

Hanwha Aerospace Co., Ltd. and Subsidiaries

**Consolidated Financial Statements
December 31, 2019 and 2018**

Hanwha Aerospace Co., Ltd. and Subsidiaries

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December 31, 2019 and 2018

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Independent Auditor's Report

(English Translation of a Report Originally Issued in Korean)

To the Board of Directors and Shareholders of
Hanwha Aerospace Co., Ltd.

Opinion

We have audited the accompanying consolidated financial statements of Hanwha Aerospace Co., Ltd. and its subsidiaries (collectively referred to as the "Group"), which comprise the consolidated statements of financial position as at December 31, 2019 and 2018, and the consolidated statements of comprehensive income, consolidated statements of changes in equity and consolidated statements of cash flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Group as at December 31, 2019 and 2018, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS).

Basis for Opinion

We conducted our audits in accordance with Korean Standards on Auditing. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Consolidated Financial Statements section of our report. We are independent of the Group in accordance with the ethical requirements of the Republic of Korea that are relevant to our audit of the consolidated financial statements and we have fulfilled our other ethical responsibilities in accordance with the ethical requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current period. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

(a) Acquisition of Hanwha Aerospace USA Co.,

Why it is determined to be a key audit matter

On September 30, 2019, the Group acquired Hanwha Aerospace USA Co., and accounted for the acquisitions in accordance with K-IFRS 1103 *Business Combinations* (Note 37).

The consideration transferred was allocated to various assets acquired and liabilities assumed. This allocation was based on fair value estimates. The Group engaged objective external experts to measure the fair value of the major tangible and intangible assets acquired.

Allocation of acquisition price and fair value measurement of tangible and intangible assets require significant level of management's judgement. Therefore, we considered the business combination to be a key audit matter.

How our audit addressed the Key Audit Matter

Our audit procedures performed in relation to the accounting for business combination included followings:

- We assessed competence of external experts engaged.
- We examined terms and conditions of acquisition agreement.
- We evaluated appropriateness of the methodology used by management for measuring fair value of identifiable intangible assets and other assets acquired, and liabilities assumed.
- We assessed reasonableness of major assumptions used by inspecting available external data and major contracts.
- We tested mathematical accuracy of calculation used in the valuation.

(b) Impairment assessment of Goodwill and Business license for international joint projects

Why it is determined to be a key audit matter

As at December 31, 2019, the Group owns goodwill of ₩ 955,162 million and business license for international joint *projects* of ₩ 272,984 million (Note 15).

By engaging objective external experts, the Group performed impairment test of goodwill using the value-in-use calculation based on the discounted cash flow model. The value-in-use calculation was also used to analyze the recoverable amount of business license for international joint projects related to the long-term RSP (Risk and Revenue Sharing Program).

The value-in-use calculation involves significant judgements and estimates by management, such as discount rate, growth rate and forecast of future cash flows. Accordingly, we considered the accounting treatment for impairment assessment of goodwill(except for Hanwha Aerospace USA Co., acquired in 2019) and business license for international joint projects to be a key audit matter.

How our audit addressed the Key Audit Matter

Our audit procedures performed in relation to the impairment assessment of goodwill and business license for international joint projects included followings:

- We assessed competence of external experts engaged.
- We evaluated appropriateness of determination of cash-generating unit (CGU) of the Group and net assets allocated to each CGU.
- We assessed appropriateness of the valuation model used in assessing value-in-use.
- We assessed reasonableness of major assumptions used by inspection available external data and major contracts.
- We tested mathematical accuracy of calculation used in the valuation and evaluated appropriateness of value-in-use through sensitivity analysis.

(c) Revenue recognition based on the cost input method

Why it is determined to be a key audit matter

For certain sales contracts, the Group recognizes revenue over time by measuring progress towards complete satisfaction of a performance obligation by using cost input method (Note 26). The progress under the cost input method is measured at the accumulated contract costs incurred for the obligation performed, divided by the total estimated contract costs.

The measurement of contract revenue is affected by a variety of uncertainties in relation to the future outcomes, and total contract costs are estimated based on the future estimates of material costs, labor costs and others. Changes in estimates of total contract revenue and total contract costs may have impacts on the profit or loss for the current year (or for the succeeding years).

In particular, we focused our efforts on the revenue recognized over time in the defense segments of Hanwha System Co. Ltd. and Hanwha Defense Systems Corp. whose revenues are significant in amount. Estimation of contract revenue and the progress to completion involve significant judgements and estimates by management. Therefore, we considered revenue recognition based on input method to be a key audit matter.

How our audit addressed the Key Audit Matter

Our audit procedures performed in relation to the revenue recognized based on input method particularly in two defense segments (Hanwha System Co. Ltd and Hanwha Defense Systems Corp.) included followings:

- We evaluated appropriateness of accounting policies for revenue recognition.
- We assessed design and effectiveness of internal controls in relation to approval process of total contract costs.
- We performed analytical review procedures to assess reasonableness of total contract costs.
- We assessed design and effectiveness of internal controls in relation to approval process of contract amounts.
- We assessed design and effectiveness of internal controls in relation to process of aggregating cost incurred.
- We independently recalculated the percentage of completion for construction contracts.
- We tested occurrence and cut-off of cost incurred by construction contract.
- We inspected agreements which were newly entered into and whose contract amounts were significantly modified.

