective basis. Intangible assets with indefinite useful lives that are acquired separately are carried at cost, less accumulated impairment losses.

2.19.2 Internally generated intangible assets - research and development expenditure

Expenditure on research activities is recognized as an expense in the period in which it is incurred.

Expenditure arising from development (or from the development phase of an internal project) is recognized as an intangible asset if, and only if, the development project is designed to produce new or substantially improved products, and the Group can demonstrate the technical and economic feasibility and measure reliably the resources attributable to the intangible asset during its development.

Subsequent to initial recognition, internally generated intangible assets are reported at cost, less accumulated amortization and accumulated impairment losses, on the same basis as intangible assets that are acquired separately.

2.19.3 Intangible assets acquired in a business combination

Intangible assets that are acquired in a business combination and recognized separately from goodwill and are initially recognized at their fair value at the acquisition date. Subsequent to initial recognition, intangible assets acquired in a business combination are reported at cost, less accumulated amortization and accumulated impairment losses, on the same basis as intangible assets that are acquired separately.

2.19.4 Derecognition of intangible assets

An intangible asset is derecognized on disposal, or when no future economic benefits are expected from its use. Gains or losses arising from derecognition of an intangible asset, measured as the difference between the net disposal proceeds and the book amount of the asset, are recognized in profit or loss when the asset is derecognized.

2.19.5 Amortization of intangible assets

Intangible assets (membership) with indefinite useful lives are not amortized. Intangible assets other than not amortized intangible assets are using the straight-line method, based on the estimated useful lives of the assets as follows:

	<u>Estimated useful lives (in years)</u>
Development costs	4-12
Industrial rights	5-10
Other intangible assets	2-20

2.20 Impairment of tangible and intangible assets other than goodwill

At the end of each reporting period, the Group reviews the book amounts of its tangible and intangible assets other than goodwill to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). When it is not possible to estimate the recoverable amount of an individual asset, the Group estimates the recoverable amount of the CGU to which the asset belongs.

Memberships with indefinite useful lives and intangible assets not yet available for use are tested for impairment at least annually, and whenever there is an indication that the asset may be impaired.

Recoverable amount is the higher of fair value, less costs to sell and value in use. If the recoverable amount of an asset (or a CGU) is estimated to be less than its book amount, the book amount of the asset (or the CGU) is reduced to its recoverable amount and the reduced amount is recognized in profit or loss.

When an impairment loss subsequently reverses, the book amount of the asset (or a CGU) is increased to the revised estimate of its recoverable amount, but so that the increased book amount does not exceed the book amount that would have been determined had no impairment loss been recognized for the asset (or the CGU) in prior years. A reversal of an impairment loss is recognized immediately in profit or loss.

2.21 Inventories

Inventories are stated at the lower of cost and net realizable value. Cost of inventories is measured under the total average cost method and consist of the purchase price, cost of conversion and other costs incurred in bringing the inventories to their present location and condition. Net realizable value represents the estimated selling price for inventories, less all estimated costs of completion and costs necessary to make the sale.

When inventories are sold, the book amount of those inventories is recognized as an expense (cost of sales) in the period in which the related revenue is recognized. The amount of any write-down of inventories to net realizable value and all losses of inventories is recognized as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories, arising from an increase in net realizable value, is recognized as a reduction in the amount of inventories recognized as an expense in the period in which the reversal occurs.

2.22 Provisions

Provisions are recognized when the Group has a present obligation (legal or constructive) as a result of a past event, it is probable that the Group will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation.

The amount recognized as a provision is the best estimate of the consideration required to settle the present obligation at the end of the reporting period, taking into account the risks and uncertainties surrounding the obligation. When a provision is measured using the cash flows estimated to settle the present obligation, its book amount is the present value of those cash flows (where the effect of the time value of money is material). The discount rate used is a pretax rate that reflects current market assessments of the time value of money and the risks specific to the liability. Where discounting is used, the increase in the provision due to the passage of time is recognized in profit or loss as finance cost.

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.

At the end of each reporting period, the remaining provision balance is reviewed and assessed to determine if the current best estimate is being recognized. If the existence of an obligation to transfer economic benefit is no longer probable, the related provision is reversed during the period.

2.23 Financial instruments

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

Financial assets are classified into the following specified categories: 'financial assets at FVTPL', 'held-to-maturity investments', 'available-for-sale ("AFS") financial assets' and 'loans and receivables'. The classification depends on the nature and purpose of the financial assets, and is determined at the time of initial recognition.

2.23.1 Effective interest method

The effective interest method is a method of calculating the amortized cost of a debt instrument and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the debt instrument, or, where appropriate, a shorter period, to the net book amount on initial recognition.

Interest income is recognized on an effective interest basis for debt instruments other than those financial assets classified as at FVTPL.

2.23.2 Financial assets at FVTPL

FVTPL includes financial assets classified as held for trading and financial assets designated at FVTPL upon initial recognition. A financial asset is classified as FVTPL if it has been acquired principally for the purpose of selling or repurchasing it in the near term. All derivative assets, except for derivatives that are designated and effective hedging instruments, are classified as held-for-trading financial assets. Financial assets at FVTPL are stated at fair value, with any gains or losses arising on remeasurement recognized in profit or loss.

2.23.3 Held-to-maturity investments

Non-derivative financial assets with fixed or determinable payments and fixed maturity dates that the Group has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are measured at amortized cost using the effective interest method, less any impairment, with revenue recognized on an effective-yield basis.

2.23.4 AFS financial assets

AFS financial assets are non-derivatives that are either designated as AFS or are not classified as (a) loans and receivables, (b) held-to-maturity investments or (c) financial assets at FVTPL.

They are subsequently measured at fair value at the end of each reporting period. Changes in the book amount of AFS monetary financial assets are recognized in profit or loss. Other changes in the book amount of AFS financial assets are recognized in other comprehensive income (as investments revaluation reserve). When the investment is disposed of, or is determined to be impaired, the cumulative gain or loss previously accumulated in other comprehensive income is reclassified to profit or loss.

Dividends on AFS equity instruments are recognized in profit or loss when the Group's right to receive the dividends is established.

AFS equity investments that do not have a quoted market price in an active market and whose fair value cannot be reliably measured and derivatives that are linked to and must be settled by delivery of such unquoted equity investments are measured at cost, less any identified impairment losses at the end of each reporting period.

2.23.5 Loans and receivables

No-derivative financial assets that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables.' Loans and receivables are measured at amortized cost using the effective interest method, less any impairment. Interest income is recognized by applying the effective interest rate, except for short-term receivables when the effect of discounting is immaterial.

2.23.6 Impairment of financial assets

Financial assets, other than those at FVTPL, are assessed for indicators of impairment at the end of each reporting period. Financial assets are considered to be impaired when there is objective evidence that more events occurred after the initial recognition of the financial asset and the estimated future cash flows of the investment have been affected.

For AFS equity investments, a significant or prolonged decline in the fair value of the security below its cost is considered to be objective evidence of impairment.

For certain categories of financial asset, such as trade receivables, assets that are assessed not to be impaired individually are, in addition, assessed for impairment on a collective basis. Objective evidence of impairment for a portfolio of receivables could include the Group's past experience of collecting payments, an increase in the number of delayed payments in the portfolio past the average credit period, as well as observable changes in national or local economic conditions that correlate with default on receivables.

For financial assets carried at amortized cost, the amount of the impairment loss recognized is the difference between the asset's book amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest rate.

For financial assets that are carried at cost, the amount of the impairment loss recognized is the difference between the asset's book amount and the present value of estimated future cash flows, discounted at the current market rate of return for a similar financial asset. Such impairment loss will not be reversed in subsequent periods.

2.23.6 Impairment of financial assets (cont'd)

When an AFS financial asset is considered to be impaired, cumulative gains or losses previously recognized in other comprehensive income are reclassified to profit or loss for the period.

For financial assets measured at amortized cost, 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 through profit or loss to the extent that the book amount of the investment at the date the impairment is reversed does not exceed what the amortized cost would have been had the impairment not been recognized.

In respect to AFS equity securities, impairment losses previously recognized in profit or loss are not reversed through profit or loss. Any increase in fair value subsequent to an impairment loss is recognized in other comprehensive income. In respect to AFS debt securities, impairment losses are subsequently reversed through profit or loss if an increase in the fair value of the investment can be objectively related to an event occurring after the recognition of the impairment loss.

2.23.7 Derecognition of financial assets

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. If the Group neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, the Group recognizes its retained interest in the asset and an associated liability for amounts it may have to pay. If the Group retains substantially all the risks and rewards of ownership of a transferred financial asset, the Group continues to recognize the financial asset and also recognizes a collateralized borrowing for the proceeds received.

On derecognition of a financial asset in its entirety, the difference between the asset's book amount and the sum of the consideration received and receivable, and the cumulated gain or loss that had been recognized in other comprehensive income and accumulated in equity is recognized in profit or loss.

On derecognition of a financial assets other than in its entirety (e.g., when the Group retains an option to repurchase part of a transferred asset, or it retains a residual interest, and such an retained interest indicates that the transferor has neither transferred nor retained substantially all the risks and rewards of ownership and has retained control of the transferred asset), the Group allocates the previous book amount of the financial asset between the part it continues to recognize under continuing involvement and the part it no longer recognizes on the basis of the relative fair value of those parts on the date of the transfer.

2.24 Financial liabilities and equity instruments

2.24.1 Classification as debt or equity

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

2.24.2 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.

Repurchase of the Group's own equity instruments is recognized and deducted directly in equity. No gain or loss is recognized in profit or loss on the purchase, sale, issue or cancellation of the Group's own equity instruments.

2.24.3 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 arrangements and the definitions of a financial liability and equity instrument. Conversion option that will be settled by the exchange of a fixed amount of cash or another financial asset for a fixed number of the Group's own equity instruments is an equity instrument.

At the date of issue, the fair value of the liability component is estimated using the prevailing market interest rate for a similar non-convertible instrument. This amount is recorded as a liability on an amortized cost basis using the effective interest method until extinguished upon conversion or at the instrument's maturity date.

The conversion option classified as equity 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. In addition, the conversion option classified as equity will remain in equity until the conversion option is exercised, in which case, the balance recognized in equity will be transferred to share premium. No gain or loss is recognized in profit or loss upon conversion or expiration of the conversion option.

2.24.4 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 deducted from the fair value of the financial liabilities on initial recognition. Transaction costs directly attributable to acquisition of financial liabilities at FVTPL are recognized immediately in profit or loss.

Financial liabilities are classified as either financial liabilities at FVTPL or other financial liabilities.

2.24.5 Financial liabilities at FVTPL

Financial liabilities are classified as financial liabilities at FVTPL when the financial liability is either held for trading or it is designated as financial liabilities at FVTPL.

Financial liabilities at FVTPL are stated at fair value, with any gains or losses 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 and is included in the 'Other non-operating income and expenses' line item in the consolidated statement of profit or loss.

2.24.6 Other financial liabilities

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

2.24.7 Financial guarantee contracts

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

Financial guarantee contract liabilities are initially measured at their fair values and, if not designated as financial liabilities at FVTPL, are subsequently measured at the higher of:

- the amount of the obligation under the contract, as determined in accordance with KIFRS 1037 *Provisions, Contingent Liabilities and Contingent Assets* and
- the amount initially recognized, less cumulative amortization recognized in accordance with the KIFRS 1018 *Revenue*

2.24.8 Derecognition of financial liabilities

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

2.25 Derivative financial instruments

The Group enters into a variety of derivative financial instruments to manage its exposure to interest rate and foreign exchange rate risk, including foreign exchange forward contracts, interest rate swaps and cross currency swaps.

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 recognized in profit or loss immediately, unless the derivative is designated and effective as a hedging instrument, in such case, the timing of the recognition in profit or loss depends on the nature of the hedge relationship.

A derivative with a positive fair value is recognized as a financial asset; a derivative with a negative fair value is recognized as a financial liability. A derivative is presented as a non-current asset or a non-current liability, if the remaining maturity of the instrument is more than 12 months and it is not expected to be realized or settled within 12 months. Other derivatives are presented as current assets or current liabilities.

2.25.1 Embedded derivatives

Derivatives embedded in non-derivative host contracts are treated as separate derivatives when they meet the definition of a derivative, their risks and characteristics are closely related to those of the host contracts and the contracts are not measured at FVTPL.

2.25.2 Hedge accounting

The Group designates certain hedging instruments, which include derivatives, embedded derivatives and non-derivatives in respect to foreign currency risk, as either fair value hedges, cash flow hedges or hedges of net investments in foreign operations.

At the inception of the hedge relationship, the Group documents the relationship between the hedging instrument and the hedged item, along with its risk management objectives and its strategy for undertaking various hedge transactions. Furthermore, at the inception of the hedge and on an ongoing basis, the Group documents whether the hedging instrument is highly effective in offsetting changes in fair values or cash flows of the hedged item.

2.25.3 Fair value hedges

Changes in the fair value of derivatives that are designated and qualify as fair value hedges are recognized in profit or loss immediately, together with any changes in the fair value of the hedged asset or liability that are attributable to the hedged risk. The change in the fair value of the hedging instrument and the change in the hedged item attributable to the hedged risk are recognized in the line of consolidated statement of profit or loss as 'financial income and expenses'.

Hedge accounting is discontinued when the Group revokes the hedging relationship, when the hedging instrument expires or is sold, terminated or exercised, or when it no longer qualifies for hedge accounting. The fair value adjustment to the book amount of the hedged item arising from the hedged risk is amortized to profit or loss from that date.

2.25.4 Cash flow hedges

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, and is included in the 'finance income and expenses' line item.

Amounts previously recognized in other comprehensive income and accumulated in equity are reclassified to profit or loss in the periods when the hedged item is recognized in profit or loss, in the same line of the consolidated statements of comprehensive income as the recognized hedged item. Reclassified amounts are recognized in the consolidated statement of profit or loss as related to the hedged items.

Hedge accounting is discontinued when the Group revokes the hedging relationship, when the hedging instrument expires or is sold, terminated or exercised, or it no longer qualifies for hedge accounting. Any gain or loss accumulated in equity at that time remains in equity, and is recognized when the forecast transaction is ultimately recognized in profit or loss. When a forecast transaction is no longer expected to occur, the gain or loss accumulated in equity is recognized immediately in profit or loss.

2.26 Fair value

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, regardless of whether that price is directly observable or estimated using another valuation technique. In estimating the fair value of an asset or a liability, the Group takes into account the characteristics of the asset or liability if market participants would take those characteristics into account when pricing the asset or liability at the measurement date. Fair value for measurement and/or disclosure purposes in these consolidated financial statements is determined on such a basis, except for share-based payment transactions that are within the scope of KIFRS 1102, *Share-based Payment*, leasing transactions that are within the scope of KIFRS 1017, *Leases*, and measurements that have some similarities to fair value but are not fair value, such as net realizable value in KIFRS 1002, *Inventories*, or value in use in KIFRS 1036, *Impairment of Assets*.

In addition, for financial reporting purposes, fair value measurements are categorized into Levels 1, 2 or 3 based on the degree to which the inputs to the fair value measurements are observable and the significance of the inputs to the fair value measurement in their entirety, which are described in Note 10.

2.27 Approval of consolidated financial statements

The consolidated financial statements of the Group were approved by the Board of Directors on March 5, 2018 and will be finalized at the annual general meeting of shareholders on March 30, 2018.

3. Significant accounting judgements and key sources of estimation uncertainties

In the application of the Group's accounting policies, which are described in Note 2, management is required to make judgments, estimates and assumptions about the book amounts of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimate is revised if the revision affects only that period or in the period of the revision and future periods if the revision affects both current and future periods.

3.1 Revenue recognition

Revenue from a construction contracts and service is recognized by reference to the stage of completion of the contract. The stage of completion of the contract is determined as reasonable estimation and is subject to change as related factors change.

3.2 Impairment of goodwill

Determining whether goodwill is impaired requires an estimation of the recoverable amount of the CGUs to which goodwill has been allocated. The recoverable amount calculation requires the directors to estimate the future cash flows expected to arise from the CGU and a suitable discount rate in order to calculate the present value.

3.3 Defined benefit obligation

The Group's defined benefit obligation is determined based on the actuarial valuation carried out at the end of each annual reporting period. Actuarial assumptions are the Group's best estimates of the variables, such as discount rates, rates of expected future salary increases and mortality rates.

3.4 Provisions

Provisions for the expected cost of warranty obligations are recognized at the best estimate of the expenditure required to settle the Group's current and future obligations. Provisions are determined by the estimate based on past experience.

3.5 Revaluation model on land and fair value model on investment properties

As stated in Note 12 and Note 14, the Group uses evaluation technique, including inputs that are not based on observable market data to assess revalued amount of land classified as property, plant and equipment and fair value of investment property. The Group's management believes that the evaluation technique and assumptions that are used for valuation on land and investment in real properties are fair.

3.6 Deferred tax

Recognition and measurement of deferred tax assets and liabilities require the management's judgment, in particular, whether to recognize if the scope of deferred tax assets is affected by management's judgment and assumption in the future.

3.7 Estimated useful lives of property, plant, equipment and intangible assets

Useful lives for depreciation and amortization are determined by the management's judgment.

3. Significant accounting judgements and key sources of estimation uncertainties (cont'd)

3.8 Determination of consolidation scope

As at December 31, 2017, the Parent Company holds 37.8% of the voting rights of Doosan Heavy Industries & Construction and Doosan Heavy Industries & Construction holds 36.3% and 42.7% of the voting rights of Doosan Infracore and Doosan Engine respectively. Most of the remaining stakes are held by small shareholders of less than 1%. Management of the Group has assessed whether the Group controls the above entities in accordance with the principles of control and presentation as set out in first adoption date of IAS 1110 (January 1, 2013) and at the end of each subsequent reporting period. The executives of Group concluded that they have control over the absolute size of the voting rights of the Group and the relative size of other shareholding voting rights and the degree of shareholding of other voting rights holders.

4. Financial risk management

The Group is exposed to various financial risks, such as market (foreign currency risk and interest rate risk), credit and liquidity related to the operations of the Group. The purpose of risk management policy is to minimize potential risks, which could have an adverse effect on financial performance.

Financial risk management activities are performed by Treasury and International Finance department, in accordance with the aforementioned documented risk management policies. In addition, the Group enters into derivative contracts to hedge against certain risks.

4.1 Market risk

4.1.1 Foreign currency risk

The Group's exposure to the risk of changes in foreign exchange rates relates primary to the Group's international operating activities. The Group's objectives of foreign currency risk management is to minimize uncertainty and volatility arising from fluctuations in foreign currency. Foreign currency risk is managed in accordance with to the Group's policy on foreign currency, and currency trading for speculative purpose is prohibited.

The Groups 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 exposure.

The book amount of the Group's monetary assets and liabilities denominated in foreign currencies, which represents the maximum exposure to foreign currency risk as at December 31, 2017 and 2016, is as follows (Korean won in millions):

		December 31, 2017					
		USD	EUR	JPY	GBP	Others (*1)	Total
Assets	₩	2,162,023	₩ 395,406	₩ 14,819	₩ 218,794	₩ 441,445	₩ 3,232,487
Liabilities		2,528,463	614,422	78,340	184,674	34,488	3,440,387
	₩	(366,440)	₩ (219,016)	₩ (63,521)	₩ 34,120	₩ 406,957	₩ (207,900)

		December 31, 2016					
		USD	EUR	JPY	GBP	Others (*1)	Total
Assets	₩	2,195,408	₩ 281,560	₩ 8,413	₩ 85,847	₩ 587,833	₩ 3,159,061
Liabilities		3,417,238	565,568	66,640	47,198	161,700	4,258,344
	₩	(1,221,830)	₩ (284,008)	₩ (58,227)	₩ 38,649	₩ 426,133	₩ (1,099,283)

(*1) Others are assets and liabilities denominated in foreign currencies other than USD, EUR, JPY and GBP.

Net gain (loss) on foreign currency translation in profit or loss for the years ended December 31, 2017 and 2016, is ₩ 148,611 million and ₩ (55,732) million, respectively.

4. Financial risk management (cont'd)

The table below summarizes the impact of increases/decreases of currency exchange rates on profit before income tax expense for the period. The analysis is based on the assumption that the currency exchange rates has increased/decreased by 10% with all other variables held constant (Korean won in millions).

	Impact on profit (loss) before income tax expense	
	2017	2016
10% Increase	₩ (20,790)	₩ (109,928)
10% Decrease	20,790	109,928

The above sensitivity analysis is based on monetary assets and liabilities denominated in foreign currencies other than the Group's functional currency as at December 31, 2017 and 2016.

4.1.2 Interest rate risk

The Group's interest rate risk is related to borrowings and bank deposits with floating interest rates, and 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. The purpose of interest rate risk management is to minimize uncertainty and financial expense arising from interest rate fluctuation.

To manage its interest rate risk, the Group minimizes external borrowings using internal funds and reduces borrowings with high interest rates and maintains an appropriate balance between borrowings with floating interest rate and fixed-interest rate and short-term and long-term borrowings. The Group manages its interest rate risk preemptively through regular monitoring and adjustments to the changing domestic and overseas markets conditions and nature of its interest rates.

The book amount of the Group's financial assets and liabilities with floating interest rates exposed to interest rate risk as at December 31, 2017 and 2016, is as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Financial assets	₩ 546,293	₩ 714,887
Financial liabilities	(3,562,407)	(5,194,486)
	₩ (3,016,114)	₩ (4,479,599)

The table below summarizes the impact of increases/decreases of interest rates on profit before income tax expense. The analysis is based on the assumption that the interest rates has increased/decreased by 100 basis point with all other variables held constant (Korean won in millions):

	Impact on profit(loss) before income tax expense	
	2017	2016
Increase	₩ (30,161)	₩ (44,796)
Decrease	30,161	44,796

4. Financial risk management (cont'd)

4.1.3 Price risk

The Group is exposed to equity price risks arising from its listed equity investments among AFS equity investments. The Group periodically measures the risk as 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 Board of Directors.

4.2 Credit risk

The credit risk refers to risk of financial losses to the Group when the counterparty defaults on the obligations of the contract. The credit risk arises from AFS financial assets, which are not equity securities, deposits in financial institution, financial derivatives and guarantee limit as well as from the Group's normal transaction and investing activity. To manage credit risk, the Group evaluates the creditworthiness of each customer or counterparty considering the financial status, past experience and other factors. The Group establishes credit limit for each customer and counterparty.

The Group evaluates the creditworthiness using open financial information and information provided by credit rating institution when the Group contracts with new customers. The Group decides credit transaction limit and is provided with collateral and guarantee based on evaluation.

Also, the Group revaluates customers' creditworthiness periodically, reassesses credit transaction limit and readjusts level of collateral. The Group reports the present condition of delayed collection and collection measures periodically to financial assets, which has delayed collection and takes measures by causes of delay.