Other Matter

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

Responsibilities of Management and Those Charged with Governance for the Consolidated Financial Statements

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

In preparing the consolidated financial statements, management is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Group or to cease operations.

Those charged with governance are responsible for overseeing the Group's financial reporting

process.

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Korean Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with Korean Standards on Auditing, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor’s report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partner on the audit resulting in this independent auditor’s report is JaeSang Han, Certified Public Accountant.

Seoul, Korea
March 16, 2020

This report is effective as of March 16, 2020, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the accompanying consolidated financial statements and notes thereto. Accordingly, the readers of the audit report should understand that there is a possibility that the above audit report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

Hanwha Aerospace Co., Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2019 and 2018

<i>(in Korean won)</i>	Notes	2019	2018
Assets			
Current assets			
Cash and cash equivalents	5, 6, 8	₩ 1,000,121,610,062	₩ 636,721,974,889
Other financial assets	5, 6, 9	122,858,098,699	39,620,106,546
Trade and other receivables	5, 6, 7, 9	1,293,046,469,349	1,245,630,373,218
Derivative assets	4, 5, 10	1,879,221,086	550,965,510
Inventories	11	1,329,689,801,105	1,319,797,341,845
Other current assets	12	804,706,336,568	634,678,584,584
Non-current assets held for sale	25	11,305,467,067	-
		<u>4,563,607,003,936</u>	<u>3,876,999,346,592</u>
Non-current assets			
Other financial assets	5, 6, 9	60,208,602,289	55,107,178,152
Long-term trade and other receivables	5, 6, 9	58,542,561,663	39,162,808,807
Derivative assets	5, 6, 10	19,210,492,467	14,315,341,865
Other non-current assets	12	22,678,923,448	28,733,705,699
Property, plant and equipment	13	1,821,964,121,936	1,713,685,418,792
Investment property	14	-	2,473,951,518
Intangible assets	15	1,881,380,376,982	1,472,440,232,180
Investments in associates	16	64,442,115,957	57,979,940,745
Deferred tax assets	21	131,938,584,059	135,788,288,598
Right-of-use of assets		84,437,937,534	-
		<u>4,144,803,716,335</u>	<u>3,519,686,866,356</u>
Total assets		<u>₩ 8,708,410,720,271</u>	<u>₩ 7,396,686,212,948</u>
Liabilities			
Current liabilities			
Trade and other payables	4, 5, 6, 17	₩ 762,736,113,155	₩ 625,352,279,593
Lease liabilities	4, 5, 6, 36	29,668,833,314	-
Borrowings and debentures	4, 5, 6, 7, 18	504,161,325,471	834,539,472,576
Derivative liabilities	5, 6, 10	1,264,158,359	42,799,446
Income tax payables		25,376,926,753	33,382,398,604
Other current liabilities	19	2,005,834,551,426	1,650,824,307,253
		<u>3,329,041,908,478</u>	<u>3,144,141,257,472</u>
Non-current liabilities			
Long-term trade and other payables	4, 5, 6, 17	268,345,855,818	159,741,739,612
Lease liabilities	4, 5, 6, 36	53,067,406,624	-
Borrowings and debentures	4, 5, 6, 18	1,588,356,855,653	899,558,335,510
Derivative liabilities	5, 6, 10	923,496,003	818,811,625
Employee benefits liabilities	20	514,869,816,408	464,347,027,515
Deferred tax liabilities	21	86,411,666,665	79,809,220,279
Other non-current liabilities	19	12,038,422,375	12,519,399,472
		<u>2,524,013,519,546</u>	<u>1,616,794,534,013</u>
Total liabilities		<u>5,853,055,428,024</u>	<u>4,760,935,791,485</u>
Equity			
Share capital	1, 22	265,650,000,000	265,650,000,000
Capital Surplus	22	412,051,703,190	399,701,022,779
Accumulated other comprehensive income	23	332,426,347,613	331,196,444,926
Retained earnings	24	1,475,931,391,060	1,373,083,857,984
Equity attributable to owners of the Parent Company		<u>2,486,059,441,863</u>	<u>2,369,631,325,689</u>
Non-controlling interest		<u>369,295,850,384</u>	<u>266,119,095,774</u>
Total equity		<u>2,855,355,292,247</u>	<u>2,635,750,421,463</u>
Total liabilities and equity		<u>₩ 8,708,410,720,271</u>	<u>₩ 7,396,686,212,948</u>

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

Hanwha Aerospace Co., Ltd. and Subsidiaries
Consolidated Statements of Comprehensive Income
Years Ended December 31, 2019 and 2018

<i>(in Korean won)</i>	Notes	2019	2018
Revenue		₩ 5,264,114,375,095	₩ 4,453,176,623,308
Cost of sales	29	<u>4,242,318,189,013</u>	<u>3,655,168,285,090</u>
Gross profit		1,021,796,186,082	798,008,338,218
Selling and administrative expenses	28, 29	683,094,152,644	592,366,403,498
Impairment loss for trade receivables		14,261,136,212	5,099,666,214
Research and development expenses		<u>173,476,098,695</u>	<u>152,464,595,594</u>
Operating profit		165,225,934,743	53,177,339,126
Other income	30	104,834,207,081	95,885,076,541
Other expenses	30	74,086,304,266	68,133,922,362
Finance income	31	30,887,518,997	26,188,140,102
Interest income	31	14,429,400,398	9,573,012,450
Finance costs	31	78,755,486,364	59,297,794,189
Interest expenses		59,404,666,272	46,504,230,867
Share of profit of associates accounted for using the equity method	16	<u>8,183,067,197</u>	<u>5,670,811,034</u>
Profit before income tax		156,288,937,388	53,489,650,252
Income tax expenses (income)	21	<u>(6,138,380,884)</u>	<u>4,238,591,486</u>
Profit for the year		<u>₩ 162,427,318,272</u>	<u>₩ 49,251,058,766</u>
Other comprehensive income			
<i>Items that will not be reclassified to profit or loss</i>			
Loss on valuation of financial assets at fair value through other comprehensive income	6, 9	(1,580,205,653)	(31,159,865,766)
Remeasurements of net defined benefit liabilities		(14,786,286,503)	(15,832,806,644)
Gain on revaluation		176,536,159	42,042,379,971
<i>Items that may be subsequently reclassified to profit or loss</i>			
Cash flow hedges		(446,489,540)	(569,513,694)
Share of other comprehensive income of associates		1,760,549,882	1,931,626,235
Exchange differences		575,626,724	1,626,668,381
Other comprehensive income for the year, net of tax		<u>(14,300,268,931)</u>	<u>(1,961,511,517)</u>
Total comprehensive income for the year		<u>₩ 148,127,049,341</u>	<u>₩ 47,289,547,249</u>
Profit is attributable to:			
Owners of the Parent Company		₩ 132,205,039,355	₩ 32,327,771,669
Non-controlling interest		30,222,278,917	16,923,287,097
Total comprehensive income is attributable to:			
Owners of the Parent Company		₩ 122,089,997,122	₩ 26,806,623,539
Non-controlling interest		26,037,052,219	20,482,923,710
Earnings per share attributable to the equity holders of the Parent Company	32		
Basic and diluted earnings per share		₩ 2,558	₩ 619

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

Hanwha Aerospace Co., Ltd. and Subsidiaries
Consolidated Statements of Changes in Equity
Years Ended December 31, 2019 and 2018

	Attributable to owners of the Controlling Company							Total Equity
	Share Capital	Capital Surplus	Capital adjustments	Accumulated Other Comprehensive Income	Retained Earnings	Non-controlling Interest		
<i>(in Korean won)</i>								
Balance at January 1, 2018	₩ 265,650,000,000	₩ 186,818,584,055	₩ -	₩ 435,800,611,000	₩ 1,291,117,994,467	₩ 1,566,031,447	₩ 2,180,953,220,969	
Changes in accounting policy	-	-	-	(106,052,857)	(33,056,354,283)	-	(33,162,407,140)	
	265,650,000,000	186,818,584,055	-	435,694,558,143	1,258,061,640,184	1,566,031,447	2,147,790,813,829	
Total comprehensive income (loss)								
Profit for the year	-	-	-	-	32,327,771,669	16,923,287,097	49,251,058,766	
Gain (loss) on valuation of financial assets at fair value through other comprehensive income	-	-	-	(141,615,606,149)	110,455,740,383	-	(31,159,865,766)	
Cash flow hedges	-	-	-	(542,842,054)	-	(26,671,640)	(569,513,694)	
Remeasurements of net defined benefit liabilities	-	-	-	-	(11,478,775,296)	(4,354,031,348)	(15,832,806,644)	
Exchange differences	-	-	-	1,649,392,466	-	(22,724,085)	1,626,668,381	
Share of other comprehensive income of associates	-	-	-	1,931,626,235	-	-	1,931,626,235	
Gain on revaluation	-	-	-	34,079,316,285	-	7,963,063,686	42,042,379,971	
Total comprehensive income (loss) for the year	-	-	-	(104,498,113,217)	131,304,736,756	20,482,923,710	47,289,547,249	
Transactions with owners								
Dividends paid	-	-	-	-	-	(494,952,423)	(494,952,423)	
Acquisition of treasury shares	-	-	(16,219,102,940)	-	-	-	(16,219,102,940)	
Retirement of treasury shares	-	-	16,219,102,940	-	(16,219,102,940)	-	-	
Business combination of entities under common control	-	(53,737,214,295)	-	-	-	-	(53,737,214,295)	
Changes in scope of consolidation	-	266,615,016,783	-	-	-	244,560,267,570	511,175,284,353	
Other changes in equity	-	4,636,236	-	-	(63,416,016)	4,825,470	(53,954,310)	
Balance at December 31, 2018	₩ 265,650,000,000	₩ 399,701,022,779	₩ -	₩ 331,196,444,926	₩ 1,373,083,857,984	₩ 266,119,095,774	₩ 2,635,750,421,463	
Balance at January 1, 2019	₩ 265,650,000,000	₩ 399,701,022,779	₩ -	₩ 331,196,444,926	₩ 1,373,083,857,984	₩ 266,119,095,774	₩ 2,635,750,421,463	
Total comprehensive income (loss)								
Profit for the year	-	-	-	-	132,205,039,355	30,222,278,917	162,427,318,272	
Gain (loss) on valuation of financial assets at fair value through other comprehensive income	-	-	-	(774,115,977)	-	(806,089,676)	(1,580,205,653)	
Cash flow hedges	-	-	-	(445,145,671)	-	(1,343,869)	(446,489,540)	
Remeasurements of net defined benefit liabilities	-	-	-	-	(11,344,944,920)	(3,441,341,583)	(14,786,286,503)	
Exchange differences	-	-	-	512,078,294	-	63,548,430	575,626,724	
Share of other comprehensive income of associates	-	-	-	1,760,549,882	-	-	1,760,549,882	
Gain on revaluation	-	-	-	176,536,159	-	-	176,536,159	
Total comprehensive income (loss) for the year	-	-	-	1,229,902,687	120,860,094,435	26,037,052,219	148,127,049,341	
Transactions with owners								
Merger and acquisition / Other changes in equity	-	13,429,380,189	-	-	-	84,851,846,982	98,281,227,171	
Dividends paid	-	-	-	-	-	(7,714,626,081)	(7,714,626,081)	
Acquisition of treasury shares	-	-	(15,526,671,000)	-	-	-	(15,526,671,000)	
Retirement of treasury shares	-	-	15,526,671,000	-	(15,526,671,000)	-	-	
Other changes in equity	-	(1,078,699,778)	-	-	(2,485,890,359)	2,481,490	(3,562,108,647)	
Balance at December 31, 2019	₩ 265,650,000,000	₩ 412,051,703,190	₩ -	₩ 332,426,347,613	₩ 1,475,931,391,060	₩ 369,295,850,384	₩ 2,855,355,292,247	