The book amount of the Group's financial assets and liabilities, which represents the maximum exposure to credit risk as at December 31, 2017 and 2016, is as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Loans and receivables:		
Cash and cash equivalents	₩ 2,344,600	₩ 2,019,319
Financial instruments	314,926	248,931
Trade and other receivables	3,884,358	3,973,014
Guarantee deposits provided	371,865	330,565
Held-to-maturity financial assets	24,388	6,215
AFS financial assets (excluding equity securities)	81,232	225,664
Derivative assets	132,035	105,855
	<u>₩ 7,153,404</u>	<u>₩ 6,909,563</u>

Apart from the above financial assets, the maximum exposure to credit risk of financial guarantee contract is the maximum amount to be paid if the guarantee will be charged (see Note 33).

4. Financial risk management (cont'd)

The aging analysis of trade and other receivables as at December 31, 2017 and 2016, is as follows (Korean won in millions):

December 31, 2017							
	Individually assessed receivables	Receivables assessed for impairment on a collective basis					Total
		Within due	Less than 3 months	3–6 months	6–12 months	More than 12 months	
Trade receivables	₩ 2,316,715	₩ 1,234,182	₩ 90,599	₩ 19,237	₩ 12,170	₩ 58,707	₩ 3,731,610
Other receivables and loans	2,351,459	91,134	23,626	3,961	3,451	39,447	2,513,078
Accrued income	134,264	4,449	-	-	-	-	138,713
	<u>₩ 4,802,438</u>	<u>₩ 1,329,765</u>	<u>₩ 114,225</u>	<u>₩ 23,198</u>	<u>₩ 15,621</u>	<u>₩ 98,154</u>	<u>₩ 6,383,401</u>
December 31, 2016							
	Individually assessed receivables	Receivables assessed for impairment on a collective basis					Total
		Within due	Less than 3 months	3–6 months	6–12 months	More than 12 months	
Trade receivables	₩ 2,530,577	₩ 1,010,905	₩ 153,118	₩ 22,406	₩ 41,216	₩ 219,643	₩ 3,977,865
Other receivables and loans	2,200,029	64,932	27,490	15,813	2,070	66,462	2,376,796
Accrued income	120,407	28,602	-	-	-	-	149,009
	<u>₩ 4,851,013</u>	<u>₩ 1,104,439</u>	<u>₩ 180,608</u>	<u>₩ 38,219</u>	<u>₩ 43,286</u>	<u>₩ 286,105</u>	<u>₩ 6,503,670</u>

The Group has recognized the provision for impairment of ₩2,485,085 million for the above trade and other receivables as at December 31, 2017 (2016: ₩ 2,515,818 million).

Provision for impaired trade receivables is recognized by applying appropriate allowance rate for receivables that are assessed to be impaired individually due to insolvency, bankruptcy and others.

A group of financial assets that is not individually significant but have similar credit risk characteristics is assessed for impairment on a collective basis. Provision for impaired trade receivables is recognized based on aging analysis and the Group's past experience of receivables collection.

AFS financial assets, held-to-maturity financial assets, deposits in financial institutions and derivative instruments are individually assessed to be impaired.

4. Financial risk management (cont'd)

4.3 Liquidity risk

Liquidity risk is the risk that the Group is unable to meet its payment obligations arising from financial liabilities as they fall due.

The Group regularly establishes funding plan in order to manage liquidity risk. Ongoing analysis and review on the budget and actual cash outflow to correspond maturity structure of financial assets and financial liabilities have been made.

Maturity analysis of financial liabilities except for derivatives as at December 31, 2017 and 2016, is as follows (Korean won in millions):

December 31, 2017						
Nominal cash flows according to contract						
	Book amount	Total	Less than 1 year	1–2 years	2–5 years	More than 5 years
Financial liabilities	₩ 17,412,301	₩ 17,569,447	₩ 11,684,559	₩ 2,176,853	₩ 2,399,047	₩ 1,308,988
Interest on financial liabilities	-	805,089	336,544	152,187	239,833	76,525
	₩ 17,412,301	₩ 18,374,536	₩ 12,021,103	₩ 2,329,040	₩ 2,638,880	₩ 1,385,513

December 31, 2016						
Nominal cash flows according to contract						
	Book amount	Total	Less than 1 year	1–2 years	2–5 years	More than 5 years
Financial liabilities	₩ 16,759,000	₩ 16,827,121	₩ 11,257,242	₩ 2,620,500	₩ 2,905,120	₩ 44,259
Interest on financial liabilities	-	664,113	310,421	174,731	177,990	971
	₩ 16,759,000	₩ 17,491,234	₩ 11,567,663	₩ 2,795,231	₩ 3,083,110	₩ 45,230

The above-mentioned maturity analysis is based on undiscounted cash flow according to the contract, which is different from non-derivative liabilities in the consolidated statements of financial position. Apart from the above non-derivative liabilities, as at December 31, 2017, financial guarantee contract liabilities of the Group are explained in Note 33.

4.4 Capital risk

The Group performs capital risk management to maintain its ability to continuously provide profits to shareholders and parties in interest, and to maintain optimum capital structure to reduce capital expenses.

Consistent with others in the industry, the Group monitors capital on the basis of debt-to-equity ratio. Debt-to-equity ratio calculated as total liabilities divided by equity is used as an index to manage the Group's capital similar to overall industry practice.

Debt-to-equity ratios as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Total liabilities	₩ 21,165,604	₩ 20,763,947
Total equity	7,603,418	7,900,858
Debt-to-equity ratio	278.37%	262.81%

5 Restricted financial assets

Details of restricted financial assets as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016	Description
Cash and cash equivalent	₩ 14,132	₩ 10,335	Collateral for advance payments and others
Short-term financial instruments	130,876	166,121	Government R&D(*1), establish the right of pledge and advances from construction contracts(*2), shared growth fund, collaterals for borrowings and others
Long-term financial instruments	594	2,310	Bank transaction deposits, establish the right of pledge and others
Guarantee deposits provided	69,754	22,020	Reserves for repayments related to asset backed loans
	<u>₩ 215,356</u>	<u>₩ 200,786</u>	

(*1) It can be used only for the purpose for implementing the national policy research and development specific issues.

(*2) It can be used only for performance of construction.

6 Short-term and long-term investment securities

Details of short and long-term investment securities as at December 31, 2017 and 2016, are as follows (Korean won in millions):

			December 31, 2017	December 31, 2016
Short-term investment securities	Financial assets at fair value through profit or loss	Equity securities and others	₩ 34,182	₩ -
	Available-for-sale financial assets	Equity securities and others	80,000	235,217
	Held-to-maturity financial assets	Other debt securities and Others	19,793	6,142
			<u>133,975</u>	<u>241,359</u>
Long-term investment securities	Available-for-sale financial assets	Equity securities and others	201,380	290,181
	Held-to-maturity financial assets	Other debt securities and others	4,595	73
			<u>205,975</u>	<u>290,254</u>
			<u>₩ 339,950</u>	<u>₩ 531,613</u>

Investment securities are measured at cost or fair value depending on the presence or absence of market prices in an active market.

6. Short-term and long-term investment securities (cont'd)

Details of financial assets at fair value through profit or loss, available-for-sale financial assets and held-to-maturity financial assets as at December 31, 2017 and 2016, are as follows (Korean won in millions):

			December 31, 2017	December 31, 2016
Financial assets at fair value through profit or loss	Marketable equity securities	Woori Bank	₩ 34,182	₩ -
Available-for-sale financial assets	Marketable equity securities	Infinitt Healthcare Co., Ltd. and others	414	939
	Non-marketable equity securities	Korea Defense Industry Association and others	199,734	298,795
	Beneficiary certificate	Gold Spoon JY 2nd Co., Ltd and others.	81,193	225,598
	Debt securities	Government bonds and Public bonds	39	66
			281,380	525,398
Held-to-maturity financial assets	Debt securities	Government bonds and Public bonds	94	72
	Other debt securities	Others	24,294	6,143
			24,388	6,215
			₩ 339,950	₩ 531,613

Changes in the fair value of available-for-sale financial assets for the periods ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017			
	Beginning balance	Valuation	Disposals and others	Ending balance
Marketable equity securities	₩ 2,975	₩ 7,942	₩ (9,517)	₩ 1,400
Non-marketable equity securities	(14,923)	3,783	1,692	(9,448)
Tax effect	(3,179)	(2,320)	1,994	(3,505)
Consolidation adjustments	1,023	(6,278)	3,603	(1,652)
	₩ (14,104)	₩ 3,127	₩ (2,228)	₩ (13,205)

	2016			
	Beginning balance	Valuation	Disposals and others	Ending balance
Marketable equity securities	₩ 301,511	₩ 5,907	₩ (304,443)	₩ 2,975
Non-marketable equity securities	7,727	(27,019)	4,369	(14,923)
Tax effect	(75,898)	3	72,716	(3,179)
Consolidation adjustments	(22,343)	25,489	(2,123)	1,023
	₩ 210,997	₩ 4,380	₩ (229,481)	₩ (14,104)

7. Trade and other receivables

Trade and other receivables as at December 31, 2017 and 2016, consist of the following (Korean won in millions):

		December 31, 2017			
		Gross	Present value discount	Provision for impairment	Book amount
Current:					
Trade receivables	₩	3,712,786	₩ (13,001)	(1,371,448)	₩ 2,328,337
Other receivables		498,212	-	(165,829)	332,383
Accrued income		138,713	-	(34,131)	104,582
Short-term loans		199,601	-	(136,450)	63,151
	₩	<u>4,549,312</u>	₩ <u>(13,001)</u>	₩ <u>(1,707,858)</u>	₩ <u>2,828,453</u>
Non-current:					
Trade receivables		18,824	-	(246)	18,579
Other receivables		20,000	(890)	(8,751)	10,359
Long-term loans		1,795,265	(69)	(768,230)	1,026,966
	₩	<u>1,834,089</u>	₩ <u>(959)</u>	₩ <u>(777,227)</u>	₩ <u>1,055,903</u>
		December 31, 2016			
		Gross	Present value discount	Provision for impairment	Book amount
Current:					
Trade receivables	₩	3,968,715	₩ (12,993)	(1,522,646)	₩ 2,433,076
Other receivables		538,811	-	(170,337)	368,474
Accrued income		149,009	-	(31,449)	117,560
Short-term loans		256,138	-	(137,386)	118,752
	₩	<u>4,912,673</u>	₩ <u>(12,993)</u>	₩ <u>(1,861,818)</u>	₩ <u>3,037,862</u>
Non-current:					
Trade receivables		9,150	-	(257)	8,893
Other receivables		9,945	(1,732)	(6,039)	2,174
Long-term loans		1,571,902	(113)	(647,704)	924,085
	₩	<u>1,590,997</u>	₩ <u>(1,845)</u>	₩ <u>(654,000)</u>	₩ <u>935,152</u>

7. Trade and other receivables (cont'd)

Movements in the provision for impairment of trade and other receivables for the year ended December 31, 2017, are as follows (Korean won in millions):

	Beginning balance	Provision for impaired receivables during the year	Write off	Others(*1)	Ending balance
Current:					
Trade receivables	₩ 1,522,646	₩ (9,930)	₩ (161,286)	₩ 20,017	₩ 1,371,448
Non-trade receivables	170,337	28,111	(1,780)	(30,839)	165,829
Accrued revenues	31,449	2,682	-	-	34,131
Short-term loans	137,385	(58)	-	(877)	136,450
Non-current:					
Trade receivables	258	(12)	-	-	246
Non-trade receivables	6,039	(4,994)	-	7,706	8,751
Long-term loans	647,704	120,586	(60)	-	768,230
	<u>₩ 2,515,818</u>	<u>₩ 136,385</u>	<u>₩ (163,126)</u>	<u>₩ (3,993)</u>	<u>₩ 2,485,085</u>

(*1) Changes from reclassification between current and non-current asset, business combination, exchange differences and others.

The creation(reversal) of provision for impaired trade receivables has been included in 'selling and administrative expense' in the consolidated statement of profit or loss. And that of other receivables have been included in 'other operating expense'.

8. Inventories

Inventories as at December 31, 2017 and 2016, are summarized as follows (Korean won in millions):

	December 31, 2017			December 31, 2016		
	Acquisition cost	Valuation allowance	Book amount	Acquisition cost	Valuation allowance	Book amount
Merchandise	₩ 375,494	₩ (29,436)	₩ 346,058	₩ 377,802	₩ (35,264)	₩ 342,538
Finished goods	599,154	(34,644)	564,510	491,542	(40,548)	450,994
Work in progress	482,951	(33,778)	449,173	463,506	(38,814)	424,692
Raw materials	748,316	(55,613)	692,703	692,418	(50,954)	641,464
Materials in transit	258,317	-	258,317	220,824	-	220,824
Supplies	36,878	(334)	36,544	31,595	(247)	31,348
Land	-	-	-	41,099	-	41,099
Others	4,321	-	4,321	1,188	-	1,188
	<u>₩ 2,505,431</u>	<u>₩ (153,805)</u>	<u>₩ 2,351,626</u>	<u>₩ 2,319,974</u>	<u>₩ (165,827)</u>	<u>₩ 2,154,147</u>

Loss (reversal of loss) on inventory valuation (charged to the cost of sales) amounted to ₩ (12,022) million and ₩ (18,550) million for the years ended December 31, 2017 and 2016, respectively.

9. Derivatives

Details of gain and loss on valuation of derivatives as at December 31, 2017 and 2016, are as follows (Korean won in millions, foreign currency in thousands):

December 31, 2017							
Buy		Sell		Derivatives	Gain (loss) on	Accumulated	Firm
Currency	Amount	Currency	Amount	valuation assets (liabilities)	valuation of derivatives	other comprehensive income(*1)	commitment assets (liabilities)
Currency forward contracts:							
KRW	4,535,215	USD	4,072,648	₩ 141,816	₩ 277,101	₩ 8,433	₩ (126,198)
KRW	297,033	EUR	225,072	2,442	1,378	922	(73)
KRW	230,928	JPY	21,202,140	17,823	12,646	689	(7,800)
USD	2,541,914	KRW	2,817,889	(105,287)	(142,031)	(25,901)	24,988
EUR	433,120	KRW	573,367	(9,452)	(4,477)	(1,377)	1,688
JPY	32,454,700	KRW	372,671	(49,690)	(13,816)	(14,412)	1,215
GBP and others		EUR and others		(25,211)	(15,352)	(4,268)	(2,765)
Interest rate swap:							
KRW 5,000, 3.15% and others		KRW 5,000, MOR 3M+1.38% and others		2,730	(17)	818	-
Foreign currency long-term borrowings(*2):							
KRW	210,710	USD	200,000	-	-	-	1,431
Embedded derivatives and others				1,902	(1,826)	-	-
Commodity forward contracts				(613)	-	(1,000)	-
Currency swap				(40,031)	(3,755)	(2,323)	-
				(63,571)	109,851	(38,419)	(107,514)
Consolidation adjustments				(1,902)	1,826	57,152	-
Tax effect				-	-	9,089	-
				₩ (65,473)	₩ 111,677	₩ 27,822	₩ (107,514)

9. Derivatives (cont'd)

December 31, 2016											
Buy		Sell		Derivatives valuation assets (liabilities)		Gain (loss) on valuation of derivatives		Accumulated other comprehensive income(*1)		Firm commitment assets (liabilities)	
Currency	Amount	Currency	Amount								
Currency forward contracts:											
KRW	5,711,269	USD	4,997,016	₩	(294,548)	₩	(164,267)	₩	(19,467)	₩	166,551
KRW	145,877	EUR	111,036		3,847		1,165		3,318		567
KRW	211,493	JPY	19,279,568		1,163		(5,724)		(635)		(2,049)
USD	2,400,231	KRW	2,750,577		116,432		57,413		44,853		(16,191)
EUR	312,270	KRW	411,561		(10,119)		(4,265)		(3,121)		3,907
JPY	25,268,718	KRW	304,509		(28,043)		(216)		(2,882)		(348)
GBP and others		EUR and others			5,003		(9,237)		(9,287)		3,705
Interest rate swap:											
KRW 5,000, and others	3.15%	KRW 5,000, 3M+1.38% and others	MOR		(110)		(104)		-		-
Foreign currency long-term borrowings(*2):											
KRW	8,500	USD	9,673		260		260		-		3,268
Embedded derivatives and others					131		447		131		-
Put back options(*3)					-		(160)		-		-
Commodity forward contracts					(1,643)		-		(2,709)		-
					(207,627)		(124,688)		10,201		159,410
Consolidation adjustments					-		-		30,094		-
Tax effect					-		-		(2,831)		-
					₩ (207,627)		₩ (124,688)		₩ 37,464		₩ 159,410

(*1) Accumulated other comprehensive income before tax effect.

(*2) The Group designated in foreign currency long-term borrowings as hedging instruments to hedge the changes in the fair value of firm commitment.

(*3) DEC, a subsidiary, participated in SOC projects and other infrastructure projects, including Shinbundang Line, Shinbundang extension Line, Daegu 4th beltway, Masan Sewer Pipeline BTL, Suwon-Gwangmyeong Road, Gwanggyo Power Center, etc. as a construction investor. To invite financial investors, DEC entered into a put option contract (KRW 19 billion). DEC classified the contract as financial derivatives and recognized the fluctuation of option value as loss on valuation of derivatives and derivatives liabilities.

10. Financial instruments by category

Categories of financial instruments as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017							
	Financial assets at FVTPL	Loans and receivables	AFS financial assets	Held-to- maturity financial assets	Derivative for hedging	Book amount	Fair value	
Cash and cash equivalents	₩ -	₩ 2,344,600	₩ -	₩ -	₩ -	₩ 2,344,600	₩ 2,344,600	
Long and short- term financial instruments	-	314,926	-	-	-	314,926	314,926	
Long and short- term investment securities	34,182	-	281,380	24,388	-	339,950	339,950	
Trade and other receivables	-	3,884,358	-	-	-	3,884,358	3,884,358	
Derivative assets	14,537	-	-	-	117,498	132,035	132,035	
Deposits provided	-	371,865	-	-	-	371,865	371,865	
	₩ 48,719	₩ 6,915,749	₩ 281,380	₩ 24,388	₩ 117,498	₩ 7,387,734	₩ 7,387,734	

	December 31, 2017					
	Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Derivative for hedging	Financial guarantee contracts	Book amount	Fair value
Trade and other payables	₩ -	₩ 4,787,286	₩ -	₩ 13,759	₩ 4,801,045	₩ 4,801,045
Borrowings, bonds and Asset-backed loans	-	12,625,015	-	-	12,625,015	12,625,015
Derivative liabilities	65,384	-	132,124	-	197,508	197,508
	<u>₩ 65,384</u>	<u>₩ 17,412,301</u>	<u>₩ 132,124</u>	<u>₩ 13,759</u>	<u>₩ 17,623,567</u>	<u>₩ 17,623,567</u>

10. Financial instruments by category(cont'd)

		December 31, 2016							
		Financial assets at FVTPL	Loans and receivables	AFS financial assets	Held-to- maturity financial assets	Derivative for hedging	Book amount	Fair value	
Cash and cash equivalents	₩	-	₩ 2,019,319	₩	-	₩	-	₩ 2,019,319	₩ 2,019,319
Long and short-term financial instruments		-	248,931	-	-	-	248,931	248,931	
Long and short-term investment securities		-	-	525,398	6,215	-	531,613	531,613	
Trade and other receivables		-	3,973,014	-	-	-	3,973,014	3,973,014	
Derivative assets		65,022	-	-	-	40,833	105,855	105,855	
Deposits provided		-	330,565	-	-	-	330,565	330,565	
	₩	65,022	₩ 6,571,829	₩ 525,398	₩ 6,215	₩ 40,833	₩ 7,209,297	₩ 7,209,297	

		December 31, 2016						
		Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Derivative for hedging	Financial guarantee contracts	Book amount	Fair value	
Trade and other payables	₩	-	₩ 4,527,696	₩	-	₩ 20,002	₩ 4,547,698	₩ 4,547,698
Borrowings, bonds and Asset-backed loans		-	12,231,304	-	-	12,231,304	12,231,304	
Derivative liabilities		44,243	-	269,238	-	313,481	313,481	
	₩	44,243	₩ 16,759,000	₩ 269,238	₩ 20,002	₩ 17,092,483	₩ 17,092,483	

10. Financial instruments by category (cont'd)

Fair value hierarchy classifications of the financial instruments as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Financial assets at fair value through profit or loss	₩ 34,182	₩ 14,537	₩ -	₩ 48,719
Available-for-sale financial assets	446	351	138,033	138,830
Derivatives for hedging	-	117,498	-	117,498
	34,628	132,386	138,033	305,047
Financial liabilities:				
Financial liabilities at fair value through profit or loss	-	(65,384)	-	(65,384)
Derivatives for hedging	-	(132,124)	-	(132,124)
	-	(197,508)	-	(197,508)
	₩ 34,628	₩ (65,122)	₩ 138,033	₩ 107,539
	December 31, 2016			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Financial assets at fair value through profit or loss	₩ -	₩ 65,022	₩ -	₩ 65,022
Available-for-sale financial assets	90,822	341	137,373	228,536
Derivatives for hedging	-	40,833	-	40,833
	90,822	106,196	137,373	334,391
Financial liabilities:				
Financial liabilities at fair value through profit or loss	-	(44,243)	-	(44,243)
Derivatives for hedging	-	(269,238)	-	(269,238)
	-	(313,481)	-	(313,481)
	₩ 90,822	₩ (207,285)	₩ 137,373	₩ 20,910

The above table does not include information on financial assets and liabilities, which are not measured at fair value because there are no material differences between the fair values and the book amounts.

Definition for each fair value hierarchy levels of the above financial instruments, are as follows:

- Level 1: Unadjusted quoted prices in active markets for identical assets or liabilities
- Level 2: Inputs other than quoted prices that are observable for the asset or liability, either directly or indirectly
- Level 3: Inputs that are not based on observable market data (unobservable inputs)

The fair value of financial instruments traded in active markets is based on quoted market prices at the dates of the consolidated statements of financial position. These instruments are included in Level 1. Instruments included in Level 1 comprise primarily listed equity investments classified as trading securities or available-for-sale securities.

10. Financial instruments by category (cont'd)

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

If one or more of the significant inputs is not based on observable market data, the instrument is included in Level 3.

Valuation techniques and the inputs used in fair value measurements of derivative (level 2), are as follows:

Valuation technique	Observable inputs	Explanation of input parameters
Discounted cash flow method	Forward exchange rate	It is based on forward exchange rate, disclosed on the market that remaining period is the same until maturity of forward contracts. If the forward exchange rate is not disclosed on the market, it is calculated by using interpolation method.
	Discount rate	It is determined by using yield curve that is disclosed at the end of the reporting period.