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

Hanwha Aerospace Co., Ltd. and Subsidiaries
Consolidated Statements of Cash Flows
Years Ended December 31, 2019 and 2018

<i>(in Korean won)</i>	Notes	2019	2018
Cash flows from operating activities			
Cash generated from operations	35	₩ 776,292,442,006	₩ 208,363,476,974
Interest received		13,735,806,493	8,628,263,681
Interest paid		(52,830,348,171)	(42,178,151,615)
Income taxes paid		(22,054,907,160)	(118,470,835,375)
Net cash inflow from operating activities		<u>715,142,993,168</u>	<u>56,342,753,665</u>
Cash flows from investing activities			
Collection of loans		1,273,167,601	12,435,444,617
Decrease in deposits		4,219,302,358	6,375,319,630
Decrease in short-term financial instruments		11,895,078,981	-
Decrease in long-term financial instruments		2,000,000	-
Increase in financial assets at fair value through profit or loss		(3,933,970,267)	(1,029,895,000)
Decrease in financial assets at fair value through profit or loss		323,936,478	-
Increase in financial assets at fair value through other comprehensive income		(1,279,636,093)	(15,172,720)
Proceeds from disposal of financial assets at fair value through other comprehensive income		-	242,271,434,048
Dividends received		4,964,046,704	4,239,988,873
Proceeds from disposal of property, plant and equipment		3,297,494,469	1,406,385,329
Proceeds from disposal of intangible assets		851,904,712	117,876,400
Proceeds from disposal of non-current assets held for sale		-	62,787,258,098
Increase in short-term financial instruments		(92,216,105,699)	(15,541,708,176)
Increase in long-term financial instruments		(4,009,386,228)	(1,497,686,883)
Acquisition of property, plant and equipment		(153,837,340,013)	(172,482,612,299)
Acquisition of intangible assets		(145,388,062,319)	(107,695,168,641)
Acquisition of business segment assets		(1,400,052,736)	(236,134,154,909)
Increase in loans		(1,038,406,087)	(1,765,505,211)
Increase in deposits provided		(5,676,533,467)	(6,331,457,880)
Acquisitions of investments in associates		-	(4,011,264,051)
Increase in other non-current assets		(30,409,647,075)	(39,153,449,457)
Cash inflow (outflow) due to merger		(231,165,137,501)	42,970,048,267
Net cash outflow from investing activities		<u>(643,527,346,182)</u>	<u>(213,054,319,965)</u>
Cash flows from financing activities			
Proceeds from short-term borrowings		1,434,098,694,901	765,658,600,000
Proceeds from long-term borrowings		465,970,104,442	255,265,358,537
Proceeds from debentures		478,475,688,400	243,336,090,000
Net increase in short-term borrowings (Nego)		(55,720,505,857)	(65,169,032,997)
Repayment of short-term borrowings		(1,473,149,135,785)	(735,305,000,000)
Repayment of long-term borrowings		(56,962,150,000)	-
Repayment of debentures		(310,000,000,000)	-
Repayment of current borrowings (others)		(242,450,706,664)	(114,409,438,000)
Repayment of lease liabilities		(25,169,134,816)	-
Acquisition of treasury shares		(15,526,671,000)	(16,219,102,940)
Dividends paid		(7,714,626,081)	(494,952,423)
Changes in non-controlling interests		97,500,097,764	54,146,700
Net cash inflow from financing activities		<u>289,351,655,304</u>	<u>332,716,668,877</u>
Net increase in cash and cash equivalents		360,967,302,290	176,005,102,577
Cash and cash equivalents at the beginning of the year		636,721,974,889	461,379,841,501
Effects of exchange rate changes on cash and cash equivalents		2,432,332,883	(662,969,189)
Cash and cash equivalents at the end of the year		<u>₩ 1,000,121,610,062</u>	<u>₩ 636,721,974,889</u>