Valuation techniques and the inputs used in fair value measurements of available-for-sale financial assets (level 3), are as follows:

AFS assets	Valuation technique	Discount rate	Changes of inputs and others
Incheon-Kimpo expressway Co, Ltd. and others	Past transaction model and others	-	Amount of recent capital increase
Daegu South Circulation Road Corporation and others	Dividend discount model and others	11%–14%	Expected dividend cash flows
Metropolitan Western Expressway Co., Ltd.	Discounted cash flow model	1.61%	Available-for-sale estimates
Others	Net asset value assessment and others	-	Fair value of net assets and others

Changes in book amount of available-for-sale financial assets that are measured at fair value (level 3) for the periods ended December 31, 2017 and 2016, are as follows (Korean won in millions):

Year	Beginning balance	Acquisition	Disposal	Total comprehensive income (loss)		Others(*1)	Ending balance
				Loss for the period	Other comprehensive income		
2017	₩ 137,373	₩ 9,855	₩ (12,056)	₩ (6,430)	₩ 12,987	₩ (3,695)	₩ 138,033
2016	126,448	10,437	-	(8,407)	2,145	6,750	137,373

(*1) Changes from business combination, exchange differences and others.

10. Financial instruments by category (cont'd)

Comprehensive income (loss) on each category of financial instruments for the periods ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017							
	Profit or loss for the period							
	Interest	Dividend	Financial guarantee	Valuation gain/loss (exclude derived)	Impairment and reversal		Disposal	Other comprehensive income (*1)
					Impairment loss	Other impairment		
Financial assets:								
Financial assets at fair value through profit or loss	₩ -	₩ -	₩ -	₩ (7,271)	₩ -	₩ -	₩ (817)	₩ -
Loans and receivables	42,500	-	-	-	(136,385)	-	(23,180)	-
AFS financial assets	10,302	2,395	-	-	-	(15,596)	54,319	1,185
Held-to-maturity investments	985	-	-	-	-	(464)	(9)	-
	53,787	2,395	-	(7,271)	(136,385)	(16,060)	30,313	1,185
Financial liabilities:								
Financial liabilities at amortized cost	₩ (569,143)	₩ -	₩ (6,274)	₩ -	₩ -	₩ -	₩ (25,200)	₩ -

(*1) Amounts before tax effect.

	2016							
	Profit or loss for the period							
	Interest	Dividend	Financial guarantee	Valuation gain/loss (exclude derived)	Impairment and reversal		Disposal	Other comprehensive income (*1)
					Impairment loss	Other impairment		
Financial assets:								
Loans and receivables	₩ 45,485	₩ -	₩ -	₩ (216,461)	₩ -	₩ -	₩ (13,662)	₩ -
AFS financial assets	4,633	2,655	-	-	-	(30,362)	244,273	(278,257)
Held-to-maturity investments	466	-	-	-	-	(2,158)	-	-
	50,584	2,655	-	(216,461)	(32,520)		230,611	(278,257)
Financial liabilities:								
Financial liabilities at amortized cost	₩ (581,150)	₩ -	₩ (6,226)	₩ -	₩ -	₩ -	₩ (10,570)	₩ -

(*1) Amounts before tax effect.

10. Financial instruments by category (cont'd)

Apart from the above financial instruments, comprehensive income (loss) on derivative financial instruments for the periods ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017			2016		
	Profit or loss		Other comprehensive income (*1)	Profit or loss		Other comprehensive income (*1)
	Valuation	Disposal		Valuation	Disposal	
Derivative financial instruments for trading	₩ (85,831)	₩ (5,188)	₩ -	₩ 17,016	₩ (7,482)	₩ -
Derivative financial instruments for fair value hedges	191,359	43,388	-	(120,718)	6,848	-
Derivative financial instruments for cash flows hedges	6,149	1,846	(48,622)	(20,985)	61,727	15,690
	₩ 111,677	₩ 40,046	₩ (48,622)	₩ (124,687)	₩ 61,093	₩ 15,690

(*1) Amounts before tax effect.

Gain (loss) on foreign currency translations and transactions are mostly occurred in financial assets classified as loans and receivables and financial liabilities measured in amortized cost.

Financial assets and liabilities subject to an enforceable master-netting arrangement or similar agreement as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017			December 31, 2016		
	Gross recognized financial instruments	Gross financial instruments set off	Net amounts presented in the statement of financial position	Gross recognized financial instruments	Gross financial instruments set off	Net amounts presented in the statement of financial position
Financial assets:						
Trade receivables	₩ 37,183	₩ (14,812)	₩ 22,371	₩ 16,815	₩ (11,851)	₩ 4,964
Other receivables	261	(64)	196	144	(14)	130
Long-term investment securities	15,000	(15,000)	-	40,000	(40,000)	-
Derivative assets	156,128	(60,364)	95,764	141,875	(54,685)	87,190
	₩ 208,571	₩ (90,240)	₩ 118,331	₩ 198,834	₩ (106,550)	₩ 92,284
Financial liabilities:						
Trade payables	₩ (74,087)	₩ 6,310	₩ (67,778)	₩ (50,775)	₩ 4,435	₩ (46,340)
Other payables	(66,478)	8,566	(57,912)	(58,940)	7,430	(51,510)
Asset-backed loans	(15,000)	15,000	-	(40,000)	40,000	-
Derivative liabilities	(179,152)	60,364	(118,788)	(315,692)	54,685	(261,007)
	₩ (334,718)	₩ 90,240	₩ (244,478)	₩ (465,407)	₩ 106,550	₩ (358,857)

11. Investments in associates and joint ventures

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

	Location	Ownership interests (%)	Acquisition cost		Book amount	
			December 31, 2017	December 31, 2016	December 31, 2017	December 31, 2016
Associates:						
Tamra Offshore Wind Power Co., Ltd.	Korea	36	₩ 11,880	₩ 11,880	₩ 11,414	₩ 9,675
The HS-Urban highway (*1)	Korea	27.29	9,578	-	9,700	-
Dalian Samyoung Doosan Metal Product Co.,Ltd. ('DSDMP')(*2)	China	10.80	2,675	2,675	2,735	3,043
New Bundang Line Co., Ltd. (*3)	Korea	29.03	13,681	50,088	-	14,770
Gyeonggi Railway Co., Ltd. (*2, 3)	Korea	7.35	7,067	7,067	-	1,893
Neo Trans Co., Ltd.	Korea	42.86	43	43	20,986	18,991
New Seoul Railroad Co. (*3)	Korea	15.40	8,794	8,794	7,528	7,837
KIAMCO Gyeonggi Railway Investment Private Equity Investment Trust	Korea	32.91	24,799	23,149	24,801	23,149
New Wave 4th Investment Fund (*7)	Korea	-	-	-	-	-
New Wave 5th Initial Enterprise Professional Investment Union (*5)	Korea	30	930	-	952	-
KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership (*5)	Korea	19.68	2,579	-	3,109	-
2010 KIF-Neoplux IT Professional Investment Association (*5, 6)	Korea	21.67	2,457	-	922	-
KoFC-Neoplux R&D Biz Creation 2013-1 Investment Partnership (*5, 6)	Korea	19	6,327	-	7,620	-
Future Creation Neo Plux Investment Partnership (*5, 6)	Korea	16.25	7,070	-	6,978	-
Neo-Plux technology valuation investment combination (*5, 6)	Korea	15	5,881	-	5,884	-
Neo Plux Market Frontier Secondary Fund (*5, 6)	Korea	15.79	4,686	-	4,679	-
Gyeonggi - Neo Plux Superman Investment Fund (*5, 6)	Korea	15.88	810	-	773	-
Shinhan - Neo Plux Energy New Industry Investment Association (*5, 6)	Korea	8.33	500	-	497	-
Neo Plux First Private Equity Investment Company (*5, 6)	Korea	15	3,618	-	72	-
KTC&P Growth Private Equity Investment Company (*5, 6)	Korea	5.56	5,987	-	8,194	-
BNW&P 1st Private Equity Investment Company and others (*7)	Korea	0.95	-	-	-	-
Guang Dong Xingpu Steel Center(*7)	China	-	-	1,853	-	1,323
Others	Korea	-	4,643	4,822	5,299	5,379
			124,005	110,371	122,143	86,060
Joint venture:						
Sichuan Kelun-Doosan Biotechnology Company Limited	China	50	2,526	2,526	2,918	2,937
Haman Industrial Complex(*3, 4)	Korea	80	3,600	3,600	-	-
Doosan PSI LLC	USA	50	1,108	1,108	1,090	1,189
Doosan Infracore Liaoning Machinery Sales Co.,Ltd.	China	43	718	355	411	134
			7,952	7,589	4,419	4,260
			₩ 131,957	₩ 117,960	₩ 126,562	₩ 90,320

(*1) Transferred from available-for-sale financial assets during the period, and the ownership interest is provided as collateral for the project financing for Kookmin Bank and others.

(*2) The investee is classified as an associate as it can exercise its voting right in the Board of Directors of the investee companies.

(*3) Pledged as collateral for Project Financing

(*4) Although the Group's equity interest in the investee is more than 50%, the investee is classified as a joint venture considering the agreement between the shareholders.

(*5) Included Neo Plux's associates and joint ventures in accordance with the acquisition of Neo Plux Co., Ltd. during the year ended December 31, 2017.

(*6) Classified as an associate as Neo Plux Co., Ltd. a subsidiary, has significant influence as a member of Board of Directors of the investee.

(*7) Disposed during the year ended December 31, 2017.

11. Investments in associates and joint ventures (cont'd)

Changes in investment in joint ventures and associates for the years ended December 31, 2017 and 2016, consist of the following (Korean won in millions):

	2017						
	Beginning balance	Acquisition (disposal)	Dividends	Share of profit (loss)	Increase (decrease) in equity of associates	Other (*2)	Ending balance
Associates:							
Tamra Offshore Wind Power Co., Ltd.	₩ 9,675	₩ -	₩ -	₩ (67)	₩ 1,806	₩ -	₩ 11,414
The HS-Urban highway	-	-	-	(1,517)	1,639	9,578	9,700
DSDMP	3,043	-	-	(143)	(165)	-	2,735
New Bundang Line Co., Ltd.	14,770	-	-	(14,770)	-	-	-
Gyeonggi Railway Co., Ltd.	1,893	-	-	(1,896)	3	-	-
Neo Trans Co., Ltd.	18,991	-	-	1,995	-	-	20,986
New Seoul Railroad Co.	7,837	-	-	(309)	-	-	7,528
KIAMCO Gyeonggi Railway Investment Private Equity Investment Trust	23,149	1,650	-	2	-	-	24,801
New Wave 4th Investment Fund (*1)	-	(315)	(262)	183	(740)	1,134	-
New Wave 5th Initial Enterprise Professional Investment Union (*1)	-	(750)	(150)	686	(73)	1,239	952
KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership (*1)	-	(1,166)	-	(103)	(612)	4,990	3,109
2010 KIF-Neoplux IT Professional Investment Association (*1)	-	(2,284)	-	(228)	(574)	4,008	922
KoFC-Neoplux R&D Biz Creation 2013-1 Investment Partnership (*1)	-	551	-	(275)	(228)	7,572	7,620
Future Creation Neo Plux Investment Partnership (*1)	-	(1,272)	-	(963)	(787)	10,000	6,978
Neo-Plux technology valuation investment combination (*1)	-	2,430	(680)	756	65	3,313	5,884
Neo Plux Market Frontier Secondary Fund (*1)	-	3,586	(92)	87	-	1,098	4,679
Gyeonggi - Neo Plux Superman Investment Fund (*1)	-	810	-	(37)	-	-	773
Shinhan - Neo Plux Energy New Industry Investment Association (*1)	-	500	-	(3)	-	-	497
Neo Plux First Private Equity Investment Company (*1)	-	(3,708)	(2,199)	(1,569)	(1,618)	9,166	72
KTC&P Growth Private Equity Investment Company (*1)	-	(2,224)	-	1,944	(253)	8,727	8,194
BNW&P 1st Private Equity Investment Company (*1)	-	(228)	(183)	156	(4)	259	-
Guang Dong Xingpu Steel Center	1,323	(1,714)	-	-	(640)	1,031	-
Others	5,379	-	(179)	143	-	(44)	5,299
	86,060	(4,134)	(3,745)	(15,928)	(2,181)	62,071	122,143

Doosan Corporation and subsidiaries
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2017							
	Beginning balance	Acquisition (disposal)	Dividends	Share of profit (loss)	Increase (decrease) in equity of associates	Other (*2)	Ending balance
Joint ventures:							
Sichuan Kelun- Doosan Biotechnology Company Limited	2,937	-	(1,285)	1,446	(180)	-	2,918
Doosan PSI LLC	1,189	-	-	39	-	(137)	1,090
Doosan Infracore Liaoning Machinery Sales Co., Ltd	134	363	-	(77)	-	(8)	411
	4,260	363	(1,285)	1,408	(180)	(145)	4,419
	₩ 90,320	₩ (3,771)	₩ (5,030)	₩ (14,520)	₩ (2,361)	₩ 61,926	₩ 126,562

(*1) Share of profit (loss) from equity method investments is classified as sales.

(*2) Changes from business combination, exchange differences and others.

2016							
	Beginning balance	Acquisition (disposal)	Dividends	Share of profit (loss)	Increase (decrease) in equity of associates	Other (*1)	Ending balance
Associates:							
Guang Dong Xingpu Steel Center	₩ 4,080	₩ -	₩ (2,319)	₩ (248)	₩ (190)	₩ -	₩ 1,323
Tamra Offshore Wind Power Co., Ltd	9,617	2,016	-	(1,948)	(10)	-	9,675
DSDMP	3,453	-	-	(311)	(99)	-	3,043
Shinbundang Railroad Co., Ltd.	26,770	-	-	(12,000)	-	-	14,770
Kyunggi Railroad Co., Ltd.	5,277	-	-	(3,384)	-	-	1,893
Neo Trans Co., Ltd	15,429	-	-	3,562	-	-	18,991
New Seoul Railroad Co.	611	7,421	-	(195)	-	-	7,837
KIAMCO	-	23,149	-	-	-	-	23,149
Doosan Eco Biznet	219	-	-	(167)	-	(52)	-
Others	4,504	178	-	699	(2)	-	5,379
	69,960	32,764	(2,319)	(13,992)	(301)	(52)	86,060
Joint ventures:							
Sichuan Kelun- Doosan Biotechnology Company Limited	2,902	-	(1,056)	1,182	(91)	-	2,937
Doosan PSI LLC	1,254	-	-	(100)	-	35	1,189
Doosan Infracore Liaoning Machinery Sales Co.,Ltd.	-	355	-	(231)	-	10	134
	4,156	355	(1,056)	851	(91)	45	4,260
	₩ 74,116	₩ 33,119	₩ (3,375)	₩ (13,141)	₩ (392)	₩ (7)	₩ 90,320

(*1) Changes from business combination, exchange differences and others.

11. Investments in associates and joint ventures (cont'd)

The condensed financial information of the investees as of and for the years ended December 31, 2017 and 2016, is as follows (Korean won in millions):

	2017			
	Total assets	Total liabilities	Sales	Profit (loss) for the period
Associates:				
New Wave 4th Investment Fund	₩ -	₩ -	₩ 740	₩ 733
New Wave 5th Initial Enterprise Professional Investment Union	3,205	33	2,291	2,288
KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership	19,151	3,353	1,875	(525)
2010 KIF-Neoplux IT Professional Investment Association	4,259	4	3,171	(1,054)
KoFC-Neoplux R&D Biz Creation 2013-1 Investment Partnership	43,918	3,811	1,626	(1,449)
Future Creation Neo Plux Investment Partnership	47,540	4,601	1,395	(5,927)
Neo-Plux technology valuation investment combination	39,507	281	6,228	5,037
Neo Plux Market Frontier Secondary Fund	29,973	342	1,881	546
Gyeonggi - Neo Plux Superman Investment Fund	5,060	196	14	(236)
Shinhan - Neo Plux Energy New Industry Investment Association	6,001	35	1	(34)
Neo Plux First Private Equity Investment Company	15,459	14,982	(10,277)	(10,461)
KTC&P Growth Private Equity Investment Company	158,991	11,502	36,439	34,983
BNW&P 1st Private Equity Investment Company and others	35	-	22,550	16,383
Tamra Offshore Wind Power Co., Ltd.	163,740	132,036	4,392	(191)
The HS-Urban highway	191,935	160,626	3,562	2,658
DSDMP	35,448	10,122	10,668	(1,325)
New Bundang Line Co., Ltd.	901,754	973,007	83,125	(122,130)
Gyeonggi Railway Co., Ltd.	681,753	708,586	35,168	(54,262)
Neo Trans Co., Ltd.	65,086	16,118	91,447	4,658
New Seoul Railroad Co.	87,411	36,325	-	(2,005)
KIAMCO Gyeonggi Railway Investment Private Equity Investment Trust	75,400	15	-	7
Others	36,801	12,205	69,272	175
Joint ventures:				
Sichuan Kelun-Doosan Biotechnology Company Limited	7,504	1,668	7,226	2,889
Doosan PSI LLC	10,165	7,980	10,160	82
Doosan Infracore Liaoning Machinery Sales Co., Ltd	1,913	671	12,311	(4)

11. Investments in associates and joint ventures (cont'd)

	2016			
	Total assets	Total liabilities	Sales	Profit (loss) for the period
Associates:				
Guang Dong Xingpu Steel Center	₩ 6,623	₩ 337	₩ 5,693	₩ (1,178)
Tamra Offshore Wind Power Co., Ltd	128,777	101,900	-	(5,411)
DSDMP	45,358	17,174	14,012	(2,871)
Shinbundang Railroad Co., Ltd.	1,003,274	952,397	83,493	(41,340)
Kyunggi Railroad Co., Ltd.	684,400	658,638	26,072	(57,780)
Neo Trans Co., Ltd	59,064	14,755	75,890	8,311
New Seoul Railroad Co.	46,715	15,508	-	(776)
KIAMCO	73,737	17	-	6
Doosan Eco Biznet	1,612	1,260	954	(385)
Others	41,927	17,204	66,594	2,668
Joint ventures:				
Sichuan Kelun-Doosan Biotechnology Company Limited	7,993	2,119	6,514	2,365
Haman Industrial Complex Co., Ltd.	10,016	11,357	-	-
Doosan PSI LLC	8,306	5,928	2,482	(199)
Doosan Infracore Liaoning Machinery Sales Co., Ltd	869	242	3,348	(415)

11. Investments in associates and joint ventures (cont'd)

Adjustments from net assets of joint ventures and associates to book amount of investment in joint ventures and associates as at December 31, 2017 and 2016, are as follows (Korean won in millions):

(*1)	December 31, 2017					
	Net asset at the end of the year	Percentage of ownership (%)	Group's share in net assets	Adjustment amounts		Book amount
				Goodwill	Internal transactions and others	
Associates:						
Tamra Offshore Wind Power Co., Ltd.	₩ 31,705	36	₩ 11,414	₩ -	₩ -	₩ 11,414
The HS-Urban highway	31,309	27.29	8,544	-	1,156	9,700
DSDMP	25,326	10.80	2,735	-	-	2,735
New Bundang Line Co., Ltd.	(71,253)	29.03	(20,685)	-	20,685	-
Gyeonggi Railway Co., Ltd.	(26,833)	7.35	(1,971)	-	1,971	-
Neo Trans Co., Ltd.	48,964	42.86	20,986	-	-	20,986
New Seoul Railroad Co.	51,086	15.40	7,867	-	(339)	7,528
KIAMCO Gyeonggi Railway Investment Private Equity Investment Trust	75,385	32.91	24,809	-	(8)	24,801
New Wave 4th Investment Fund	-	-	-	-	-	-
New Wave 5th Initial Enterprise Professional Investment Union	3,172	30	952	-	-	952
KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership	15,798	19.68	3,109	-	-	3,109
2010 KIF-Neoplux IT Professional Investment Association	4,255	21.67	922	-	-	922
KoFC-Neoplux R&D Biz Creation 2013-1 Investment Partnership	40,107	19	7,620	-	-	7,620
Future Creation Neo Plux Investment Partnership	42,940	16.25	6,978	-	-	6,978
Neo-Plux technology valuation investment combination	39,226	15	5,884	-	-	5,884
Neo Plux Market Frontier Secondary Fund	29,631	15.79	4,679	-	-	4,679
Gyeonggi - Neo Plux Superman Investment Fund	4,864	15.88	773	-	-	773
Shinhan - Neo Plux Energy New Industry Investment Association	5,966	8.33	497	-	-	497
Neo Plux First Private Equity Investment Company	477	15	72	-	-	72
KTC&P Growth Private Equity Investment Company	147,489	5.56	8,194	-	-	8,194
BNW&P 1st Private Equity Investment Company	35	0.95	-	-	-	-
Others	24,428	-	5,299	-	-	5,299
Joint ventures:						
Sichuan Kelun-Doosan Biotechnology Company Limited	5,836	50	2,918	-	-	2,918
Doosan PSI LLC	2,184	50	1,092	-	-	1,090
Doosan Infracore Liaoning Machinery Sales Co., Ltd	1,243	43	534	-	(123)	411

(*1) The adjustment on the Haman Industrial Complex Co., Ltd. was not included as the Group discontinued using the equity method.

11. Investments in associates and joint ventures (cont'd)

December 31, 2016											
(*1)	Net asset at the end of the year		Percentage of ownership (%)	Group's share in net assets	Adjustment amounts						
					Goodwill	Internal transactions and others		Book amount			
Associates:											
Guang Dong Xingpu Steel Center	₩	6,286	21	₩	1,323	₩	-	₩	-	₩	1,323
Tamra Offshore Wind Power Co., Ltd		26,877	36		9,675		-		-		9,675
DSDMP		28,184	11		3,043		-		-		3,043
Shinbundang Railroad Co., Ltd.		50,878	29		14,770		-		-		14,770
Kyunggi Railroad Co., Ltd.		25,756	7.35		1,893		-		-		1,893
Neo Trans Co., Ltd		44,309	43		18,991		-		-		18,991
New Seoul Railroad Co.		31,206	25		7,818		-		19		7,837
KIAMCO		73,719	31		23,155		-		(6)		23,149
Joint ventures:											
Sichuan Kelun-Doosan Biotechnology Company Limited		5,874	50		2,937		-		-		2,937
Doosan PSI LLC		2,378	50		1,189		-		-		1,189
Doosan Infracore Liaoning Machinery Sales Co., Ltd		627	43		270		-		(136)		134

(*1) The adjustment on the Haman Industrial Complex Co., Ltd. was not included as the Group discontinued using the equity method.

12. Property, plant and equipment

Changes in property, plant and equipment for the years ended December 31, 2017 and 2016, consist of the following (Korean won in millions):

	2017					
	Land	Buildings and structures	Machinery	Others	Construction in progress	Total
Beginning balance	₩ 4,688,725	₩ 1,597,684	₩ 1,013,243	₩ 327,670	₩ 281,851	₩ 7,909,173
Acquisition/capital expenditure	6,923	17,362	49,685	77,783	230,195	381,948
Reclassification	39,149	74,503	171,845	21,450	(251,567)	55,380
Disposal	(71,409)	(12,901)	(8,743)	(5,982)	(19,588)	(118,623)
Depreciation	(43)	(99,510)	(215,756)	(89,633)	-	(404,942)
Impairments	1,465	(4,031)	10,899	3,436	-	11,769
Change in scope of consolidation	-	-	10,531	5,493	-	16,024
Asset revaluation	412,958	-	-	-	-	412,958
Others(*1)	(6,160)	(34,178)	(15,729)	(4,707)	(4,098)	(64,872)
Ending balance	₩ 5,071,608	₩ 1,538,929	₩ 1,015,975	₩ 335,510	₩ 236,793	₩ 8,198,815
Acquisition cost	₩ 3,124,810	₩ 2,707,181	₩ 3,466,163	₩ 1,120,203	₩ 236,793	₩ 10,655,149
Accumulated depreciation (accumulated impairment losses are included)	-	(1,168,252)	(2,450,188)	(784,693)	-	(4,403,132)
Accumulated revaluation surplus	1,946,798	-	-	-	-	1,946,798

(*1) Changes due to exchange rate difference and others

12. Property, plant and equipment (cont'd)

	2016					
	Land	Buildings and structures	Machinery	Others	Construction in progress	Total
Beginning balance	₩ 5,201,685	₩ 1,712,043	₩ 1,087,507	₩ 361,259	₩ 259,277	₩ 8,621,771
Acquisition/capital expenditure	2,319	76,046	57,521	86,779	296,915	519,580
Reclassification	(4,031)	40,179	160,381	13,015	(269,539)	(59,995)
Disposal	(15,515)	(17,990)	(10,190)	(7,456)	(3,756)	(54,907)
Depreciation	(43)	(97,276)	(224,741)	(97,219)	-	(419,279)
Impairments	-	(5,709)	(14,782)	(707)	(279)	(21,477)
Change in scope of consolidation (*1)	(499,007)	(112,495)	(41,275)	(15,687)	(403)	(668,867)
Others(*2)	3,317	2,886	(1,178)	(12,314)	(364)	(7,653)
Ending balance	₩ 4,688,725	₩ 1,597,684	₩ 1,013,243	₩ 327,670	₩ 281,851	₩ 7,909,173
Acquisition cost	₩ 3,140,766	₩ 2,676,849	₩ 3,334,713	₩ 1,079,735	₩ 281,851	₩ 10,513,914
Accumulated depreciation (accumulated impairment losses are included)	-	(1,079,165)	(2,321,470)	(752,065)	-	(4,152,700)
Accumulated revaluation surplus	1,547,959	-	-	-	-	1,547,959

(*1) Merger, acquisition and transfer of business

(*2) Changes due to exchange rate difference and others

The Group recognized the land subsequently measured at revaluation amount, and if the land were stated at cost, the land would amount to ₩3,124,810 million and ₩3,140,766 million as at December 31, 2017 and 2016, respectively.

As at December 31, 2017, a certain portion of the Company's land and buildings are pledged as collaterals for loans from KDB and others (see Note 34).

Details of revaluation model, which the Company applies to measurement of the land are as follows:

For the year ended December 31, 2017, the Group initially measured all land assets using fair value at the date of the revaluation. As at December 31, 2017, the fair value of land assets was determined from the appraisal that was undertaken by independently qualified valuers, the First Appraisal & Consulting Co., Ltd ("FACC") and Mirae & Saehan Appraisal Co., Ltd., on October 30, 2017.

FACC and Mirae & Saehan Appraisal Co., Ltd. are members of Korea Association of Property Appraisers and comprise of certified professionals that have a significant amount of industry experience.

Fair value hierarchy classifications of the land as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017			December 31, 2016		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Land	₩ -	₩ -	₩ 5,071,608	₩ -	₩ -	₩ 4,688,725

12. Property, plant and equipment (cont'd)

Valuation techniques and inputs used for fair value measurement of land assets (Level 3) are as follows:

Valuation technique	Significant and unobservable inputs	Correlation between unobservable inputs and fair value arguments
Official Assessed Reference Land Price ("OARLP"):	Fluctuation rate of land price and others	Fair value increases (decreases), if rate of land price increases (decreases).
OARLP of similar parcels nearby the subject land and reflating corrections necessary for differences between the subject and the comparable	Parcel conditions and others	Fair value increases (decreases), if correction of parcel conditions and others increases (decreases).
	Land conditions affecting the sales price and others	Fair value increases (decreases), if correction of land conditions affecting the sales price increases (decreases).

Changes related to the application of the revaluation model for land for the year ended of December 31, 2017 are as follows (Korean won in millions):

Beginning balance	Acquisition	Reclassification	Disposal	Revaluation		Others	Ending balance
				Other comprehensive income	Profit for the period		
₩ 4,688,725	₩ 6,923	₩ 39,149	₩ (71,409)	₩ 412,958	₩ 1,465	₩ (6,203)	₩ 5,071,608

Capitalized borrowing costs for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017	2016
Capitalized borrowing cost	₩ 4,380	₩ 7,440
Capitalization interest rate	3.44%~4.10%	3.60%~4.47%

Classification of depreciation expenses for the years ended December 31, 2017 and 2016, is as follows (Korean won in millions):

	2017	2016
Cost of sales	₩ 337,128	₩ 343,517
Selling and administrative expenses	45,943	43,949
Research and development cost and others	21,869	20,823
Profit for the period from discontinued operations	2	10,990
	₩ 404,942	₩ 419,279

13. Intangible assets

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

	2017				
	Goodwill	Industrial rights	Development costs	Other intangible assets	Total
Beginning balance	₩ 4,574,667	₩ 1,160,915	₩ 945,808	₩ 272,942	₩ 6,954,332
Acquisition/capital expenditure	-	1,245	291,845	30,877	323,967
Reclassification	-	634	(55,641)	43,499	(11,508)
Disposal	-	(62)	-	(7,106)	(7,168)
Amortization	-	(14,534)	(143,056)	(68,297)	(225,887)
Impairments	-	-	(26,729)	(85)	(26,814)
Reversal of impairment loss	-	-	-	2,690	2,690
Change in scope of consolidation					
(*1)	10,047	-	-	12,924	22,971
Others(*2)	(140,114)	(82,059)	(12,928)	(5,471)	(240,572)
Ending balance	₩ 4,444,600	₩ 1,066,139	₩ 999,299	₩ 281,973	₩ 6,792,011
Acquisition cost	₩ 4,444,600	₩ 1,244,002	₩ 1,656,143	₩ 784,275	₩ 8,129,020
Accumulated amortization (accumulated impairment losses are included)	-	(177,863)	(656,844)	(502,302)	(1,337,009)

(*1) Merger, acquisition of subsidiaries and transfer of business (See Note 39)

(*2) Changes due to exchange rate difference and others

	2016				
	Goodwill	Industrial rights	Development costs	Other intangible assets	Total
Beginning balance	₩ 4,687,119	₩ 1,160,263	₩ 905,282	₩ 272,677	₩ 7,025,341
Acquisition/capital expenditure	-	406	244,689	33,546	278,641
Reclassification	-	-	(7,911)	32,317	24,406
Disposal	-	(17)	-	(3,505)	(3,522)
Amortization	-	(17,819)	(126,668)	(77,092)	(221,579)
Impairments	(3,579)	-	(54,707)	(3,446)	(61,732)
Reversal of impairment loss	-	-	-	18	18
Change in scope of consolidation					
(*1)	(132,229)	(910)	(13,693)	(6,811)	(153,643)
Others(*2)	23,356	18,992	(1,184)	25,238	66,402
Ending balance	₩ 4,574,667	₩ 1,160,915	₩ 945,808	₩ 272,942	₩ 6,954,332
Acquisition cost	₩ 4,574,667	₩ 1,336,335	₩ 1,469,433	₩ 708,518	₩ 8,088,953
Accumulated amortization (accumulated impairment losses are included)	-	(175,420)	(523,625)	(435,576)	(1,134,621)

(*1) Merger, acquisition of subsidiaries and transfer of business

(*2) Changes due to exchange rate difference and others

13. Intangible assets (cont'd)

The book amount of membership with indefinite useful lives in other intangible assets item is ₩49,084 million and ₩53,539 million as at December 31, 2017 and 2016, respectively.

Meanwhile, expenditure on research and development, which was recognized as expenses, amounted to ₩267,646 million and ₩270,716 million for the years ended December 31, 2017 and 2016, respectively.

Details of impairment test of goodwill, are as follows:

Goodwill allocated to the CGU as at December 31, 2017 and 2016, are as follows:

Company	CGUs	December 31, 2017	December 31, 2016	Description
Doosan	Mottrol BG	₩ 84,562	₩ 84,562	Manufacturing and sale of hydraulic components
	Industrial vehicles BG	76,861	79,175	Manufacturing and sale of forklifts
	Fuel Cell BG	41,133	42,521	Manufacturing and sale of fuel cell
DHC	Power plant	635,912	619,233	Manufacturing and sale of power plant
	WATER	15,455	6,786	Manufacturing and sale of freshwater and water treatment facilities
DI	Construction machine	3,519,566	3,671,278	Manufacturing and sale of construction equipment
DEC	Construction industry	60,049	60,049	Housing construction and infrastructure construction
Oricom	Magazine	1,373	1,373	Advertising services
	Advertisement	9,690	9,690	
		<u>₩ 4,444,600</u>	<u>₩ 4,574,667</u>	

The recoverable amount of CGU is determined based on a value-in-use calculation, and a discount rate used as follows:

Company	CGUs	Discount rate	Long-term sustainable growth rate
Doosan	Mottrol BG	10.60%	1.00%
	Industrial vehicles BG	8.30%	1.00%
	Fuel Cell BG	11.30%	1.00%
DHC	Power plant	10.10%	1.00%
	WATER	10.10%	1.00%
DI	Construction machinery	8.50~9.50%	1.50~2.00%
DEC	Construction industry	10.10%	1.00%
Oricom	Magazine	9.80%	-
	Advertisement		1.00%

13. Intangible assets (cont'd)

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. Cash flows beyond that five-year periods have been estimated using expected growth rate, and the growth rate does not exceed long-term average growth rate of market. the discount rates used reflect relevant risks specific to the CGUs.

The recoverable amount may change according to changes in key assumptions. Accordingly, the Group's management regularly observes relevant turnovers and industrial trends.

Capitalized borrowing costs for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017	2016
Capitalized borrowing cost	₩ 14,387	₩ 12,268
Capitalization interest rate	3.44%~4.10%	3.60%~4.47%

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

	2017	2016
Cost of sales	₩ 143,623	₩ 134,306
Selling and administrative expenses	81,618	84,955
Research and development cost and others	646	882
Profit for the period from discontinued operations	-	1,436
	₩ 225,887	₩ 221,579

Development costs as at December 31, 2017, are as follows (Korean won in millions):

Company	Individual asset	December 31, 2017	Residual amortization period(*1)
	Large Gas Turbine	₩ 221,619	-
	IGCC gasification plant	48,543	-
DHC	Standard thermal power 500MW	36,493	-
	Wind Power 3MW Class III Model	24,485	-
	USC CFB Boiler RPM	14,360	4.25 years
	1500 horsepower engine for next tram	14,453	3.16 years
DI	Loader generation 6	11,334	-
	G2 D34 Tier4-finalexhaust emission control engine	10,614	1.92 years

(*1) In case the amortization begins, the remaining amortization period is included. Otherwise, it is marked with '-'.
'-'

13. Intangible assets (cont'd)

Intangible assets for which an impairment loss has been recognized as at December 31, 2017, are as follows (Korean won in millions):

Company	Classification	Individual asset	Amount of impairment loss		December 31, 2017	Recoverable amount assessment methods
			2017	Accumulated		
			₩ 652	₩ 652	₩ -	Value in use
DHC	Development costs	Development of submerged UF membrane process technology (*1)				
	Development costs	Development of onshore / offshore wind power(*2)	17,312	17,312	-	Value in use
	Development costs	Trimble Burners and others	6,796	6,796	-	Value in use
Doosan	Development costs	Functional film and others	1,244	1,244	-	Value in use
Doosan Robotics	Development costs	Industrial Robot Development	725	725	8,161	Fair value
			₩ 26,729	₩ 26,729	₩ 8,161	
	Other intangible assets	Golf membership (*3)	82	8,430	10,184	Fair value
DI	Other intangible assets		3	156	620	Fair value
DEC	Condo membership (*3)					
			₩ 85	₩ 8,586	₩ 10,804	
			₩ 26,814	₩ 35,316	₩ 18,965	

(*1) With regard to development of submerged UF membrane process technology, it is anticipated to be difficult to advance into the North American market and decided to stop the development project. Accordingly, the related book amount has been reduced in full.

(*2) As the market competitiveness deteriorated in relation to the development of onshore / offshore wind power, the related book amount was fully reduced as part of securing new technology.

(*3) The recoverable amount is estimated by reflecting the fair value of the individual asset.

13. Intangible assets (cont'd)

Intangible assets recognized for the reversal of impairment losses as at December 31, 2017, are as follows (Korean won in millions):

Company	Classification	Individual asset	Reversal of impairment loss	Recoverable amount assessment methods
DHC	Other intangible assets	Golf membership (*1)	₩ 756	Fair value
DE	Other intangible assets	Golf membership (*1)	66	Fair value
DI	Other intangible assets	Software (*2)	1,868	Value in use
			₩ 2,690	

(*1) The recoverable amount is estimated by reflecting the fair value of the individual asset.

(*2) The recoverable amount is estimated based on the value in use of individual assets and the company's medium and long-term strategy.

The accounts on the statement of comprehensive income for which the Group recognizes an impairment loss (reversal) for the years ended December 31, 2017 and 2016 are as follows (Korean won in millions):

	2017	2016
Other non-operating expenses	₩ 26,814	₩ 61,732
Other non-operating income	2,690	18

14. Investment properties

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

	2017			2016		
	Land	Building	Total	Land	Building	Total
Beginning balance	₩ 367,770	₩ 96,519	₩ 464,289	₩ 387,242	₩ 120,283	₩ 507,525
Acquisition/capital expenditure	-	451	451	505	7,791	8,296
Disposal	(15,358)	(1,814)	(17,172)	(24,778)	(11,513)	(36,291)
Revaluation	32,495	(6,728)	25,767	4,095	(4,564)	(469)
Reclassification	(2,224)	(2,781)	(5,005)	(97)	(15,478)	(15,575)
Others(*1)	(227)	(252)	(479)	803	-	803
Ending balance	₩ 382,456	₩ 85,395	₩ 467,851	₩ 367,770	₩ 96,519	₩ 464,289

(*1) Changes due to exchange rate difference and others

Certain of the Company's land and buildings included in the above investment properties are pledged as collaterals for borrowings from Woori Bank and others (see Note 34).

During the year ended December 31, rental income from investment properties is ₩33,270 million (2015: ₩42,150 million).

14. Investment properties(cont'd)

Details of fair value model that the Group applies to measurement of investment properties are as follows:

For the year ended December 31, 2017, the Group initially measured all investment properties using revaluation model. As at December 31, 2017, the fair value of investment properties was determined from the appraisal that was undertaken by independently qualified valuers, the First Appraisal & Consulting Co., Ltd ("FACC") and Mirae & Saehan Appraisal Co., Ltd., on November 30, 2017.

FACC and Mirae & Saehan Appraisal Co., Ltd. are members of Korea Association of Property Appraisers, and comprise of certified professionals who have a significant amount of industry experience.

Fair value measurements of land assets by fair value hierarchy level as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017			December 31, 2016		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Land	₩ -	₩ -	₩ 382,456	₩ -	₩ -	₩ 367,770
Building	-	-	85,395	-	-	96,519
	₩ -	₩ -	₩ 467,851	₩ -	₩ -	₩ 464,289

Valuation techniques and inputs used for fair value measurement of land (Level 3) are as follows:

Valuation technique	Significant and unobservable inputs	Correlation between unobservable inputs and fair value arguments
Official Assessed Reference Land Price ("OARLP"): OARLP of similar parcels nearby the subject land and reflating corrections are necessary for differences between the subject and the comparable	Fluctuation rate of land price and others Parcel conditions and others Land conditions affecting the sales price and others	Fair value increases (decreases), if rate of land price increases (decreases). Fair value increases (decreases), if correction of parcel conditions and others increases (decreases). Fair value increases (decreases), if correction of land conditions affecting the sales price increases (decreases).
Sales comparison approach : Fair value is based on sales comparison of a similar object based on marketability with target object, while measuring fair value as compared with circumstance correction, time correction and individual factors	Circumstance correction Regional factors Comparative value of individual factors	Fair value increase (decrease) if circumstance correction increases (decreases). Fair value increase (decrease) if regional factors increases (decreases). The comparative value of individual factors increases (decreases) if the fair value increases (decreases).
Estimated cost price approach: Fair value is based on depreciation and replacement costs considered with structure, building materials, construction condition, building equipment, end use, present condition and management condition	Replacement cost	Fair value decreases (increases), if replacement cost increases (decreases).

15. Bonds and borrowings

Details of bonds and borrowings as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	Annual interest rate (%)	December 31, 2017	December 31, 2016
Public subscription bond	2.38~5.27	₩ 1,877,724	₩ 2,077,434
Private subscription bond(*1)	1.68~5.73	625,000	535,000
Convertible bond	3.20	6,265	152,630
Bonds with stock warrants	1.00~3.00	1,194,175	143,423
Bonds denominated in foreign currencies(*2)	2.13~4.13	640,590	737,185
		4,343,754	3,645,672
Less: Exchange rights adjustment		-	(17,524)
Less: Conversion rights adjustment		(133)	(9,998)
Less: Warrants adjustment		(219,142)	-
More: Premium on bonds		126,933	30,658
Less: Discount on bonds		(41,321)	(26,264)
Less: Current portion of long-term bonds		(1,331,969)	(1,535,144)
		₩ 2,878,122	₩ 2,087,400

(*1) Property, plant and equipment are pledged as collateral for the above bonds (see Note 34).

(*2) The Group is provided with guarantees from the Korea Export-Import Bank in connection with foreign currency contingent assets (see Note 33).

Detailed terms on issuance of bonds with stock warrants issued by Doosan Heavy Industries & Construction, a subsidiary of the Group, are as follows.

	Bonds with stock warrants(48 th)(*1)
Issue date (Maturity date)	2017.5.4 (2022.5.4)
Coupon rate	1.00%
Guaranteed rate of return	2.00% (105.2448% of the principal amount)
Exercise period	From one month after the issue date to one month before the repayment date
Exercise price	₩ 18,800 per share
Par value	₩ 500,000 million
Issuing price(*2)	₩ 491,546 million
Book amount	₩ 438,014 million
The option of redemption	Three years from the issue date
The modification of exercise price	Exercising price adjustable due to increase of capital stock with consideration, stock dividend
Stock for conversion	Ordinary share of DHC

(*1) As at December 31, 2017, 0.02% of 48th stock warrants have been exercised and 0.02% of principal amount of debentures have been under substitution payment. The accumulated number of shares issued as a result of exercise of stock warrants on bonds is 5,507 shares.

(*2) The issuance price is the amount obtained by deducting the discount on issuance of bonds from the par value.

15. Bonds and borrowings (cont'd)

Detailed terms on issuance of convertible notes and bonds with stock warrants issued by Group's subsidiary, DEC, are as follows:

Details	Convertible bond(85 th)(*1)	Bond with stock warrants(92 nd)(*2)	Bond with stock warrants(93 rd)(*3)
Issue date	2015.06.11	2016.06.24	2017.03.21
(Maturity date)	(2018.06.11)	(2019.06.24)	(2020.03.21)
Coupon rate	3.20%	3.00%	2.50%
Guaranteed return	6.50% (110.8345% of principal)	6.00% (109.7809% of principal)	5.50% (109.7128% of principal)
Exercise period	From one month after date of issue to one month before maturity	From one month after date of issue to one month before maturity	From one month after date of issue to one month before maturity
Exercise price	₩6,000 per share	₩3,185 per share	₩2,925 per share
Par value	₩150,000 million	₩150,000 million	₩150,000 million
Issuing price(*3)	₩143,560 million	₩143,019 million	₩144,480 million
Book amount	₩6,770 million	₩143,064 million	₩141,036 million
The option of redemption	Right exercisable after 2 years and 2 and a half years from the day of issue	Right exercisable after 2 years and 2 and a half years from the day of issue	Right exercisable after 2 years and 2 and a half years from the day of issue
The modification of exercise price	Exercising price adjustable due to capital increase with consideration, share dividends and others	Exercising price adjustable due to capital increase with consideration, share dividends and others	Exercising price adjustable due to capital increase with consideration, share dividends and others
Share for conversion	Ordinary share of DEC	Ordinary share of DEC	Ordinary share of DEC

(*1) As at December 31, 2017, 7.27% of amount of 85th convertible bonds have been converted and 1,545,853 shares were issued as a result of exercise of conversion rights.

(*2) As at December 31, 2017, 4.68% of 92nd stock warrants and 0.94% of 93rd stock warrants have been exercised and 4.55% of principal amount of 92nd debentures and 0.93% of principal amount of 93rd debentures have been under substitution payment. Accordingly, 1,564,345 shares and 391,465 shares are issued, respectively, as a result of stock warrants exercised on bonds with stock warrants.

(*3) The issuance price is the amount obtained by deducting the discount on issuance of bonds from the par value.

15. Bonds and borrowings (cont'd)

Detailed terms on issuance of bonds with stock warrants issued by Doosan Infracore, a subsidiary of the Group, are as follows.

	Bonds with warrants(31 st)(*1)
Issue date (Maturity date)	2017.8.1 (2022.8.1)
Coupon rate	2.00%
Guaranteed rate of return	4.75% (115.4175% of the principal amount)
Exercise period	From one month after the issue date to one month before the repayment date
Exercise price	₩ 8,030 per share
Par value	₩ 500,000 million
Issuing price(*2)	₩ 491,607 million
Book amount	₩ 442,423 million
The option of redemption	Three years from the issue date
The modification of exercise price	Exercising price adjustable due to increase of capital stock with consideration, stock dividend
Share for conversion	Ordinary share of DI

(*1) As at December 31, 2017, 0.87% of 31st bond with stock warrants have been exercised and 0.86% of principal amount of debentures have been under substitution payment. The accumulated number of shares issued as a result of 31st stock warrants exercised on bonds with stock warrants is 544,805 shares.

(*2) The issuance price is the amount obtained by deducting the discount on issuance of bonds from the par value.