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

Hanwha Aerospace Co., Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

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1. General Information

1.1 Description of the Parent Company

Hanwha Aerospace Co., Ltd. (the Parent Company) was incorporated in August, 1977 under its original name of Samsung Precision Co, Ltd. The Parent Company changed its name to Samsung Aeronautics Co., Ltd. in February, 1987, to Samsung Techwin Co., Ltd., in March, 2000, to Hanwha Techwin Co., Ltd. on June 29, 2015, and finally changed its name to Hanwha Aerospace Co., Ltd. on March 23, 2018.

The Parent Company listed its ordinary shares on the Korea Exchange in May, 1987 and it is domiciled in the Republic of Korea with its address at 1204 Changwon Daero, Sungsan-gu, Changwon, Gyeongsangnam-do. The Parent Company is located in Changwon, Gyeongsangnam-do, Asan, Chungcheongnam-do, U.S.A., and Vietnam for manufacturing and sales. And the Parent Company is engaged and provides aircraft engines and repair services.

After several capital increases and reductions, the Parent Company's share capital amounts to ₩ 265,650 million as at December 31, 2019 and its largest shareholder is Hanwha Corp (33.35%).

1.2 Consolidated Subsidiaries

Details of the consolidated subsidiaries as at December 31, 2019 and 2018, are as follows:

Subsidiaries	Location	Main business	Ownership interest held by the Group (%)		Closing month
			2019	2018	
Hanwha Techwin America	U.S.A.	Sale of CCTV, etc	100.00%	100.00%	December
Hanwha Techwin (Tianjin) Co., Ltd.	China	Manufacture and sale of CCTV, etc	100.00%	95.00%	December
Hanwha Techwin Europe, Ltd.	U.K.	Sale of CCTV, etc	100.00%	100.00%	December
Hanwha Techwin (Shanghai) Co., Ltd.	China	Sale of turbo-machinery, IMS, etc.	100.00%	100.00%	December
Techwin Engineering Center	Japan	Research and development of IMS	100.00%	100.00%	December
Tawasul Al-Ezdihar Co., Ltd.	Iraq	Trade business and construction	100.00%	100.00%	December
Hanwha Defense Systems Corp(formerly, Hanwha Land Systems Co., Ltd.) ¹	Korea	Manufacture and sale of military equipment	100.00%	100.00%	December
Hanwha Systems Co., Ltd. ⁷	Korea	Manufacture and sale of military equipment, development of software and consulting	48.99%	52.91%	December
Hanwha Techwin Automation Americas, Inc.	U.S.A.	Sale of IMS	100.00%	100.00%	December
Hanwha Techwin Security Vietnam Company Limited	Vietnam	Manufacture of CCTV, etc	100.00%	100.00%	December
Hanwha Techwin Middle East FZE	UAE	Sale of CCTV, etc	100.00%	100.00%	December
Hanwha Techwin Automation Vietnam Company Limited	Vietnam	Sale of IMS	100.00%	100.00%	December

Hanwha Aerospace Co., Ltd. and Subsidiaries
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Subsidiaries	Location	Main business	Ownership interest held by the Group (%)		Closing month
			2019	2018	
Hanwha Techwin Co., Ltd.	Korea	Manufacture and sale of CCTV, etc	100.00%	100.00%	December
Hanwha Power Systems Co., Ltd.	Korea	Manufacture and sale of turbo-machinery	100.00%	100.00%	December
Hanwha Precision Machinery Co., Ltd.	Korea	Manufacture and sale of IMS	100.00%	100.00%	December
Hanwha Aero Engines Company Limited	Vietnam	Manufacture of engine	100.00%	100.00%	December
Hanwha Power System Americas, Inc.	U.S.A.	Manufacture and services of turbo-machinery, sales of service material	100.00%	100.00%	December
Hanwha Power Systems (Shanghai) Co., Ltd.	China	Manufacture and services of turbo-machinery, sales of service material	100.00%	100.00%	December
Hanwha Power Systems Service Middle East LLC ²	UAE	Manufacture and services of turbo-machinery, sales of service material	49.00%	49.00%	December
Hanwha Systems Japan Co., Ltd.	Japan	Logistics (agency), logistics consulting,	100.00%	100.00%	December
Hanwha TechM (Suzhou) Co., Ltd	China	Sale of IMS	100.00%	100.00%	December
Kyongju Aerospace Electrical Systems Co. Ltd.	Korea	Manufacture of aircraft parts	100.00%	100.00%	December
Hanwha Systems Vietnam Co., Ltd ³	Vietnam	Software consulting	100.00%	-	December
Hanwha Defense Australia PTY Ltd ³	Australia	Manufacture and sale of military equipment	100.00%	-	December
Hanwha Power Systems Vietnam ³	Vietnam	Manufacture and services of turbo-machinery, sales of service material	100.00%	-	December
Hanwha Aerospace USA Co., ^{4,5}	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December
EDAC Technologies Intermediate Company ⁴	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December
Hanwha Aerospace USA LLC ^{4,6}	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December
EBTEC Corporation ⁴	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December
APEX Machine Tool Company, Inc. ⁴	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December
Gros-Ite Industries, Inc. ⁴	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December
EDAC ND ⁴	U.S.A.	Manufacture of engine and aircraft parts	100.00%	-	December

¹ Hanwha Land Systems Co., Ltd. merged with Hanwha Defense Systems Corp., and changed its name to Hanwha Defense Systems Corp.