15. Bonds and borrowings (cont'd)

Short-term borrowings as at December 31, 2017 and 2016, are as follows (Korean won in millions):

(*1)	Creditor	Annual interest rate (%)	December 31, 2017(*2)	December 31, 2016
Borrowings in Korean won:				
Doosan	Korea Exim Bank and others	2.89 ~ 5.04	₩ 369,548	₩ 716,100
	Discount of notes receivable(*3)	-	2,436	4,306
DHC	KDB and others	1.40 ~ 4.28	1,328,450	725,000
	Discount of notes receivable(*3)	-	8,593	25,790
DI	Korea Exim Bank and others	3.75 ~ 4.95	988,200	495,419
DEC	Woori Bank and others(*2)	3.21 ~ 7.54	49,972	202,858
	Discount of notes receivable(*3)	-	13,074	14,438
DE	KDB and others	3.40 ~ 6.15	121,200	44,200
Doosan Cuvex	-	-	-	14,000
			<u>2,881,473</u>	<u>2,242,111</u>
Borrowings in foreign currency:				
Doosan	Woori Bank and others	1.00 ~ 5.73	211,340	222,176
DHC	Woori Bank and others	0.29 ~ 11.30	827,868	901,698
DI	Sales of bonds in foreign currency(*3)	-	30,291	93,904
	KDB and others	0.39 ~ 5.96	390,796	375,233
DEC	Asia Commercial Bank and others	2.50 ~ 2.70	4,967	20,344
DE	Korea Exim Bank and others	5.68	3,208	7,240
			<u>1,468,470</u>	<u>1,620,595</u>
			<u>₩ 4,349,943</u>	<u>₩ 3,862,706</u>

(*1) Includes the Company's domestic and foreign subsidiaries (excluding DHC and its subsidiaries) and consolidated subsidiaries.

(*2) Property, plant and equipment and others are pledged as collaterals for borrowings (see Note 34).

(*3) As discounting of commercial papers with recourse do not qualify for derecognition of a financial instrument, the Group continues to recognize the related receivables and accounted for the related amounts received as short-term borrowings.

15. Bonds and borrowings (cont'd)

Long-term borrowings as at December 31, 2017 and 2016, are as follows (Korean won in millions):

(*1)	Creditor	Annual interest rate (%)	December 31, 2017(*2)	December 31, 2016
Borrowings in Korean won:				
Doosan	Shinhan Bank and others	2.76 ~ 5.50	₩ 233,936	₩ 261,589
DHC	Korea Exim Bank and others	3.00 ~ 4.80	746,551	1,075,903
DI	KDB	3.90 ~ 4.98	38,333	55,000
DEC	Doosan E&C 3 rd	8.00, CD+2.50	93,000	82,000
DE	KDB and others	3.72	30,000	75,000
Doosan Cuvex	Dura Ace 1 st	6.50	44,800	-
			<u>1,186,620</u>	<u>1,549,492</u>
Borrowings in foreign currency:				
Doosan	Korea Exim Bank and others	1.72 ~ 3.74	148,417	203,384
DHC	National Bank of Abu Dhabi and others	2.75 ~ 9.55	363,693	385,912
DI	Korea Exim Bank and others	2.60 ~ 8.00	1,581,367	1,958,087
			<u>2,093,477</u>	<u>2,547,383</u>
Less: present value discounts			(10,221)	(30,783)
Less: current portion of long-term borrowings			<u>(999,491)</u>	<u>(1,178,915)</u>
			<u>₩ 2,270,385</u>	<u>₩ 2,887,117</u>

(*1) Includes the Company's domestic and foreign subsidiaries (excluding DHC and its subsidiaries) and consolidated subsidiaries.

(*2) Property, plant and equipment and others are pledged as collaterals for borrowings (see Note 34).

Asset-backed loans for future receivables from various construction project and others of the Group are as follows (Korean won in millions):

	Creditor	Annual interest rate (%)	December 31, 2017(*1)	December 31, 2016
DHC	KDB and others	3.43 ~ 5.50	₩ 373,650	₩ 377,000
DEC	Shinyoung Securities Co., Ltd. and others	5.50 ~ 7.30	423,700	307,300
			<u>797,350</u>	<u>684,300</u>
Less: present value discounts			(521)	(4,337)
Less: current portion of long-term borrowings			<u>(599,350)</u>	<u>(432,988)</u>
			<u>₩ 197,479</u>	<u>₩ 246,975</u>

(*1) Property, plant and equipment and others are pledged as collaterals for borrowings (see Note 34).

16. Net defined benefit liabilities

The Group partially operates a defined benefit plan for employees, and the actuarial valuation of plan assets and the defined benefit obligations are performed by a reputable actuary using the projected unit credit method.

Details of net defined benefit liabilities as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Present value of defined benefit obligation	₩ 2,489,741	₩ 2,577,100
Fair value of plan assets	(1,760,859)	(1,655,553)
Net defined benefit liabilities	₩ 728,882	₩ 921,547

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

	2017	2016
Current service cost	₩ 114,142	₩ 118,779
Net interest cost	33,265	36,560
Effect of reduction / liquidation	(2,027)	(3,834)
	₩ 145,380	₩ 151,505

Classification of the expenses related to the net defined benefit liabilities recognized in the consolidated statements of income for the years ended December 31, 2017 and 2016, is as follows (Korean won in millions):

	2017	2016
Cost of sales	₩ 91,000	₩ 86,287
Selling and administrative expenses	49,450	51,259
Research and development cost and others	4,719	10,475
Profit for the period from discontinued operations	211	3,484
	₩ 145,380	₩ 151,505

16. Net defined benefit liabilities (cont'd)

Changes in net defined benefit liabilities for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017		
	Defined benefit obligations	Plan assets	Net defined benefit liabilities
Beginning balance	₩ 2,577,100	₩ (1,655,553)	₩ 921,547
Current service cost	114,142	-	114,142
Interest cost (income)	76,614	(43,349)	33,265
Effect of reduction / liquidation	(2,027)	-	(2,027)
	188,729	(43,349)	145,380
Remeasurements:			
Return on plan assets (excluding amounts included in interest income)	-	(68,011)	(68,011)
Actuarial gain or loss from change in demographic assumptions	(6,178)	-	(6,178)
Actuarial gain or loss from change in financial assumptions	13,021	-	13,021
Others	(4,737)	-	(4,737)
	2,106	(68,011)	(65,905)
Transfer in and out	(2,115)	29	(2,086)
Business combination	(1,123)	985	(138)
Contributions by employee directly to plan assets	2,828	(832)	1,996
Contributions by employer directly to plan assets	-	(173,020)	(173,020)
Benefit payments	(153,473)	109,817	(43,656)
Others	(124,311)	69,075	(55,236)
Ending balance	₩ 2,489,741	₩ (1,760,859)	₩ 728,882

	2016		
	Defined benefit obligations	Plan assets	Net defined benefit liabilities
Beginning balance	₩ 2,538,128	₩ (1,571,665)	₩ 966,463
Current service cost	118,779	-	118,779
Interest cost (income)	83,219	(46,659)	36,560
Effect of reduction / liquidation	(5,215)	1,381	(3,834)
	196,783	(45,278)	151,505
Remeasurements:			
Return on plan assets (excluding amounts included in interest income)	-	(113,191)	(113,191)
Actuarial gain or loss from change in demographic assumptions	(3,503)	-	(3,503)
Actuarial gain or loss from change in financial assumptions	218,511	-	218,511
Others	(13,976)	-	(13,976)
	201,032	(113,191)	87,841
Transfer in and out	(46)	1,104	1,058
Business combination	(136,363)	96,068	(40,295)
Contributions by employee directly to plan assets	2,623	(2,569)	54
Contributions by employer directly to plan assets	-	(212,145)	(212,145)
Benefit payments	(125,207)	106,910	(18,297)
Others	(99,850)	85,213	(14,637)
Ending balance	₩ 2,577,100	₩ (1,655,553)	₩ 921,547

16. Net defined benefit liabilities (cont'd)

Assumptions used for actuarial valuation as at December 31, 2017 and 2016, are as follows (In percentage, %):

	2017	2016
Discount rate	1.03 ~ 7.76	1.20 ~ 7.72
Salary growth rate	2.00 ~ 8.00	2.00 ~ 8.00

Details of plan assets as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Equity securities	₩ 334,651	₩ 441,389
Debt securities	607,006	542,487
Deposits and others	819,202	671,677
	<u>₩ 1,760,859</u>	<u>₩ 1,655,553</u>

Plan assets are mostly invested in assets that have a quoted market price in an active market.

The sensitivity analysis of the defined benefit liabilities as at December 31, 2017 and 2016, is as follows (Korean won in millions):

			Amount	Ratio
December 31, 2017	Discount rate	1% increase	₩ (285,591)	(-)11.47%
		1% decrease	356,729	14.33%
	Salary growth rate	1% increase	67,062	2.69%
		1% decrease	(62,159)	(-)2.50%
December 31, 2016	Discount rate	1% increase	(273,796)	(-)10.62%
		1% decrease	342,157	13.28%
	Salary growth rate	1% increase	63,257	2.45%
		1% decrease	(57,111)	(-)2.22%

The weighted average maturity of defined benefit liabilities at the end of the current year is 13 years.

The Group expects to contribute ₩103,500 million for the defined benefit plans in the following period. The expense recognized in the current period in relation to defined contribution plan was ₩20,196 million (2016: ₩19,949 million), respectively.

17. Provisions

Changes in provisions for other liabilities and charges for the years ended December 31, 2017, is as follows (Korean won in millions):

	2017						
	Beginning balance	Addition (Reversal)	Used	Others	Ending balance	Current	Non-current
Provision for product warranties	₩ 352,889	₩ 324,595	₩ (264,130)	₩ (13,371)	₩ 399,983	₩ 167,852	₩ 232,131
Provision for sales return	2,519	1,702	(1,315)	2,608	5,514	5,514	-
Provision for restoration	6,041	133	-	204	6,378	-	6,378
Provision for loss compensation	9,060	4	-	(9,027)	37	-	37
	<u>₩ 370,509</u>	<u>₩ 326,434</u>	<u>₩ (265,445)</u>	<u>₩ (19,586)</u>	<u>₩ 411,912</u>	<u>₩ 173,366</u>	<u>₩ 238,546</u>

The Group estimates expenditure required to settle the Group's obligations from product warranty, refund, related after service and others based on warranty period, historical claim rate and recognized provision. Meanwhile, the Group recognized provisions amounting to ₩117,744 million related to pending litigations as other liabilities.

18. Share capital and share premium

Changes in share capital and share premium for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions, except for share data):

	Number of shares		Share capital			Share premium
	Ordinary shares	Preferred shares	Ordinary shares	Preferred shares	Total	
Balance at January 1, 2016	21,270,888	5,396,759	₩ 107,854	₩ 26,984	₩ 134,838	₩ 355,736
Retirement of treasury shares	(1,064,000)	-	-	-	-	-
Balance at December 31, 2016	<u>20,206,888</u>	<u>5,396,759</u>	<u>₩ 107,854</u>	<u>₩ 26,984</u>	<u>₩ 134,838</u>	<u>₩ 355,736</u>
Balance at January 1, 2017	20,206,888	5,396,759	₩ 107,854	₩ 26,984	₩ 134,838	₩ 355,736
Exercise of stock options	800	-	4	-	-	65
Retirement of treasury shares	(1,010,385)	-	-	-	-	-
Exercise of stock options	700	-	4	-	-	115
Balance at December 31, 2017	<u>19,198,003</u>	<u>5,396,759</u>	<u>₩ 107,862</u>	<u>₩ 26,984</u>	<u>₩ 134,846</u>	<u>₩ 355,916</u>

The Group's number of shares authorized amounted to 400,000,000 shares, with a par value of ₩5,000 per share. There is a difference arising from retirement of shares through retained earnings, and capital stock is not the same as total par value of shares issued.

The number of shares that are having limitation on voting right under commercial law amounted to 4,226,070 and 5,276,455 as at December 31, 2017 and 2016, respectively. Preferred share has no voting rights.

19. Capital surplus

Details of capital surplus as at December 31, 2017 and 2016, are summarized as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Share premium	₩ 355,916	₩ 355,736
Gain from merger	1,390	1,390
Revaluation reserve	277,542	277,542
Other reserve	209,403	193,114
	<u>₩ 844,251</u>	<u>₩ 827,782</u>

20. Other components of equity

Other components of equity as at December 31, 2017 and 2016, are summarized as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Treasury shares	₩ (261,975)	₩ (323,456)
Loss on sale of treasury shares	(16,738)	(16,738)
Stock option	10,431	12,296
Loss on capital reduction	(127,318)	(127,319)
Others	(48,872)	(38,463)
	<u>₩ (444,472)</u>	<u>₩ (493,680)</u>

Treasury shares

The Group held treasury shares for the purpose of stabilizing the share price and changes in treasury shares for the year ended December 31, 2017, are as follows (Korean won in millions, except for share data):

	Number of treasury shares			Book amount of treasury shares		
	Ordinary shares	Preferred shares	Total	Ordinary shares	Preferred shares	Total
Beginning balance	5,276,455	673,054	5,949,509	₩ 308,404	₩ 15,052	₩ 323,456
Acquisition	-	-	-	-	-	-
Disposal (retirement of treasury shares)	(1,010,385)	-	(1,010,385)	(61,481)	-	(61,481)
Ending balance	<u>4,266,070</u>	<u>673,054</u>	<u>4,939,124</u>	<u>₩ 246,923</u>	<u>₩ 15,052</u>	<u>₩ 261,975</u>

Share-based payment

The Group has granted stock options to its directors several times. Stock options are settled based on the Board of Directors' decision by issuance of new share, treasury share or cash settlement. Vesting condition offers two-year service after the resolution at the shareholders' meeting.

Number of granted options as at December 31, 2017, is as follows (Korean won, except for share data):

	Date of grant	Number of granted options	Exercisable period	Exercisable price	Expected fair value at the date of grant
8th	2007.3.16	-	2010.3.16 - 2017.3.15	₩ 59,600	₩ 28,930
9th	2008.3.21	11,900	2011.3.21 - 2018.3.20	165,100	68,846
10th	2009.3.27	1,850	2012.3.27 - 2019.3.26	106,500	53,382
12th	2010.3.26	39,310	2013.3.26 - 2020.3.26	116,500	56,460
13th	2011.3.25	15,500	2014.3.25 - 2021.3.25	137,500	68,045
14th	2012.3.30	23,300	2015.3.30 - 2022.3.30	156,200	63,647
15th	2013.3.29	50,400	2016.3.29 - 2023.3.28	128,100	43,353

16th	2014.3.28	65,000	2017.3.28 - 2024.3.27	134,300	39,558
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20. Other components of equity (cont'd)

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

	Risk-free interest rate	Expected exercisable period	Expected volatility	Expected dividend yield ratio
8th	4.79%	3.00	46.73%	-
9th	5.18%	3.00	58.89%	-
10th	3.71%	3.53	69.82%	22.00%
12th	3.82%	3.27	71.67%	35.00%
13th	3.66%	3.29	73.42%	40.00%
14th	3.57%	3.41	62.76%	43.00%
15th	2.45%	3.42	49.22%	46.00%
16th	2.88%	3.60	40.90%	48.00%

Risk-free interest rate is based on a three-year Treasury bond yield rate.

Changes in stock options for the year ended December 31, 2017, are as follows (Korean won in millions, except for share data):

	Number of ordinary shares to be issued				
	Beginning	Granted	Exercised	Forfeited	Ending
8th	800	-	(800)	-	-
9th	11,900	-	-	-	11,900
10th	2,250	-	(200)	(200)	1,850
12th	40,810	-	(500)	(1,000)	39,310
13th	16,300	-	-	(800)	15,500
14th	25,000	-	-	(1,700)	23,300
15th	53,000	-	-	(2,600)	50,400
16th	101,900	-	-	(36,900)	65,000
	251,960	-	(1,500)	(43,200)	207,260

	Valuation amount				
	Beginning	Granted	Exercised	Forfeited	Ending
8th	₩ 23	₩ -	₩ (23)	₩ -	₩ -
9th	819	-	-	-	819
10th	120	-	(11)	(11)	99
12th	2,304	-	(28)	(56)	2,219
13th	1,109	-	-	(54)	1,055
14th	1,591	-	-	(108)	1,483
15th	2,298	-	-	(113)	2,185
16th	4,031	-	-	(1,460)	2,571
	₩ 12,295	₩ -	₩ (62)	₩ (1,802)	₩ 10,431

The weighted-average remaining contractual period (from December 31, 2017 to maturity) of stock options is 4.40 years.

21. Accumulated other comprehensive income

Accumulated other comprehensive income as at December 31, 2017 and 2016, is summarized as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Loss on AFS securities	₩ (13,206)	₩ (14,104)
Decrease in equity of associates	(5,517)	(2,707)
Loss on translation of foreign operations	(108,453)	(100,006)
Cash flow hedge	30,866	40,511
Revaluation surplus	703,231	588,202
	<u>₩ 606,921</u>	<u>₩ 511,896</u>

22. Retained earnings

Retained earnings as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Legal reserves	₩ 62,906	₩ 52,864
Discretionary reserves	26,666	51,666
Retained earnings before appropriation	1,242,948	1,306,129
	<u>₩ 1,332,520</u>	<u>₩ 1,410,659</u>

The Commercial Code of the Republic of Korea requires the Group to appropriate an amount equal to a minimum of 10% of annual cash dividends declared as a legal reserve until the reserve equals 50% of its issued share capital.

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

	2017	2016
Beginning balance	₩ 1,410,659	₩ 1,357,017
Profit for the period	40,568	196,568
Actuarial gain (loss) on retained earnings	21,724	(28,114)
Payment of dividends	(100,426)	(91,267)
Land revaluation surplus	21,475	40,001
Retirement of treasury shares	(61,480)	(63,546)
Ending balance	<u>₩ 1,332,520</u>	<u>₩ 1,410,659</u>

22. Retained earnings (cont'd)

Details of dividends for the years ended December 31, 2017 and 2016, are as follows (Korean won, except for share data and dividend amount):

	2017			2016		
	Preferred shares (old)	Preferred shares (new)	Ordinary shares	Preferred shares (old)	Preferred shares (new)	Ordinary shares
Face value per share	₩ 5,000	₩ 5,000	₩ 5,000	₩ 5,000	₩ 5,000	₩ 5,000
Year-end dividends:						
Number of shares issued	4,411,074	985,685	19,198,003	4,411,074	985,685	20,206,888
Number of treasury shares	(620,812)	(52,242)	(4,266,070)	(620,812)	(52,242)	(5,276,455)
Shares eligible for dividends	3,790,262	933,443	14,931,933	3,790,262	933,443	14,930,433
Rate of dividend per face value	1.03	1.02	1.02	1.03	1.02	1.02
Dividend per share	₩ 5,150	₩ 5,100	₩ 5,100	₩ 5,150	₩ 5,100	₩ 5,100
Dividend amount (in millions)	₩ 19,520	₩ 4,761	₩ 76,153	₩ 19,520	₩ 4,761	₩ 76,145
Average closing price(*1)	₩ 79,150	₩ 78,375	₩ 123,750	₩ 70,480	₩ 70,200	₩ 112,300
Dividend yield	6.51%	6.51%	4.12%	7.31%	7.26%	4.54%

(*1) Average of prices in the stock market for one week preceding the two business days before the record date of the shareholders' list related to above dividends.

23. Information for non-controlling interests

Details of hybrid capital instruments issued by the Group's subsidiary, DPS.S.A as at December 31, 2017 are as follows:

	Details
Issue date	December 3, 2015
Value at issue	USD 300,000,000
Issue purpose	General operating funds
Issue process	Overseas competition
Whether listed or not	Listed (Singapore)
Outstanding balance	USD 300,000,000
Matters concerning the recognition of capital	<p>① Accounting standards Based on paragraph 15 of KIFRS 1032 <i>Financial Instruments: Presentation</i>. The Company may elect to cash or settle shares in accordance with Doosan Heavy Industries & Construction's discretion, and it is classified as an equity instrument because it is a transaction that can be exchanged for a fixed amount of equity instruments when issued.</p> <p>② Rate of capital approval of credit rating agencies, etc. None</p>
Accrued interest	None
Maturity and Early Repayment Date	<p>Expiration date: 30 years Revolving</p> <p>The issuer can make a call option once on December 03, 2018, which is three years after issuance. If the call option is not exercised, the investor's hybrid capital instruments will be transferred to the Korea Exim bank.(Non-call Put right)</p>
Interest rate	<p>① Interest rate: 2.50% on the face value basis, 3-year Treasury Rate + Initial Credit Spread (1.35%) and Step up margin (1.30%) every 3 years from December 3, 2018.</p> <p>② Payment: Dividends are paid at the end of every six months, optional deferral of distributions is available.</p>
Priority	Equivalent to existing senior loans
Impact on financial structure of debt classification	The debt-to-equity ratio rise from 278.37% to 292.64% as of December 31, 2017.
Other important issuing conditions	If the Korea Export-Import Bank, which is the guarantee institution, holds the issuer's hybrid capital securities after the non-call put right of the investor after three years, the Korea Export-Import Bank may request the exchange of the newly acquired capital securities to ordinary shares of Doosan Heavy Industries & (1) Doosan Heavy Industries & Construction Co., Ltd. shall, at its option, request the exchange of USD 19.1 of the face value of the hybrid securities with one (1) ordinary share of Doosan Heavy Industries & Construction Co.,) Can be settled in cash. In connection with this, Doosan Heavy Industries & Construction provided 75,509,366 shares of Doosan Infracore Co., Ltd. and 29,650,000 shares of Doosan Engine Co., Ltd., which are owned by Doosan Heavy Industries & Construction Co.,

Meanwhile, Doosan Infracore Co., Ltd., a subsidiary of the Group, exercised the call option on October 5, 2017 for hybrid capital instruments (USD 500,000 thousand) issued on October 5, 2012.

23. Information for non-controlling interests (cont'd)

Details of redeemable convertible preference shares issued by the Group's subsidiary, DHC, as at December 31, 2017 are as follows:

	Details
Issue date	December 6, 2014
Issue purpose	For improvement of financial structure
Issued shares	Cumulative non-participating preferred stock
Total number of outstanding shares	13,203,540 shares
Issue price per share	₩ 28,250
Voting right	Preferred stock has one voting right per share, same as common stock, and when a resolution of shareholders' meeting is unfavorable to the preferred stock, such resolution must be also approved at the preferred stockholders' meeting.
Dividend right	Annual 4.8% of the issue price (after 5 years, 0.75% will be added annually on the index of 5 year average rate of returns posted by the private bond value appraisal institutions)
Redemption right	<ul style="list-style-type: none"> ① Reimbursement from 1 year to 5 years: Early redemption is available to the extent of 10% of total preferred stock with 10% plus issuance price. ② Repayment at 5 years: Redeemable all or some portion of preferred stock 5 years after the payment date. (At issue price plus 5.48% per annum less prepaid dividends) ③ Repayment at the time of 5 ~ 10 years: Redeemable with adjusted amount based on the rate of returns posted by the private bond value appraisal institutions. .
Conversion right	<ul style="list-style-type: none"> ① Conversion rights: Convertible all or some portion of preferred stocks ② Conversion period: From 1 to 10 years from the contribution date ③ Conversion ratio: 1 shares of preferred shares issued is converted to 1 share of ordinary shares

DHC, a subsidiary of the Group has the redeemable right in connection with the above RCPS and there are no contractual obligations for DHC to pay in cash and/or other financial assets. Therefore, DHC classified the RCPS as equity.