² Although the Group has less than 50% ownership interest, the Group concluded that the Group has de facto control taking into account the ability to appoint or dismiss 50% of members of board of directors in accordance with shareholders' agreement.

³ Established in 2019.

⁴ Acquired in 2019.

Hanwha Aerospace Co., Ltd. and Subsidiaries

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⁵ The Group fully acquired EDAC Technologies Holding Company and changed its name.

⁶ The Group fully acquired EDAC Technologies LLC and changed its name.

⁷ Although the Group has less than 50% ownership interest, the Group concluded that the Group has de facto control over Hanwha Systems Co., Ltd., and classified as a subsidiary, considering the component ratio of the shareholders.

1.3 Changes in Scope of Consolidation

Subsidiaries newly included in the consolidation for the year ended December 31, 2019, are as follows:

Subsidiaries	Reason
Hanwha Systems Vietnam Co., Ltd	Newly established
Hanwha Defense Australia PTY Ltd	Newly established
Hanwha Power Systems Vietnam	Newly established
Hanwha Aerospace USA Co., (formerly, EDAC Technologies Holding Company)	Newly acquired
EDAC Technologies Intermediate Company	Newly acquired
Hanwha Aerospace USA LLC (formerly, EDAC Technologies LLC)	Newly acquired
EBTEC Corporation	Newly acquired
APEX Machine Tool Company, Inc.	Newly acquired
Gros-lte Industries, Inc.	Newly acquired
EDAC ND	Newly acquired

Subsidiary excluded in the consolidation for the year ended December 31, 2019, is as follows:

Subsidiaries	Reason
Hanwha Techwin Do Brazil Equipamentos De Seguranca Ltda.	Liquidated

1.4 Summarized Financial Information

Summarized financial information for consolidated subsidiaries as at and for the years ended December 31, 2019 and 2018, is as follows:

(in millions of Korean won)

Subsidiaries	2019					
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the year	Total comprehensive income (loss)
Hanwha Techwin America	125,313	85,796	39,517	253,709	3,015	4,218
Hanwha Techwin (Tianjin) Co., Ltd.	21,698	3,602	18,096	50,617	(4,067)	(3,524)
Hanwha Techwin Europe Limited	48,916	21,025	27,891	74,236	715	2,459
Hanwha Techwin (Shanghai) Co., Ltd.	16,317	3,756	12,561	16,841	3,674	4,037
Techwin Engineering Center	1,413	246	1,167	2,957	76	127
Tawasul Al-Ezdihar Co., Ltd.	332	27	305	(36)	270	273

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<i>(in millions of Korean won)</i>	2019					
Hanwha Defense Systems Corp. (formerly, Hanwha Land Systems Co., Ltd.) ¹	1,866,855	1,209,021	657,834	1,462,670	74,031	70,281
Hanwha Systems Co., Ltd.	2,406,652	1,438,228	968,424	1,519,479	72,922	64,595
Hanwha Techwin Automation Americas, Inc.	21,760	14,313	7,447	18,223	1,832	1,989
Hanwha Techwin Security Vietnam Company Limited	86,562	66,554	20,008	142,101	9,890	10,175
Hanwha Techwin Middle East FZE	18,274	15,957	2,317	35,532	582	474
Hanwha Techwin Automation Vietnam Company Limited	1,175	692	483	1,101	104	121
Hanwha Techwin Co., Ltd.	387,411	191,500	195,911	450,515	17,407	16,677
Hanwha Power System Co., Ltd.	247,814	111,124	136,690	188,312	13,801	12,901
Hanwha Precision Machinery Co., Ltd.	251,266	158,976	92,290	337,367	9,807	9,541
Hanwha Aero Engines Company Limited	142,413	113,989	28,424	42,541	(2,743)	(1,748)
Hanwha Power System Americas, Inc.	6,299	4,830	1,469	13,466	349	371
Hanwha Power Systems (Shanghai) Co., Ltd.	22,639	14,762	7,877	56,230	1,992	2,039
Hanwha Power Systems Service Middle East LLC	397	322	75	818	28	25
Hanwha Systems Japan Co., Ltd.	2,915	1,838	1,077	20,473	51	98
Hanwha TechM (Suzhou) Co., Ltd.	13,023	12,998	25	12,077	(1,003)	(967)
Kyongju Aerospace Electrical Systems Co. Ltd.	24,788	21,025	3,763	21,184	92	268
Hanwha Systems Vietnam Co., Ltd. ²	1,015	741	274	6,120	(76)	(68)
Hanwha Defense Australia PTY Ltd. ²	4,600	5,092	(492)	-	(681)	(696)
Hanwha Power Systems Vietnam. ²	515	377	138	369	(214)	(204)
Hanwha Aerospace USA Co., ^{3,4}	195,516	163,113	32,403	49,876	(86)	(1,676)

¹ Hanwha Land Systems Co., Ltd. merged with Hanwha Defense Systems Corp., and changed its name to Hanwha Defense Systems Corp.

² Established in 2019.

³ The Group fully acquired EDAC Technologies Holding Company and changed its name.

⁴ It is the consolidated financial information of Hanwha Aerospace USA Co., and it includes financial information of 6 subsidiaries.

Hanwha Aerospace Co., Ltd. and Subsidiaries
Notes to the Consolidated Financial Statements
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(in millions of Korean won)

2018

Subsidiaries	Assets	Liabilities	Equity	Revenue	Profit (loss) for the year	Total comprehensive income (loss)
Hanwha Techwin America	109,471	74,172	35,299	207,251	1,548	2,982
Hanwha Techwin (Tianjin) Co., Ltd.	38,461	10,267	28,194	181,857	5,467	5,067
Hanwha Techwin Europe Limited	35,821	10,389	25,432	75,498	2,464	1,956
Hanwha Techwin (Shanghai) Co., Ltd.	24,140	7,170	16,970	32,605	4,226	3,971
Techwin Engineering Center	1,212	161	1,051	2,917	53	117
Hanwha Techwin Do Brazil Equipamentos De Seguranca Ltda.	-	-	-	301	(14)	(16)
Tawasul Al-Ezdihar Co., Ltd.	994	962	32	87	(685)	(665)
Hanwha Defense Systems Corp.	791,996	382,878	409,118	699,054	41,985	41,985
Hanwha Systems Co., Ltd.	1,899,880	1,078,906	820,974	1,121,416	41,243	41,162
Hanwha Techwin Automation Americas, Inc.	19,657	14,198	5,459	20,327	832	996
Hanwha Techwin Security Vietnam Company Limited	68,642	58,809	9,833	47,333	(1,044)	(858)
Hanwha Techwin Middle East FZE	16,870	15,027	1,843	30,856	721	883
Hanwha Techwin Automation Vietnam Company Limited	618	256	362	1,204	260	265
Hanwha Techwin Co., Ltd.	390,145	210,911	179,243	363,416	1,286	1,286
Hanwha Land Systems Co., Ltd.	1,342,406	769,873	572,533	773,277	55,163	55,163
Hanwha Power System Co., Ltd.	221,087	97,298	123,789	170,076	16	16
Hanwha Precision Machinery Co., Ltd.	242,188	159,439	82,749	245,070	10,445	10,445
Hanwha Aero Engines Company Limited	105,708	75,535	30,173	52	(13,198)	(12,355)
Hanwha Power System Americas, Inc.	3,996	2,898	1,098	6,853	254	260
Hanwha Power Systems (Shanghai) Co., Ltd.	18,105	12,267	5,838	34,492	3,956	3,872
Hanwha Power Systems Service Middle East LLC	224	174	50	632	(49)	(65)
Hanwha Systems Japan Co., Ltd.	3,464	2,490	974	7,570	(6)	6
Hanwha TechM (Suzhou) Co., Ltd	13,696	12,704	992	-	-	-
Kyongju Aerospace Electrical Systems Co. Ltd.	20,241	16,747	3,494	-	-	-

Hanwha Aerospace Co., Ltd. and Subsidiaries

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2. Significant Accounting Policies

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

2.1 Basis of Preparation

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

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

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

The financial statements have been prepared on a historical cost basis, except for the following:

- Certain financial assets and liabilities (including derivative instruments), certain classes of property, plant and equipment and investment property – measured at fair value
- assets held for sale – measured at fair value less costs to sell, and
- defined benefit pension plans – plan assets measured at fair value.

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

2.2 Changes in Accounting Policy and Disclosures

(a) New and amended standards adopted by the Group

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

- Enactment of Korean IFRS 1116 *Leases*

Under the new standard, with implementation of a single lease model, lessee is required to recognize assets and liabilities for all lease which lease term is over 12 months and underlying assets are not low

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value assets. A lessee is required to recognize a right-of-use asset and a lease liability representing its obligation to make lease payments.

- Amendment to Korean IFRS 1109 *Financial Instruments*

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

- Amendments to Korean IFRS 1019 *Employee Benefits*

The amendments require that an entity shall calculate current service cost and net interest for the remainder of the reporting period after a plan amendment, curtailment or settlement based on updated actuarial assumptions from the date of the change. The amendments also require that a reduction in a surplus must be recognized in profit or loss even if that surplus was not previously recognized because of the impact of the asset ceiling. The amendment is applied prospectively to a plan amendment, curtailment or settlement that occur after annual periods beginning on or after January 1, 2019. The amendment does not have a significant impact on the financial statements.