24. Operating segment information

The Group is engaged in various businesses, such as heavy industry, machinery manufacturing, apartment construction industry and service industry; key products and services of each division are as follows:

Business segment	Main products and services
Electro-Materials BG	Copper-clad laminates and others
Mottrol BG	Oil hydraulic equipment and others
Industrial Vehicle BG	Forklift and others
Information and Communication BU	Development and maintenance service of information technology system and others
Others	Advertisement, manufacture and sale of industrial installations and operating condominiums, golf course and others
DHC	Generating unit, casting, forging and others
DI	Internal combustion engine, construction machinery of all kinds, transportation equipment and others
DEC	Construction of apartment buildings and others
DE	Marine engine, internal combustion engine, nuclear power plant emergency generator and others

24. Operating segment information (cont'd)

Information on each business segment for the years ended December 31, 2017 and 2016, is as follows (Korean won in millions):

	2017				
	Total sales	Inter-segment sales	Net sales	Operating profit	Profit (loss) for the period
Electro-Materials BG	₩ 1,170,577	₩ (238,789)	₩ 931,788	₩ 133,212	₩ 104,867
Mottrol BG	553,114	(209,540)	343,574	35,216	28,887
Industrial Vehicle BG	1,071,480	(282,809)	788,671	64,826	43,034
Information and Communication BU	255,094	(248,825)	6,269	32,047	24,954
Others	1,513,246	(392,853)	1,120,393	96,217	62,366
DHC	5,970,573	(338,289)	5,632,284	187,276	(142,055)
DI	8,835,800	(2,328,618)	6,507,182	660,769	296,643
DEC	1,535,864	(46,704)	1,489,160	58,946	(184,024)
DE	778,814	(12,930)	765,884	13,477	(10,343)
	21,684,562	(4,099,357)	17,585,205	1,281,986	224,329
Consolidation adjustments	(4,099,357)	-	-	(102,070)	(178,380)
	₩ 17,585,205	₩ -	₩ -	₩ 1,179,916	₩ 45,949

	2016				
	Total sales	Inter-segment sales	Net sales	Operating profit	Profit (loss) for the period
Electro-Materials BG	₩ 999,338	₩ (199,884)	₩ 799,454	₩ 80,183	₩ 74,894
Mottrol BG	338,710	(115,032)	223,678	11,316	2,479
Industrial Vehicle BG	902,575	(216,831)	685,744	52,151	34,444
Information and Communication BU	263,613	(249,572)	14,041	37,561	29,309
Others	1,375,738	(390,051)	985,687	133,471	432,288
DHC	6,553,646	(502,762)	6,050,884	286,116	10,430
DI	7,953,616	(2,279,629)	5,673,987	490,818	115,985
DEC	1,334,164	(94,295)	1,239,869	19,807	(357,034)
DE	818,222	(21,275)	796,947	4,237	(181,226)
	20,539,622	(4,069,331)	16,470,291	1,115,660	161,569
Consolidation adjustments	(4,069,331)	-	-	(191,405)	(111,153)
	₩ 16,470,291	₩ -	₩ -	₩ 924,255	₩ 50,416

The above inter-segment sales are made in accordance with the terms of the transactions between independent parties.

24. Operating segment information (cont'd)

Segment assets and liabilities as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017		December 31, 2016	
	Assets	Liabilities	Assets	Liabilities
Electro-Materials BG	₩ 596,010	₩ 341,542	₩ 558,306	₩ 340,561
Mottrol BG	284,050	191,064	221,426	119,106
Industrial Vehicle BG	504,961	337,024	462,252	278,113
Information and Communication				
BU	109,157	74,998	124,664	80,912
Others	5,163,840	2,317,835	4,944,959	2,386,444
DHC	14,844,695	9,101,798	14,610,281	9,329,638
DI	10,276,090	7,102,929	10,026,809	6,578,432
DEC	2,845,644	1,880,195	3,030,035	1,965,359
DE	1,231,347	688,177	1,356,450	822,185
	35,855,794	22,035,562	35,335,182	21,900,750
Consolidation adjustments	(7,086,772)	(869,958)	(6,670,377)	(1,136,803)
	<u>₩ 28,769,022</u>	<u>₩ 21,165,604</u>	<u>₩ 28,664,805</u>	<u>₩ 20,763,947</u>

Sales information by geographical location for the periods ended December 31, 2017 and 2016, is as follows (Korean won in millions):

	2017			2016		
	Total sales	Inter-segment sales	Net sales	Total sales	Inter-segment sales	Net sales
Korea	₩ 9,883,161	₩ (2,213,593)	₩ 7,669,568	₩ 9,221,381	₩ (1,973,344)	₩ 7,248,037
U.S.A	3,762,982	(635,687)	3,127,295	3,586,792	(507,862)	3,078,930
Asia	3,367,165	(389,764)	2,977,401	2,899,335	(449,611)	2,449,724
Middle East	1,429,356	(4,070)	1,425,286	1,131,751	(1,461)	1,130,290
Europe	3,159,199	(854,406)	2,304,793	3,545,060	(1,136,966)	2,408,094
Other countries	82,699	(1,837)	80,862	155,303	(87)	155,216
	21,684,562	(4,099,357)	17,585,205	20,539,622	(4,069,331)	16,470,291
Consolidation adjustments	(4,099,357)	-	-	(4,069,331)	-	-
	<u>₩ 17,585,205</u>	<u>₩ -</u>	<u>₩ -</u>	<u>₩ 16,470,291</u>	<u>₩ -</u>	<u>₩ -</u>

25. Revenues

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

	2017	2016
Sales on merchandises and finished goods	₩ 9,931,669	₩ 8,708,916
Construction contracts	7,031,720	7,343,243
Others	621,816	418,132
	<u>₩ 17,585,205</u>	<u>₩ 16,470,291</u>

26. Construction contracts

Details of the Group's accumulated construction income and assets and liabilities related to construction contracts as of and for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017					
	Accumulated construction revenue	Accumulated construction cost	Accumulated profit or loss	Receivable from construction contracts		Due to customers
				Billed	Unbilled	
DHC	₩ 40,027,901	₩ 33,982,168	₩ 6,045,733	₩ 459,887	₩ 1,490,488	₩ (399,007)
DEC	7,929,865	7,026,948	902,918	1,091,173	245,072	(291,139)
DE	263,996	227,479	36,517	144	1,451	(11,492)
DPS S.A. and others	10,816,659	8,532,646	2,284,013	259,244	316,319	(204,974)
Doosan Mecatec Co., Ltd.	313,696	289,513	24,183	37,309	86,697	(10,237)
	59,352,117	50,058,754	9,293,364	1,847,757	2,140,027	(916,849)
Inter-company transactions	(166,243)	(150,023)	(16,220)	(18,696)	1	75,009
Amount attributable to discontinued operation segment	(41,172)	(38,873)	(2,299)	-	-	-
	₩ 59,144,702	₩ 49,869,858	₩ 9,274,845	₩ 1,829,061	₩ 2,140,028	₩ (841,840)
	2016					
	Accumulated construction revenue	Accumulated construction cost	Accumulated profit or loss	Receivable from construction contracts		Due to customers
				Billed	Unbilled	
DHC	₩ 38,744,512	₩ 32,748,738	₩ 5,995,774	₩ 713,803	₩ 1,548,041	₩ (667,763)
DEC	7,643,392	6,733,554	909,838	1,208,749	228,130	(175,765)
DE	233,372	187,819	45,553	452	15,762	(16,562)
DPS S.A. and others	8,960,275	8,255,745	704,529	287,303	217,639	(74,036)
DST	123,298	134,672	(11,374)	-	-	-
Doosan Mecatec Co., Ltd.	1,231,229	1,094,010	137,220	60,057	145,199	(9,569)
	56,936,078	49,154,538	7,781,540	2,270,364	2,154,771	(943,695)
Inter-company transactions	(145,347)	(130,661)	(14,686)	(15,896)	10,931	33,476
Amount attributable to discontinued operation segment	(144,250)	(151,268)	7,018	22,170	(1,663)	919
	₩ 56,646,481	₩ 48,872,609	₩ 7,773,872	₩ 2,276,638	₩ 2,164,039	₩ (909,300)

26. Construction contracts (cont'd)

Details of changes in the remaining balance of construction contract for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

		2017			
	Project	Beginning balance	Changes	Recognized construction revenue	Ending balance
DHC	Fadhili CHP and others	₩ 13,600,876	₩ 3,591,936	₩ (4,022,580)	₩ 13,170,232
DEC	Ulsan Daehyun APT and others	6,523,604	2,137,462	(1,497,787)	7,163,280
DE	Shin-kori # 3,4 Emergency generator, alternate power diesel generator and 10 others	49,931	2,238	(31,483)	20,686
DPS S.A. and others	Raipur and others	3,226,092	1,927,144	(1,293,031)	3,860,205
Doosan Mecatec Co., Ltd.	Bechtel CCL II (MVA0-02) and others	145,449	259,775	(189,723)	215,501
		23,545,952	7,918,555	(7,034,604)	24,429,904
Inter-company transactions		(372,936)	(126,755)	40,852	(458,840)
Amount attributable to discontinued operation segment		(16,600)	(70)	334	(16,336)
		₩ 23,156,416	₩ 7,791,730	₩ (6,993,418)	₩ 23,954,728

		2016			
	Project	Beginning balance	Changes	Recognized construction revenue	Ending balance
DHC	Vinh Tan 4 Thermal Power Plant and others	₩ 13,454,315	₩ 4,510,835	₩ (4,364,274)	₩ 13,600,876
DEC	Suseo Pyeongtaek Golcheol 2 Tools and others	6,793,342	1,176,365	(1,446,103)	6,523,604
DE	Shin-kori # 3,4 Emergency generator, alternate power diesel generator and 10 others	85,208	(831)	(34,446)	49,931
DPS S.A. and others	Raipur and others	3,319,743	1,348,350	(1,442,001)	3,226,092
DST	Prototype research and others	146,868	(145,536)	(1,332)	-
Doosan Mecatec Co., Ltd.	Liwa Bullets and others	279,427	157,753	(291,731)	145,449
		24,078,903	7,046,936	(7,579,887)	23,545,952
Inter-company transactions		(283,799)	(169,311)	80,174	(372,936)
Amount attributable to discontinued operation segment		(718,591)	561,003	140,988	(16,600)
		₩ 23,076,513	₩ 7,438,628	₩ (7,358,725)	₩ 23,156,416

26. Construction contracts (cont'd)

Changes in profit or loss in current and future reporting periods and the book amount of due from/to customers for contracts work (excluding foreign currency translation effect) resulting from changes in total contract revenue and in total estimated contract costs for construction contracts in progress as at December 31, 2017, are as follows (Korean won in millions):

	Changes in estimated total contract revenue	Changes in estimated total contract costs	Impact on profit or loss for the period	Impact on profit or loss for the succeeding year	Changes in due from/to customers for contract work	Provision for construction loss
DHC	₩ 487,903	₩ 333,541	₩ 58,436	₩ 95,926	₩ 58,436	₩ 8,978
DEC	70,053	79,525	(42,465)	32,993	(42,465)	1,041
DE	(5,922)	2,502	(4,737)	(3,687)	(4,737)	124
Doosan Mecatec Co., Ltd.	7,406	(1,259)	1,543	7,122	1,543	73
	559,440	414,309	12,777	132,354	12,777	10,216
Amount attributable to discounted operation segment	(70)	(203)	130	3	130	-
	₩ 559,370	₩ 414,106	₩ 12,907	₩ 132,357	₩ 12,907	₩ 10,216

The impact on profit or loss for the period and the succeeding year is determined based on total contract costs which are estimated based on the circumstances present from the start of the contract to the end of current year, and the estimated contract revenue as at December 31, 2017. The total contract costs and contract revenue may change in the future.

26. Construction contracts (cont'd)

As at December 31, 2017, details of contracts that the revenue was recognized based on the percentage of completion measured by contract cost incurred, which is more than 5% of sales of year ended December 31, 2016 are as follows (Korean won in millions):

	Contract	Contractual completion date	Percentage-of-completion (%)	Due from customers		Trade receivables (receivables from construction contracts)	
				Gross amount	Accumulated impairment loss	Gross amount	Provision for impairment
UAE BNPP 1, 2 NSSS	2010-06-30	2018-05-01	98	₩ -	₩ -	₩ -	₩ -
Ras Al Khair	2010-08-31	2020-03-19	97	180	-	55	1
Nghi Son II	2014-12-24	2019-07-30	-	-	-	-	-
Vinh Tan 4 TPP	2014-02-26	2018-06-30	91	46,543	-	16,058	-
Shin-Kori 5 and 6 NSSS	2014-08-28	2022-03-31	48	3,994	-	-	-
Shinhan Wool 1, 2 NSSS	2009-07-31	2018-02-28	97	23,997	-	-	-
UAE BNPP 3, 4 NSSS	2010-06-30	2020-05-01	90	15,976	-	-	-
Shin-Kori 3 and 4 NSSS	2006-08-28	2018-09-30	98	9,416	-	-	-
Yanbu ph.3 MSF	2012-12-04	2019-04-30	94	13,221	-	-	-
Qurayyah Add-On(*1)	2009-09-16	2014-10-15	99	51,761	-	-	-
Fadhili CHP	2016-11-12	2019-11-30	51	89,414	-	27,089	-
Song Hau1	2015-04-10	2019-10-02	64	114,641	-	1	-
Subic Redondo(*2)	2016-10-13	2021-06-30	2	-	-	-	-
Jawaharpur	2016-12-22	2021-10-21	6	17,108	-	1,710	-
Obra C	2016-12-22	2021-10-21	4	15,436	-	-	-
Raipur Chhattisgarh TPP	2010-01-10	2018-03-31	100	-	-	81,576	-

(*1) The Group is negotiating to extend contract period with respective contract party.

(*2) The contract was terminated on March 13, 2018.

27. Breakdown of expenses by nature

Expenses classified by nature for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017	2016
Changes in inventories	₩ (197,478)	₩ 598,171
Purchases of raw materials and goods	7,961,328	7,017,276
Employee benefits expenses	2,588,892	2,653,927
Depreciation and amortization	630,827	628,432
Others	5,421,719	4,648,230
Total cost of sales and administrative expenses	₩ 16,405,288	₩ 15,546,036

28. Selling and administrative expenses

Selling and administrative expenses for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017	2016
Salaries	₩ 686,594	₩ 702,095
Post-employment benefits	46,513	48,517
Employee benefits	137,577	132,357
Travel expenses	62,970	59,669
Sales commission	85,532	69,173
Taxes and dues	38,134	35,028
Rental expenses	52,305	51,113
Depreciation	45,943	43,949
Insurance expenses	32,442	31,051
Repairing expenses	2,209	8,822
Advertising expenses	53,227	63,479
Packaging expenses	13,855	10,820
Research and development	220,896	218,479
Training expenses	13,753	15,499
Freight expenses	27,448	29,714
Promotional expenses	38,941	41,540
Commission expenses	200,734	157,583
Service contract expenses	28,459	21,828
Impairment loss	(5,065)	28,337
Amortization	81,618	84,955
Expansion expenses of overseas market	22,011	25,012
Warranty expenses	37,187	20,813
Others	43,294	63,871
	<u>₩ 1,966,577</u>	<u>₩ 1,963,704</u>

29. Finance income and expenses

Finance income and expenses for the years ended December 31, 2017 and 2016, are summarized as follows (Korean won in millions):

	2017	2016
Finance income:		
Interest income	₩ 53,785	₩ 49,490
Dividend income	2,395	2,494
Gain on foreign currency transaction	298,585	265,386
Gain on foreign currency translation	420,182	152,719
Gain on derivative transactions	196,621	325,831
Gain on valuation of derivatives	182,935	104,772
Gain on valuation of firm commitment	58,957	186,909
Financial guarantee income	152	704
Gain on exemption of debt	-	41
	<u>1,213,612</u>	<u>1,088,346</u>
Finance expenses:		
Interest expense	568,393	583,633
Loss on foreign currency transactions	311,328	284,400
Loss on foreign currency translations	275,048	223,246
Loss on derivative transactions	156,574	264,738
Loss on valuation of derivatives	71,259	229,460
Loss on valuation of firm commitment	323,496	76,489
Loss on exemption of bonds	24,316	9,944
Loss on exemption of borrowings	884	667
Financial guarantee expense	59,768	32,873
Other financial expenses	3,531	1,759
	<u>1,794,597</u>	<u>1,707,209</u>
	<u>₩ (580,985)</u>	<u>₩ (618,863)</u>

30. Other non-operating income and expenses

Other non-operating income and expenses for the years ended December 31, 2017 and 2016, consist of the following (Korean won in millions):

	2017	2016
Other non-operating income:		
Gain on disposal of short-term investment securities	₩ 9,389	₩ 14,528
Gain on disposal of long-term investment securities	45,188	231,285
Gain on disposal of subsidiary investment securities	1,003	-
Gain on disposal of property, plant and equipment	4,889	16,004
Gain on disposal of intangible assets	947	406
Gain on disposal of investment properties	333	469
Gain on disposal of assets held for sale	2,183	1,102
Gain on valuation of investment properties	47,618	6,362
Reversal of intangible asset impairment loss	2,690	18
Others	77,161	101,143
	<u>191,401</u>	<u>371,317</u>
Other non-operating expenses:		
Loss on disposal of trade receivables	23,180	13,662
Loss on disposal of long-term investment securities	1	1,540
Impairment loss of long-term investment securities	16,060	32,520
Loss on disposal of property, plant and equipment	10,752	20,304
Loss on disposal of intangible assets	388	251
Loss on disposal of investment properties	3,568	9,379
Impairment loss of property, plant and equipment	6,746	25,847
Impairment loss of intangible assets	26,814	61,732
Loss on valuation of investment properties	21,850	6,831
Loss on disposal of assets held for sale	183	31,399
Loss on disposal of investments in subsidiaries	11,959	50
Donations	26,382	21,606
Others	287,061	436,796
	<u>434,944</u>	<u>661,917</u>
	<u>₩ (243,543)</u>	<u>₩ (290,600)</u>

31. Tax expenses and deferred tax

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

	2017	2016
Current tax on profits for the year	₩ 155,320	₩ 251,749
Deferred tax:		
Origination and reversal of temporary differences	245,908	98,057
Charged or credited directly to equity	(104,908)	22,836
Others	(23,419)	(1,805)
Income tax expense directly reflected in discontinued operations	-	(177,803)
Income tax expenses	<u>₩ 272,901</u>	<u>₩ 193,034</u>

31. Tax expenses and deferred tax (cont'd)

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

	2017			
	Beginning balance	Changes		Ending balance
		Profit or loss	Equity	
Allowance for bad debts	₩ 486,612	₩ (4,029)	₩ -	₩ 482,583
Derivatives	23,293	(14,034)	12,710	21,969
Property, plant and equipment	(699,203)	53,334	(95,644)	(741,513)
Intangible assets	54,249	(6,355)	-	47,894
Assets and liabilities by foreign currencies	23,358	(23,562)	82	(122)
Post-employment benefit liabilities	296,555	(15,964)	(27,916)	252,675
Reserve for research and human resource	(58,273)	37,299	-	(20,974)
Investment properties	(12,924)	(7,294)	-	(20,218)
Others	344,374	(167,749)	11,001	187,626
Consolidation adjustments	(41,667)	7,354	(5,141)	(39,454)
	₩ 416,374	₩ (141,000)	₩ (104,908)	₩ 170,466

	2016			
	Beginning balance	Changes		Ending balance
		Profit or loss	Equity	
Inventories	₩ 2,567	₩ 17,388	₩ -	₩ 19,955
Available-for-sale financial assets	(75,898)	27,430	36,123	(12,345)
Property, plant and equipment	(778,293)	75,086	4,005	(699,202)
Accrued expenses	15,003	64,627	-	79,630
Post-employment benefit liabilities	269,955	15,143	11,456	296,554
Reserve for research and human resource	(110,157)	51,884	-	(58,273)
Investment properties	(15,162)	2,238	-	(12,924)
Others	1,249,154	(375,759)	(28,748)	844,647
Consolidation adjustments	(42,738)	1,070	-	(41,668)
	₩ 514,431	₩ (120,893)	₩ 22,836	₩ 416,374

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 against deferred tax liabilities relating to income taxes levied by the same taxation authority.

Temporary differences, net loss and tax credit carryforwards, which have not been recognized as deferred income tax assets and expired or unused as at December 31, 2017 and 2016, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016
Deductible temporary differences	₩ 3,744,239	₩ 3,790,474

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

31. Tax expenses and deferred tax (cont'd)

Details of unrecognized deductible (taxable) temporary differences as deferred tax assets (liabilities) related to investments in subsidiaries, joint ventures and associates, are as follows (Korean won in millions):

	December 31, 2017	December 31, 2016	Remarks
Investments in subsidiaries	₩ (493,908)	₩ (218,906)	Able to control the reversal of the temporary difference
Investments in associates and joint ventures	76,233	55,494	Probable that the temporary difference will not reverse in the foreseeable future
	<u>₩ (417,675)</u>	<u>₩ (163,412)</u>	

A reconciliation of income tax expense and accounting income before income tax expense for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017	2016
Profit before income tax expense	₩ 341,266	₩ 1,652
Tax at domestic tax rates applicable to profits	82,586	400
Adjustments:		
Non-temporary difference	151,833	154,014
Temporary difference not recognized as deferred income tax	96,265	60,584
Tax credits	(18,072)	(21,270)
Effect of tax rate fluctuation	1,194	(22)
Additional income tax paid(refunded) for prior periods	3,990	(570)
Others	(44,896)	(104)
Income tax expense	<u>₩ 272,901</u>	<u>₩ 193,034</u>
Average effective tax rate (Income tax expense/Profit before income tax expense)	80%	11688%

32. Earnings per share

Basic earnings per share

Basic earnings per share for the years ended December 31, 2017 and 2016, are as follows (Korean won):

	2017		
	Continuing	Discontinued	Total
Basic earnings (losses) per ordinary share	₩ 2,120	₩ (211)	₩ 1,909
Basic earnings (losses) per old-type preferred share (*1)	2,141	(213)	1,928

	2016		
	Continuing	Discontinued	Total
Basic earnings per ordinary share	₩ 4,755	₩ 5,217	₩ 9,972
Basic earnings per old-type preferred share (*1)	4,778	5,244	10,022

(*1) The Group calculated earnings per share for old-type preferred share due to the nature of the share, which does not have preferred right on dividends and liquidation; therefore, the share is considered as ordinary share, based on KIFRS 1033 'Earnings per share.'

32. Earnings per share (cont'd)

Basic earnings per share

Profit attributable to ordinary shares is as follows (Korean won):

	2017		
	Continuing	Discontinued	Total
Profit attributable to the ordinary equity holders of the Parent Company	₩ 45,063,458,611	₩ (4,495,474,202)	₩ 40,567,984,409
(-)Expected dividends on new-type preferred shares	5,288,092,818	(527,533,518)	4,760,559,300
(-)Expected dividends on old-type preferred shares	8,115,635,520	(809,605,637)	7,306,029,883
Profit attributable to ordinary share	₩ 31,659,730,273	₩ (3,158,335,047)	₩ 28,501,395,226

	2016		
	Continuing	Discontinued	Total
Profit attributable to the ordinary equity holders of the Parent Company	₩ 93,725,507,417	₩ 102,842,773,970	₩ 196,568,281,387
(-)Expected dividends on new-type preferred shares	2,269,877,077	2,490,682,223	4,760,559,300
(-)Expected residual income attributable to new-type preferred shares	2,168,187,990	2,379,101,203	4,547,289,193
(-)Expected dividends on old-type preferred shares	9,307,238,011	10,212,611,289	19,519,849,300
(-)Expected residual income attributable to old-type preferred shares	8,803,966,123	9,660,382,994	18,464,349,117
Profit attributable to ordinary share	₩ 71,176,238,216	₩ 78,099,996,261	₩ 149,276,234,477

The weighted-average number of ordinary shares and old-type preferred shares outstanding used in basic earnings per share calculation is as follows (in Shares):

	2017		2016	
	Ordinary shares	Old-type preferred shares	Ordinary shares	Old-type preferred shares
Beginning outstanding shares	14,930,433	3,790,262	15,280,760	3,790,262
Exercise of stock option	638	-	-	-
Change in treasury shares	-	-	(310,506)	-
Weighted-average number of ordinary shares outstanding	14,931,071	3,790,262	14,970,254	3,790,262

Diluted earnings per share

Diluted earnings per share for the years ended December 31, 2017 and 2016, are as follows (Korean won):

	2017		
	Continuing	Discontinued	Total
Diluted earnings (losses) per ordinary share	₩ 2,120	₩ (211)	₩ 1,909
Diluted earnings (losses) per old-type preferred share	2,141	(213)	1,928

	2016		
	Continuing	Discontinued	Total
Diluted earnings per ordinary share	₩ 4,754	₩ 5,217	₩ 9,971

Diluted earnings per old-type preferred share	4,778	5,244	10,022
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32. Earnings per share (cont'd)

Diluted profit attributable to ordinary shares is as follows (Korean won):

	2017		
	Continuing	Discontinued	Total
Profit attributable to ordinary shares	₩ 31,659,730,273	₩ (3,158,335,047)	₩ 28,501,395,226
Share-based expense (after tax)	-	-	-
Diluted profit attributable to ordinary shares	₩ 31,659,730,273	₩ (3,158,335,047)	₩ 28,501,395,226

	2016		
	Continuing	Discontinued	Total
Profit attributable to ordinary shares	₩ 71,176,238,216	₩ 78,099,996,261	₩ 149,276,234,477
Share-based expense (after tax)	-	-	-
Diluted profit attributable to ordinary shares	₩ 71,176,238,216	₩ 78,099,996,261	₩ 149,276,234,477

The weighted-average number of ordinary shares outstanding used in the diluted earnings per share calculation is as follows (in Shares):

	2017	2016
Weighted-average number of ordinary shares outstanding	14,931,071	14,970,254
Effect of stock option exercise	371	314
Adjusted weighted-average number of ordinary shares outstanding	14,931,442	14,970,568

As there are no potential ordinary shares for old-type preferred share, diluted earnings per share for old-type preferred share are equal to basic earnings per share for old-type preferred share.

Conditions for preferred shares dividends (Korean won, except for share data):

	Face value	Number of shares issued
Old-type preferred share (*1)	₩ 5,000	4,411,074
New-type preferred share (*2)	5,000	985,685

(*1) The Company should distribute cash dividend available to ordinary shares +1%.

(*2) The Company should distribute 2% of face value of preferred share annually. In case the dividend rate of ordinary share exceeds that of preferred share, preferred share is participated in dividend for the exceeded dividend.

33. Contingencies and commitments

33.1 Notes, bills and checks offered in security

As at December 31, 2017, the Group pledged 20 face value notes (face value: ₩11,602 million), 2 face value checks (face value: ₩600 million), 11 blank face notes and 41 blank face checks as collateral against financial institutions for the borrowings and payment guarantees of the Group.

33.2 Financial covenant

33.2.1 DI

During 2016 and 2017, DI issued 28th foreign currency-denominated bonds for USD 300,000 thousand and 32nd foreign currency-denominated bonds for USD 300,000 thousand. In addition, the issued 28th and 32nd foreign currency-denominated bond has an early redemption clause for when and if DI's guarantor, KDB, becomes privatized, and the funds required for such redemption will be provided by KDB to DI. In addition, 11,178,538 shares and 10,882,765 shares of Doosan Bobcat Co., Ltd. held by Doosan Infracore Co., Ltd. are provided as collateral for the above bonds. If they do not meet the base price, additional shares or deposits equivalent to the difference should be provided as collateral.

DI has provided 25,433,532 shares of Doosan Bobcat Co., Ltd. as collateral for borrowings of ₩550,000 million from 11 companies including KDB Bank. The share or deposit should be provided as collateral when the contracted mortgage ceiling ratio is not met in relation to the above borrowings

In addition, if the long-term credit rating given by one or more of the three domestic credit rating agencies (Nice Credit Rating Co., Ltd., Korea Credit Rating Co., Ltd. and Korea Ratings & Co.) of DI is below BB0, it includes arrangements that constitute reasons for the loss of interest on the due date.

33.2.2 DEC

DEC entered into construction contracts with INTDC Co., Ltd. and Daewon Plus Constructions Co., Ltd. to develop Ilsan Zenith project and Haeundae Zenith project, respectively. DEC has provided guarantees to customers, who purchase the Ilsan Zenith and Haeundae Zenith apartments for the consideration paid to purchase the apartments during the repurchase guarantee periods (two to three years after the date of sale), should customers apply for such guarantees (see Note 33.8). As at December 31, 2017, the Group's consolidated financial statements do not reflect the effect from such guarantees, as the Group cannot reasonably predict the number of purchasers applying for the guarantee and the related guaranteed amount.

33.2.3 DHC

As at December 31, 2017, DHC has entered into an agreement with Doosan We've in Gwanggyo and Namyangju Baebong District Apartment Housing Project to take over debt (conditional limit: ₩ 488,100 million) on condition that the liability is completed or not yet completed.

33.3 Transferred trade receivables

Outstanding trade receivables sold with recourse by the Group are in the amount of ₩54,394 million and ₩106,225 million as at December 31, 2017 and 2016, respectively. Because the Group retains some level of risks and rewards relating to trade receivables, the Group has recognized its book amount and cash receipt from transfer as short-term borrowings, in consolidated statements of financial position (see Note 15).

33. Contingencies and commitments(cont'd)

33.4 Litigation in progress

Details of major lawsuits are as follows (Korean won in millions):

	Claim	Claimed amount
Doosan	Claims for damages and others	₩ 25,902
DHC	LNG tank collusion claims for damages and others	479,000
DI	Claims for damages and others	86,568
DEC	Claims for damages and others	77,867
DE	Claims for damages and others	33,898
		<u>₩ 703,235</u>

The outcome of such pending lawsuits cannot presently be determined.

In 2015, Hyundai Engineering & Construction Co., Ltd. requested International Chamber of Commerce to arbitrate disputes on manufacture of HRSG and warranties for general repairs with DEC. As at December 31, 2017, arbitration is in process, and the outcome of the arbitration cannot be reasonably estimated.

Besides, in 2011, outside investors invested 20% shares of Doosan Infracore China Co., Ltd., subsidiary of Doosan Infracore Co., Ltd. at ₩380 billion, and they have the right to request to jointly sell the shares held by the other party to a third party according to shareholder's agreement with Doosan Infracore Co., Ltd. In principle, Doosan Infracore Co., Ltd. should jointly sell its shares upon request by the outside investors, but it also has the right to purchase shares of outside investors at the price they are willing to sell.

In 2014, outside investors requested a due diligence report as a preliminary step to proceed with the sale process, but Doosan Infracore Co., Ltd. has not been able to provide due diligence materials including confidential information since the sale has not been confirmed. As a result, outside investors filed a lawsuit for the provision of due diligence to the Seoul Central District Court. Seoul Central District Court (March 2, 2015) dismissed an application for disposition of outside investors because Doosan Infracore Co., Ltd. did not have any obligation to provide due diligence data to outside investors.

Outside investors filed a lawsuit in November 2015 seeking the payment of the proceeds from the sale of stocks (foreign investors' proceeds of sale: ₩709.3 billion, lawsuit value of ₩10 billion). Seoul Central District Court (January 12, 2017) dismissed outside investor's claims for DI's non-fulfillment of the sale process. Then, Seoul High Court (February 21, 2018) recognized the obligation for the sale process and ruled that DI pay a portion of ₩709.3 billion of the proceeds from the sale which is ₩10 billion.

DI objected to the second judgment and appealed to the Supreme Court on February 26, 2018. Seoul High Court (February 28, 2018) suspended enforcement by the second judgment.

Even if the Supreme Court rules that DI is required to pay the plaintiffs' claims and obtain the shares to be acquired, the Group is unable to reliably measure future profits and losses that may arise from such transactions.

33.5 Technical contract

The Group has technical license agreements for the purpose of manufacturing specific products with MHI and others for the years ended December 31, 2017, and the Group paid ₩60,481 million as license fee.

33. Contingencies and commitments(cont'd)

33.6 Operating leases

Details of non-cancelable operating leases contract for the year ended December 31, 2017, are as follows (Korean won in millions):

	2017
Within one year	₩ 49,134
Later than one year but not later than five years	145,109
Later than five years	99,624
	<u>₩ 293,867</u>

33.7 Credit lines for borrowings

As at December 31, 2017, the Group has entered into bank overdraft agreements amounting to ₩ 9,918,028 million with various financial institutions.

33.8 Guarantee of payment

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

Provider	Provided to	2017
Doosan	KDFA and others	₩ 740
Circuit Foil Luxembourg Sarl	Alsarec and others	2,482
DHC and subsidiaries	Rentees of Yongin Doosan we've Apt. and others	168,208
DI and subsidiaries	Daewoo Engineering & Construction and others	181,222
DEC and subsidiaries	Ilsan Zenith's customers and others	1,516,967
		<u>₩ 1,869,619</u>

33. Contingencies and commitments (cont'd)

As at December 31, 2017, guarantees provided to third parties by the Group are as follows (Korean won in millions):

Provided to	Provider	2017
Doosan Corporation Co., Ltd.	Korea Defense Industry Association and others	₩ 58,679
	Seoul Guarantee Insurance	86,275
	KDB and others	41,849
	Machinery Financial Cooperative	35,467
	Woori Bank and others	37,431
	Korea Software Financial Cooperative	2,567
Dootamall Co., Ltd.	Seoul Guarantee Insurance	274
DLI	Seoul Guarantee Insurance	117
Doosan Mecatec	KEB Hana Bank	40,593
	Woori Bank	52,049
	KDB	21,154
	Machinery Financial Cooperative and others	43,732
Doosan Bears, Inc.	Seoul Guarantee Insurance	48
Circuit Foil Luxembourg Sarl	Credit Agricole and others	207
Oricom Inc.	Seoul Guarantee Insurance	1,742
Hancomm Inc.	Seoul Guarantee Insurance	3,750
Doosan Energy Solutions America, Inc.	KDB	41,849
DHC and subsidiaries	Korea Exim Bank	1,313,151
	Machinery Financial Cooperative	1,697,895
	Seoul Guarantee Insurance	917,002
	Construction Guarantee Cooperative	422,671
	National Agricultural Cooperative Federation	4,569
	KEB Hana Bank	180,918
	Korea Federation of Small and Medium Business	103,002
	Korea Trade Insurance Corporation	47,021
	Others	3,640,729
	KDB	642,840
DI and subsidiaries	Seoul Guarantee Insurance	2,290
	Machinery Financial Cooperative	24,176
	Korea Exim Bank	115,000
	KEB Hana Bank and others	1,237
	Construction Guarantee Cooperative	1,984,927
DEC and subsidiaries	Korea Housing Guarantee	2,381,382
	Hanshin Engineering & Construction	211,322
	Machinery Financial Cooperative	48,115
	Asia Commercial Bank	2,055
	Seoul Guarantee Insurance	32,205
	Others	3,305
	KEB Hana Bank	5,288
DE and subsidiaries	Woori Bank	12,485
	Nonghyup Bank	8,877
	Kookmin Bank	1,434
	Seoul Guarantee Insurance	20,873
		₩ 14,292,552

33. Contingencies and commitments (cont'd)

As at December 31, 2017, guarantees provided by the group for PF of developer are as follows (Korean won in millions):

Company name	Business name	Bond institution	The term of guarantee	Limit of guarantee	The balance	Description
Asset-backed commercial paper:						
DHC	Yongin Administrative City Doosan We've	Meritz Securities	2017.04.04 ~ 2018.04.04	₩ 36,000	₩ 36,000	Debt acceptance
				36,000	36,000	
Loan:						
DEC	Pohang New Port	Shinhan bank and others	2010.03.26 ~ 2025.12.31	7,447	7,447	Joint and several guarantee
	Daejeon Cheonbyeon	KEB Hana Bank	2004.05.06 ~ 2024.05.06	13,500	4,500	Joint and several guarantee
				20,947	11,947	
Short-term debenture:						
DHC	Hongcheon Mokok CC	KB securities	2017.04.18 ~ 2018.04.18	190,000	190,000	Debt acceptance
DEC	Cheonan Cheongdang-dong	HMC investment securities	2017.12.01 ~ 2018.02.28	10,000	10,000	Joint and several guarantee
	Cheonan Cheongdang-dong	HMC investment securities	2017.12.08 ~ 2018.03.08	20,000	20,000	Joint and several guarantee
	Cheonan Cheongdang-dong	HMC investment securities	2017.12.15 ~ 2018.03.15	30,000	30,000	Joint and several guarantee
	Cheonan Cheongdang-dong	HMC investment securities	2017.12.29 ~ 2018.03.29	90,000	90,000	Joint and several guarantee
	Yongin 3 ga	KTB investment & securities	2017.12.29 ~ 2018.03.29	60,000	60,000	Joint and several guarantee
				400,000	400,000	
				₩ 456,947	₩ 447,947	

33. Contingencies and commitments (cont'd)

33.9 Covenant related to consolidated structured entities

Details of unconsolidated structured entities as at December 31, 2017, are as follows (Korean won in millions):

	Line item of interests in unconsolidated structured entities or financial support provided	Liability amount of interests in unconsolidated structured entities	Maximum exposure to the loss of unconsolidated structured entities
DEC:			
DM BEST 2nd Co., Ltd.		₩ 133,000	₩ 133,000
PINETREECITY 1st Co., Ltd.		49,700	49,700
DM BEST 3rd Co., Ltd.		110,000	110,000
DM BEST 4th Co., Ltd.		100,000	100,000
GMS 1st Co., Ltd.		5,000	5,000
GMS 2nd Co., Ltd.		10,000	10,000
Doosan E&C 3rd Co., Ltd.		93,000	93,000
DHC:			
KDPP 1st Co., Ltd.	Fund supplementary	46,000	46,000
KDPP 2nd Co., Ltd.	obligation such as	52,650	52,650
Happy Tomorrow 20th Co., Ltd.	loan's principal and	5,000	5,000
KDPP 3rd Co., Ltd.	interests	70,000	70,000
Happy Tomorrow 25th Co., Ltd.		50,000	50,000
Happy Tomorrow 27th Co., Ltd.		30,000	30,000
Seung Li 3rd Co., Ltd.		150,000	150,000
U BEST 4th Co., Ltd.		200,000	200,000
New Star Power 1st Co., Ltd		30,000	30,000
New Star Power 2nd Co., Ltd		90,000	90,000
Doosan Bears:			
Sunnyrussel 8th Co., Ltd		15,000	15,000

33. Contingencies and commitments (cont'd)

Details of securitization assets and method are as follows:

	Assets	Method
DEC:		
DM BEST 2nd Co., Ltd.	Future construction receivables	ABS
Pinetree city 1st Co., Ltd.	Property, plant and equipment (Changwon 2nd plant subordinated bonds)	ABS
DM BEST 3rd Co., Ltd.	Future construction receivables	ABS
DM BEST 4th Co., Ltd.	Future construction receivables	ABS
GMS 1st Co., Ltd.	Future construction receivables	ABS
GMS 2nd Co., Ltd.	Equity securities	ABS
Doosan E&C 3rd Co., Ltd.	Future construction receivables	ABS
DHC:		
KDPP 1st Co., Ltd.	Future construction receivables	ABCP
KDPP 2nd Co., Ltd.	Future construction receivables	ABCP
Happy Tomorrow 20th Co., Ltd.	Future construction receivables	ABCP
KDPP 3rd Co., Ltd.	Subsidiary Equity securities	ABCP
Happy Tomorrow 25th Co., Ltd.	Subsidiary Equity securities	ABCP
Happy Tomorrow 27th Co., Ltd.	Subsidiary Equity securities	ABCP
Seung Li 3rd Co., Ltd.	Loan receivables	ABSTB
U BEST 4th Co., Ltd.	Newly issued bonds	ABCP
New Star Power 1st Co., Ltd	Future construction receivables	ABSTB
New Star Power 2nd Co., Ltd	Future construction receivables	ABSTB
Doosan Bears:		
Sunnyrussel 8th Co., Ltd	Future construction receivables	ABL/ABSTB

33.10 Joint liability for contract execution

As at December 31, 2017, the Group provides joint and several guarantees amounting to ₩328,445 million for the performance of construction contracts to other construction companies. In addition, the Group provides joint and several guarantees for construction performance to Korea Housing & Finance Corporation related to the guarantee for housing sales, which was provided by Korea Housing Finance Corporation to the developers. And, investors associated with SOC business have an agreement of providing for an insufficient fund when the agreement is terminated or insufficient to repay the loan principal and interest by buy price or payment arising from purchase requirement from authorities.

34. Pledged assets

The Group pledged certain assets as collateral for its long-term and short-term borrowings as at December 31, 2017, as follows:

DI, Doosan Bobcat Inc. and DE

Clark Equipment Co. ("CECO"), a subsidiaries of the Doosan Infracore Co., Ltd. ("DI", subsidiaries of the Group), in cooperation with Doosan Holdings Europe Ltd. fully repaid the borrowings borrowed on May 28, 2014 and entered into a new loan agreement amounting to USD 1,345,000 thousand and entered into a new loan agreement for a limit of USD 150,000 thousand on May 18, 2017. DI has provided 1,980 shares (Book amount ₩446,483,250 thousand) in Clark Equipment Co., 38,447 shares (Book amount ₩2,520,951,505 thousand) in Doosan Holdings Europe Ltd., 110,071,219 shares (Book amount ₩104,402,525 thousand) in Doosan Bobcat Singapore Pte.Ltd.as collateral for borrowings and the limited loan agreements.

34. Pledged assets (cont'd)

As at December 31, 2017, the outstanding balance of borrowings is USD 1,234,913 thousand.

DI, a subsidiaries of the Group, provides collateral for all of shares of Doosan Infracore North America LLC and Doosan Infracore Norway AS., which are subsidiaries of the parent company, in the amount of USD 147,000 thousand borrowed from The Export-Import Bank.

The Group pledged certain assets as collateral for its financial liabilities as at December 31, 2017, which are as follows (Korean won in millions):

Provided by	Secured assets	Secured party	Financial liabilities	Secured amount
Doosan Corporation	Property, plant and equipment, Investment properties	KDB and others	₩ 183,375	₩ 422,035
DLI Co., Ltd. (*2)	Investment properties	KDB Capital, IBK Capital, Happy Tomorrow Apollon 3rd	25,500	13,978
Dootamall Co., Ltd.	Property, plant and equipment, Investment properties	Woori Bank and others	239,820	349,837
Doosan Mecatec	Property, plant and equipment	KEB Hana Bank and others	-	8,101
Doosan Electro-Materials (Changshu) Co., Ltd.	Property, plant and equipment	Bank of China	5,799	8,183
Doosan Industrial Vehicle America Corp.	Trade receivables, Inventories	US Bank	10,714	10,714
Doosan Industrial Vehicle Yantai Co., Ltd.	Property, plant and equipment	Woori Bank	2,455	6,940
Doosan Bears, Inc.	Property, plant and equipment	KEB Hana Bank	24,900	48,700
DHC and subsidiaries	Property, plant and equipment	KDB and others	1,097,993	1,340,415
	Subsidiary investment securities	Shin young Securities and others	200,000	405,392
	Equity share	Machinery Financial Cooperative and others	2,450	4,845
DI and subsidiaries	Property, plant and equipment (*1)	KDB and others	255,486	624,581
DEC and subsidiaries	Short-term financial instruments	IBK	1,000	1,000
	Long-term investment securities	Eugene Investment & Securities	10,000	13,000
	Property, plant and equipment	KDB and others	142,700	196,575
	Associates investment securities	Woori Bank	40,000	126,259
DE and subsidiaries	Property, plant and equipment	Daehan Real Estate trust and others	211,378	292,521
Doosan Cuvex Co., Ltd.	Property, plant and equipment	KEB Hana Bank	29,800	33,000
			<u>₩ 2,483,370</u>	<u>₩ 3,906,056</u>

(*1) Benefit entitlement on property, plant and equipment and inventories has been provided as collateral to KDB.

(*2) As at December 31, 2017, the Group has established the right to receive real estate beneficiary certificates of the land and buildings (pledged amount of ₩14,413 million) for the purpose of loan agreements with KDB Capital. The amounts attributable to redeemable convertible preference shares are included in the collateralized amount.

34. Pledged assets (cont'd)

Pledged assets to parties other than consolidated entity are summarized as follows (Korean won in millions):

Provided by	Secured assets	Book amount	Secured party	Provided to
DHC	Long-term investment securities	₩ 14,240	Kookmin Bank and others	Inchen-Kimpo express highway Co., Ltd.
	Inventories	18,948	CSOB	Abener Energia S.A.
DEC	Long-term investment securities	124,877	KDB and others	Metropolitan West Highway and others
	Investments in associates	32,330	KDB and others	New Seoul Railroad Co., Ltd and others
		<u>₩ 190,395</u>		

Also, as at December 31, 2016, certain property, plant and equipment of DEC are pledged as collateral (Amount: ₩ 3,000 million) for leasehold deposits received of Next Entertainment Co., Ltd.

35. Related party transactions

The related parties of the Group and nature of their relationship with the Group as at December 31, 2017 are as follows:

Relationship with the Group	Company name
Associates (*1, *2, *3)	Tamra Offshore Wind Power Co., Ltd., Dalian Samyoung Doosan Metal Product Co., Ltd. ('DSDMP'), New Bundang Line Co., Ltd., Gyeonggi Railway Co., Ltd. Neo Trans Co., Ltd., New Seoul Railroad Co., KIAMCO Gyeonggi Railway Investment Private Equity Investment Trust, PrestoliteAsia, KDDI Korea, New Wave 5th Initial Enterprise Professional Investment Union, 2010 KIF-Neoplux IT Professional Investment Association, KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership, KoFC-Neoplux R&D Biz Creation 2013-1 Investment Partnership, Future Creation Neo Plux Investment Partnership, Neoplux technology valuation investment combination, Neo Plux Market Frontier Secondary Fund, Neo Plux First Private Equity Investment Company, Gyeonggi - Neo Plux Superman Investment Fund, KTC&P Growth Private Equity Investment Company, Shinhan - Neo Plux Energy New Industry Investment Association, The HS-Urban highway, BNW&P 1st Private Equity Investment Company and others
Joint ventures	Sichuan Kelun-Doosan Biotechnology Company Limited, Haman Industrial Complex Co., Ltd., Doosan PSI LLC, Doosan Infracore Liaoning Machinery Sales Co., Ltd and others
Other related parties(*4)	Doosan Credit Union, Yeongang Foundation, Chung-Ang University, Dongdaemun Future Creation Foundation and others

(*1) During this year, Guang Dong Xingpu Steel Center, 101Global, New Wave 4th Investment Fund were excluded from the related companies.

(*2) During this year, New Wave 5th Initial Enterprise Professional Investment Union, 2010 KIF-Neoplux IT Professional Investment Association, KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership, KoFC-Neoplux, R & D Biz Creation 2013-1 Investment Association, Future Creation Neo-Plux Investment Combination Summary, Neo-plux technology valuation investment combination, Neo Plux Market Frontier Secondary Fund, Neo Plux First Private Equity Investment Company, KTC&P Growth Private Equity Investment Company, BNW&P 1st Private Equity Investment Company, Shinhan - Neo Plux Energy New Industry Investment Association were included as an associate based on the acquisition of Neo Plux.

(*3) The HS-Urban highway is reclassified from available-for-sale financial assets to investments in associates and joint ventures and included in related parties.

(*4) Neo Plux and Neo Holdings were excluded from other related party in accordance with the transfer of subsidiary.

35. Related party transactions (cont'd)

Sales and purchases with related parties for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	Name of entity	2017				
		Sales	Disposal of property plant and equipment	Purchases	Other expenses	Acquisition of property, plant and equipment
Associates	Gyeonggi Railway New Bundang Line Co., Ltd.	₩ 26,578	₩ -	₩ -	₩ -	₩ -
	Tamra Offshore Wind Power Co., Ltd.	23,059	-	32	-	-
	Neo Trans Co., Ltd.	8,813	-	-	27	-
	KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership	176	-	-	-	-
	KoFC-Neoplux R & D Biz Creation 2013-1 Investment Cooperative	685	-	-	-	-
	Future Creation Neo Plux Investment Partnership	895	-	-	-	-
	Neo Plux First Private Equity Investment Company	6,180	-	-	-	-
	KTC&P Growth Private Equity Investment Company	811	-	-	-	-
	New Seoul Railroad Co.	16,475	-	-	-	-
	Others	5,011	-	-	-	-
		88,683	-	32	27	-
Joint ventures	Haman Industrial Complex	-	-	-	-	-
		-	-	-	-	-
Other related parties	Chung-Ang University	12	-	2,847	7,543	-
	Doosan Credit Union	-	-	-	-	-
	Doosan Yonkang Foundation	1,374	8	5,304	769	-
	Others	768	-	77	-	-
		2,154	8	8,228	8,312	-
		₩ 90,837	₩ 8	₩ 8,260	₩ 8,339	₩ -

35. Related party transactions (cont'd)

		2016				
	Name of entity	Sales	Disposal of property plant and equipment	Purchases	Other expenses	Acquisition of property, plant and equipment
Associates	Gyeonggi Railway	₩ 47,047	₩ -	₩ 3	₩ -	₩ -
	New Bundang Line Co., Ltd.	-	-	56	-	-
	Tamra Offshore Wind Power Co., Ltd.	39,767	-	-	-	-
	Neo Trans Co., Ltd.	11,433	-	437	-	-
	New Seoul Railroad Co.	1,841	-	207	-	-
	Others	9,097	-	5,421	-	-
		109,185	-	6,124	-	-
Joint ventures	Haman Industrial Complex	180	-	-	-	-
		180	-	-	-	-
Other related parties	Chung-Ang University	18,671	-	6,962	6,670	-
	Doosan Credit Union	218	5,325	2	-	-
	Doosan Yonkang Foundation	1,565	-	5,100	990	-
	Others	1,385	-	38	37	35
		21,839	5,325	12,102	7,697	35
		₩ 131,204	₩ 5,325	₩ 18,226	₩ 7,697	₩ 35

35. Related party transactions (cont'd)

Outstanding balances arising from sales/purchases of goods and services as at December 31, 2017 and 2016, are as follows (Korean won in millions):

		December 31, 2017				
	Name of entity	Trade receivables	Other receivables	Loans	Trade payables	Other payables
Associates	Gyeonggi Railway	₩ 12,000	₩ -	₩ 9,350	₩ -	₩ -
	New Bundang Line Co., Ltd.	11,023	-	32,574	1	-
	Neo Trans Co., Ltd.	847	-	-	277	152
	KoFC-Neoplux Pioneer Champ 2010-7 Investment Partnership	3,353	-	-	-	-
	KoFC-Neoplux R & D Biz Creation 2013-1 Investment Cooperative	3,259	-	-	-	-
	Future Creation Neo Plux Investment Partnership	4,596	-	-	-	-
	Neo Plux First Private Equity Investment Company	2,519	-	-	-	-
	KTC&P Growth Private Equity Investment Company	2,864	-	-	-	-
	The HS-Urban highway	2,723	-	-	-	-
	Others	853	9	-	-	-
		44,037	9	41,924	278	152
Joint ventures	Haman Industrial Complex	1,068	3,068	-	-	47
		1,068	3,068	-	-	47
Other related parties	Chung-Ang University	14	133	-	632	336
	Doosan Yonkang Foundation	62	1,719	-	643	77
	Others	33	-	-	-	84
		109	1,852	-	1,275	497
		₩ 45,214	₩ 4,929	₩ 41,924	₩ 1,553	₩ 696

35. Related party transactions (cont'd)

		December 31, 2016				
	Name of entity	Trade receivables	Other receivables	Loans	Trade payables	Other payables
Associates	Gyeonggi Railway	₩ -	₩ -	₩ 35,000	₩ -	₩ -
	New Bundang Line Co., Ltd.	11,023	-	27,859	5	-
	Tamra Offshore Wind Power Co., Ltd.	-	115	-	-	12,795
	Neo Trans Co., Ltd.	868	-	-	495	152
	Others	3	-	-	284	-
		<u>11,894</u>	<u>115</u>	<u>62,859</u>	<u>784</u>	<u>12,947</u>
Joint ventures	Haman Industrial Complex	1,535	4,196	-	-	-
		<u>1,535</u>	<u>4,196</u>	<u>-</u>	<u>-</u>	<u>-</u>
Other related parties	Chung-Ang University	14	330	-	571	499
	Doosan Credit Union	19	-	-	-	84
	Doosan Yonkang Foundation	120	1,835	-	441	20
	Others	37	13	-	10	230
		<u>190</u>	<u>2,178</u>	<u>-</u>	<u>1,022</u>	<u>833</u>
		<u>₩ 13,619</u>	<u>₩ 6,489</u>	<u>₩ 62,859</u>	<u>₩ 1,806</u>	<u>₩ 13,780</u>

35. Related party transactions (cont'd)

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

	Name of entity	2017					
		Loan		Contribution		Dividend	
		Loans	Repayment	Received	Provided	Income	Paid
Associates	KDDI Korea	₩ -	₩ -	₩ -	₩ -	₩ 81	₩ -
	Prestolite Asia	-	-	-	-	47	-
	KoFC-Neoplux R & D						
	Biz Creation 2013-1	-	-	950	399	-	-
	Investment						
	Cooperative						
	Neo-Plux technology						
	valuation investment	-	-	2,700	270	680	-
	Union						
	Neo Plux Market						
	Frontier Secondary	-	-	3,700	114	92	-
	Fund						
	BNW&P 1st Private						
	Equity Investment	-	-	-	227	183	-
	Company						
	New Wave No. 4	-	-	-	315	262	-
	Investment Fund						
	Neo Plux First Private						
	Equity Investment	-	-	-	3,708	2,199	-
	Company						
	Gyeonggi - Neo Plux						
	Superman	-	-	810	-	-	-
	Investment Fund						
	Gyeonggi Railway	9,350	35,000	-	1,650	-	-
	Co., Ltd.						
	New Wave 5th Initial						
	Enterprise	-	-	-	750	149	-
	Professional						
	Investment Union						
	Shinhan - Neo Plux						
	Energy New	-	-	500	-	-	-
	Industry Investment						
	Association						
	KoFC-Neoplux						
	Pioneer Champ	-	-	-	1,166	-	-
	2010-7 Investment						
	Partnership						
	2010 KIF-NeoPlux IT						
	Professional	-	-	-	2,284	-	-
	Investment						
	Association						
	Future Creation Neo						
	Plux Investment	-	-	-	1,272	-	-
	Partnership						
	KTC&P Growth						
	Private Equity	-	-	-	2,225	-	-
	Investment						
	Company						

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Joint ventures	New Bundang Line Co., Ltd.	4,715	-	-	-	-	-
	Doosan Infracore Liaoning Machinery Sales Co., Ltd	-	-	-	363	-	-
Other related parties	Sichuan Kelun-Doosan Biotechnology Co., Ltd.	-	-	-	-	1,285	-
	Doosan Yonkang Foundation	-	-	-	-	-	8,781
	Dongdaemun Future Creation Foundation	-	-	-	-	-	479
		₩ 14,065	₩ 35,000	₩ 8,660	₩ 14,743	₩ 4,978	₩ 9,260

2016

		2010											
		Loan				Contribution				Dividend			
Name of entity		Loans		Repayment		Received		Provided		Income		Paid	
Associates	Guang Dong Xingpu Steel Center	₩	-	₩	-	₩	-	₩	-	₩	2,319	₩	-
	Tamra Offshore Wind Power Co., Ltd.		-		-		-		2,016		-		-
	New Bundang Line Co., Ltd.		12,001		-		-		-		-		-
	Gyeonggi Railway Co., Ltd.		9,000		-		-		-		-		-
	New Seoul Railroad Co.		45		45		-		7,421		-		-
	Doosan Infracore Liaoning Machinery Sales Co., Ltd.		-		-		-		335		-		-
	101Global		-		-		-		178		-		-
	KIAMCO		-		-		-		23,149		-		-
	Joint ventures	Sichuan Kelun-Doosan Biotechnology Co., Ltd.		-		-		-		-		1,056	
Other related parties	Doosan Yonkang Foundation		-		-		-		-		-		7,837
	Dongdaemun Future Creation Foundation		-		-		-		-		-		428
		₩	21,046	₩	45	₩	-	₩	33,099	₩	3,375	₩	8,265

As at December 31, 2017, the Group has provided payment guarantees and others for related party. (See Notes 33 and 34)

The compensation to key management for employee services for the years ended December 31, 2017 and 2016, is as follows (Korean won in millions):

	2017	2016
Short-term employee benefits	₩ 88,725	₩ 99,361
Post-employment benefits	6,445	6,894
Share-based payments	-	640
	₩ 95,170	₩ 106,895

36. Cash generated from (used in) operations

The adjustments and changes in operating assets and liabilities in the consolidated statements of cash flows for the years ended December 31, 2017 and 2016, are as follows (Korean won in millions):

	2017	2016
Adjustments for:		
Bad debt expenses	₩ (5,065)	₩ 30,234
Loss on valuation of inventories (cost of sales)	(12,187)	(16,545)
Depreciation	404,942	419,003
Amortization	225,887	221,579
Post-employment benefits	145,380	151,505
Share-based payment	109	670
Interest income	(53,786)	(50,584)
Dividend income	(2,395)	(2,655)
Gain on foreign currency translation	(423,664)	(147,217)
Gain on valuation of derivatives	(182,935)	(109,996)
Gain on valuation of firm contracts	(58,957)	(186,909)
Financial guarantee income	(127)	(410)
Interest expense	569,143	583,364
Loss on foreign currency translation	275,053	202,949
Loss on valuation of derivatives	71,259	231,962
Loss on valuation of firm contract	323,496	76,489
Loss on repayment of bonds	24,316	9,944
Financial guarantee expenses	6,401	6,333
Provisions	329,912	46,631
Gain on disposal of short-term investment securities	(9,389)	(14,528)
Gain on disposal of long-term investment securities	(45,188)	(231,285)
Gain on disposal of property, plant and equipment	(4,889)	(16,510)
Gain on disposal of intangible asset	(947)	(406)
Gain on disposal of investment properties	(333)	(469)
Gain on disposal of assets held for sale	(2,183)	(1,102)
Gain on disposal of business	(2,454)	(546,080)
Gain on valuation of investment properties	(47,618)	(6,362)
Reversal of impairment loss on property, plant and equipment	(18,515)	(871)
Reversal of impairment loss on intangible asset	(2,690)	(18)
Gain on transfer of business	(1,003)	-
Loss on disposal of trade receivables	23,180	13,662
Loss on disposal of long-term investment securities	1	1,540
Impairment loss on long-term investment securities	16,060	32,520
Loss on disposal of investments in subsidiaries	11,959	-
Loss on disposal of property, plant and equipment	10,752	20,442
Loss on disposal of intangible assets	388	251
Loss on disposal of investment properties	3,568	9,379
Losses on valuation of investment properties	21,850	6,831
Impairment loss on property, plant and equipment	6,746	42,099
Impairment loss on intangible assets	26,814	147,002
Impairment loss on Non-current assets held for sale	183	57,134
Other bad debt expenses	173,330	209,989
Gain on shares in equity method investments	14,300	13,141
Income tax expense	272,901	370,796
Other expense	71,983	72,369
	₩ 2,155,588	₩ 1,645,871

36. Cash generated from (used in) operations (cont'd)

	2017	2016
Changes in operating assets and liabilities:		
Decrease (increase) in trade receivables	₩ (243,156)	₩ 159,704
Decrease (increase) in other receivables	(78,012)	105,101
Increase in due from customers for contract work	(53,402)	(326,700)
Increase in derivative assets (liabilities)	(129,949)	(51,255)
Decrease (increase) in inventories	(339,995)	13,704
Decrease (increase) in other current assets	(1,813)	971
Decrease (increase) in long-term other receivables	(1,032)	9,021
Increase in other non-current assets	(50,376)	(90,459)
Increase in trade payables	675,827	591,005
Decrease in other payables	(38,751)	(113,337)
Decrease in due to customers for contract work	(53,252)	(220,495)
Increase (decrease) in provisions	(288,328)	17,346
Increase (decrease) in other current liabilities	(150,080)	6,733
Increase (decrease) in long-term other payables	(98,296)	102,561
Increase in other non-current liabilities	86,110	20,722
Benefit payments	(43,656)	(125,207)
Increase in plan assets	(171,024)	(106,885)
Changes in other assets and liabilities related to operating activities	24,887	10,791
	₩ (954,298)	₩ 3,321

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

	2017	2016
Reclassification of construction in progress to property, plant and equipment and others	₩ 251,567	₩ 216,994
Transfer from property, plant and equipment and investment property into assets held for sale	-	112,101

Changes in liabilities arising from financial activities for the year ended December 31, 2017, is as follows (Korean won in millions):

	Beginning balance	Financing activities	Business combination /sale	Exchange rate change	Reclassification	Others	Ending balance
Short-term borrowings	₩ 3,862,706	₩ 550,076	₩ (14,105)	₩ (90,974)	₩ -	₩ 42,240	₩ 4,349,943
Asset-backed loans	679,963	105,982	-	-	-	9,159	795,104
Bonds	2,087,400	2,297,148	-	(133,495)	(1,284,314)	(88,617)	2,878,122
Current portion of bonds	1,379,038	(1,339,400)	-	(12,290)	1,284,314	13,537	1,325,199
Current portion of convertible bonds	156,106	(157,322)	-	-	-	7,986	6,770
Long-term borrowings	2,887,177	861,226	-	(205,986)	(1,238,802)	(33,230)	2,270,385
Current portion of long-term borrowings	1,178,915	(1,381,703)	(593)	(35,930)	1,238,802	-	999,491
Financing lease liabilities	15,586	(9,610)	-	-	-	11,244	17,220
	₩ 12,246,891	₩ 926,397	₩ (14,698)	₩ (478,675)	₩ -	₩ (37,681)	₩ 12,642,234

37. Discontinued operations

Details of discontinued operations as at December 31, 2017 and 2016 are as follows (Korean won in millions):

	2017		
	HRSG business unit(*1)		
Discontinued operations	Production and installation of power equipment		
Main business	-		
Transfer date	-		
Method	Transfer of business		
Acquiring company	-		
Disposal price	-		
	2016		
	DI, Machine-tools business unit	Doosan DST Co., Ltd. ("DST")	HRSG business unit(*1)
Discontinued operations	Manufacturing and sales of machine-tools for working	Manufacture of motor vehicles for combat	Manufacturing and installation of generator
Main business	2016.4.29	2016.5.31	2016.8.17
Transfer date	Transfer of business	Disposal of shares	Transfer of business
Method	DMT Holdings Co., Ltd.	Hanwha Techwin Co., Ltd.	GE Global Parts & Products GMBH and 4 others
Acquiring company	₩1,130,819	₩353,818	₩275,000(*2)
Disposal price			

(*1) The sale of HRSG held by Doosan Heavy Industries Vietnam Co., Ltd. was completed in the current year. As the plan to sell Doosan Heavy Industries Vietnam Haipong Co., Ltd. was cancelled, it was reclassified as continuing operation and the 2016 consolidated financial statements presented for comparative purposes have been restated.

(*2) As the plan to sell Doosan Heavy Industries Vietnam Haipong changed, the consideration transferred changed.

37. Discontinued operations (cont'd)

Details of discontinued operating profit and loss as at December 31, 2017 and 2016 are as follows (Korean won in millions):

	2017	
	HRSG	
Sales	₩	6,361
Cost of sales		3,960
Selling and administrative expenses		33,271
Operating loss		(30,870)
Non-operating profit		6,001
Loss before income tax		(24,869)
Income tax expense		-
Loss from discontinued operation		(24,869)
Gain on disposal of discontinued business		2,454
Loss for the period from discontinued operation	₩	(22,415)

	2016			
	Machine- tools	DST	HRSG	Total
Sales	₩ 313,348	₩ 223,917	₩ 122,034	₩ 659,299
Cost of sales	241,571	209,382	110,167	561,120
Selling and administrative expenses	48,909	25,952	14,383	89,244
Operating profit(loss)	22,868	(11,417)	(2,516)	8,935
Non-operating loss	(10,608)	(857)	(125,279)	(136,744)
Profit(loss) before income tax	12,260	(12,274)	(127,795)	(127,809)
Income tax expense	5,944	(5,100)	(1,442)	(598)
Profit(loss) from discontinued operation	6,316	(7,174)	(126,353)	(127,211)
Gain on disposal of discontinued business	109,677	58,043	201,289	369,009
Profit for the period from discontinued operation	₩ 115,993	₩ 50,869	₩ 74,936	₩ 241,798

37. Discontinued operations (cont'd)

Cash flows from discontinued operations for the years ended December 31, 2017 and 2016 are as follows (Korean won in millions):

	2017	
	HRSG	
Net cash outflow from operating activities	₩	(8,754)
Net cash inflow from investing activities(*1)		22,413
Net cash inflow from financing activities(*2)		10,196
Net increase in cash generated from discontinued operations	₩	23,855

	2016			
	Machine- tools	DST	HRSG	Total
Net cash inflow(outflow) from operating activities	₩ 2,209	₩ 17,100	₩ (56,884)	₩ (37,575)
Net cash inflow(outflow) from investing activities(*1)	923,928	(4,194)	112,994	1,032,728
Net cash outflow from financing activities(*2)	(30,714)	(60,000)	-	(90,714)
Net increase(decrease) in cash generated from discontinued operations	₩ 895,423	₩ (47,094)	₩ 56,110	₩ 904,439

(*1) Net cash flows of investing activities include cash flows related to the disposal of discontinued business.

(*2) Financing activities do not include cash flows related to the disposal of discontinued business and include a portion of borrowings and repayments incurred by fund transactions between divisions.

38. Assets and liabilities held for sale

Doosan Hydro Technology LLC and Doosan Heavy Industries Vietnam Co., Ltd.'s HRSG and CPE divisions were sold off during the current period and thus, as at December 31, 2017, the Group has no assets / liabilities held for sale. Doosan Heavy Industries Vietnam Haiphong Co., Ltd., classified as a non-current asset or liability held for sale at the end of the previous year, was excluded due to the withdrawal of the sale plan during the current year (Korean won in millions):

	December 31, 2016		
	HRSG	Other	Total
Non-current assets held for sale:			
Trade receivables	₩ 712	₩ -	₩ 712
Due from customers for contract work	1,663	-	1,663
Inventories	132	-	132
Property, plant and equipment	76,538	9,625	86,163
Other assets	517	13	530
	<u>₩ 79,562</u>	<u>₩ 9,638</u>	<u>₩ 89,200</u>
Non-current liabilities held for sale:			
Trade payables	₩ 115	₩ -	₩ 115
Advanced received	-	-	-
Other liabilities	1,560	-	1,560
	<u>₩ 1,675</u>	<u>₩ -</u>	<u>₩ 1,675</u>

39. Business combination

Details of business combination are summarized as follows (Korean won in millions):

Acquired company	Main business	Date of acquisition	Ownership after acquisition	Purchase consideration
Doosan Turbomachinery Services Inc.	manufacturing industry	2017.07.31	95.9%	36,822

Doosan Heavy Industries & Construction Co., Ltd., a subsidiary of the Group, acquired ACT independent Turbo Services, Inc. (Now, "Doosan Turbomachinery Services Inc.") to develop gas turbines and advance the US service market.

Details of fair value of consideration transferred for business combination for the year ended December 31, 2017 are as follows (Korean won in millions):

	Amount
Cash and cash equivalents	₩ 36,822

39. Business combination (cont'd)

Fair values of assets and liabilities at acquisition date from business combinations are as follows (Korean won in millions):

	Amount
Current assets	₩ 8,435
Non-current assets	39,077
	47,512
Current liabilities	10,039
Non-current liabilities	119
	10,158
Net identifiable assets acquired	₩ 37,354

Net cash outflow in business combinations for the year ended December 31, 2017 is as follows (Korean won in millions):

	Amount
Consideration paid in cash	₩ 36,822
Less: Acquisition of cash and cash equivalents	3,183
	₩ 33,639

40. Events after the reporting period

DHC and DEC, the subsidiaries, have committed for the responsibility of construction with regards to the PF loan agreement of DBC Co., Ltd, a subsidiary, for the construction of Doosan Bundang Center amounting to ₩375,000 million at the Board of Directors on January 8, 2018. They have decided to provide 1,723,560 shares of DBC Co., Ltd (collateral amount of ₩86,178 million) held by the Group and claim for construction insurance (collateral amount of ₩252,300 million) as collateral.