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

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

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

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

- Annual Improvements to Korean IFRS 2015 – 2017 Cycle:

• Amendments to Korean IFRS 1103 *Business Combination*

The amendments clarify that when a party to a joint arrangement obtains control of a business that is a joint operation, and had rights to the assets and obligations for the liabilities relating to that joint operation immediately before the acquisition date, the transaction is a business combination achieved in stages. In such cases, the acquirer shall remeasure its entire previously held interest in the joint operation. The amendment does not have a significant impact on the financial statements.

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- Amendments to Korean IFRS 1111 *Joint Agreements*

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

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

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

- Korean IFRS 1023 *Borrowing Costs*

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

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

The following new accounting standards and interpretations have been published that are not mandatory for December 31, 2019 reporting periods and have not been early adopted by the Group.

- Amendments to Korean IFRS 1001 *Presentation of Financial Statements* and Korean IFRS 1008 *Accounting policies, changes in accounting estimates and errors – Definition of Material*

The amendments clarify the explanation of the definition of material and amended Korean IFRS 1001 and Korean IFRS 1008 in accordance with the clarified definitions. Materiality is assessed by reference to omission or misstatement of material information as well as effects of immaterial information, and to the nature of the users when determining the information to be disclosed by the Group. These amendments should be applied for annual periods beginning on or after January 1, 2020, and earlier application of permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

- Amendments to Korean IFRS 1103 *Business Combination – Definition of a Business*

To consider the integration of the required activities and assets as a business, the amended definition of a business requires an acquisition to include an input and a substantive process that together significantly contribute to the ability to create outputs and excludes economic benefits from the lower costs. An entity can apply a concentration test, an optional test, where substantially all of the fair value of gross assets acquired is concentrated in a single asset or a group of similar assets, the assets acquired would not represent a business. These amendments should be applied for annual periods beginning on or after January 1, 2020, and earlier application of permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

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2.3 Consolidation

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

(a) Subsidiaries

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

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

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

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

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

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

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(b) Associates

Associates are entities over which the Group has significant influence but not control or joint control. Investments in associates are accounted for using the equity method of accounting, after initially being recognized at cost. Unrealized gains on transactions between the Group and its associates are eliminated to the extent of the Group's interest in the associates. If the Group's share of losses of an associate equals or exceeds its interest in the associate (including long-term interests that, in substance, form part of the Group's net investment in the associate), the Group discontinues recognizing its share of further losses. After the Group's interest is reduced to zero, additional losses are provided for, and a liability is recognized, only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate. If there is an objective evidence of impairment for the investment in the associate, the Group recognizes the difference between the recoverable amount of the associate and its book amount as impairment loss. If an associate uses accounting policies other than those of the Group for like transactions and events in similar circumstances, if necessary, adjustments shall be made to make the associate's accounting policies conform to those of the Group when the associate's financial statements are used by the entity in applying the equity method.

(c) Joint Arrangements

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

2.4 Cash and Cash Equivalents

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

2.5 Foreign Currency Translation

(a) Functional and presentation currency

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

(b) Transactions and balances

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

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Foreign exchange gains and losses that relate to borrowings are presented in the statement of comprehensive income, within finance income or finance costs. All other foreign exchange gains and losses are presented in the statement of comprehensive income within 'other income or other expenses'.

2.6 Financial Assets

(a) Classification

The Group classifies its financial assets in the following measurement categories:

- those to be measured at fair value through profit or loss
- those to be measured at fair value through other comprehensive income, and
- those to be measured at amortized cost.

The classification depends on the Group's business model for managing the financial assets and the contractual terms of the cash flows.

For financial assets measured at fair value, gains and losses will either be recorded in profit or loss or other comprehensive income. For investments in debt instruments, this will depend on the business model in which the investment is held. The Group reclassifies debt investments when, and only when its business model for managing those assets changes.

For investments in equity instruments that are not held for trading, this will depend on whether the Group has made an irrevocable election at the time of initial recognition to account for the equity investment at fair value through other comprehensive income.

(b) Measurement

At initial recognition, the Group measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed in profit or loss.

Financial assets with embedded derivatives are considered in their entirety when determining whether their cash flows are solely payment of principal and interest.

A. Debt instruments

Subsequent measurement of debt instruments depends on the Group's business model for managing the asset and the cash flow characteristics of the asset. The Group classifies its debt instruments into one of the following three measurement categories:

- Amortized cost: Assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest are measured at amortized cost. A gain or loss on a debt investment that is subsequently measured at amortized cost and is not part of a hedging relationship is recognized in profit or loss when the asset is derecognized or impaired.

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Interest income from these financial assets is included in 'finance income' using the effective interest rate method.

- Fair value through other comprehensive income: Assets that are held for collection of contractual cash flows and for selling the financial assets, where the assets' cash flows represent solely payments of principal and interest, are measured at fair value through other comprehensive income. Movements in the carrying amount are taken through other comprehensive income, except for the recognition of impairment loss (reversal of impairment loss), interest income and foreign exchange gains and losses which are recognized in profit or loss. When the financial asset is derecognized, the cumulative gain or loss previously recognized in other comprehensive income is reclassified from equity to profit or loss. Interest income from these financial assets is included in 'finance income' using the effective interest rate method. Foreign exchange gains and losses are presented in 'other income or expenses' and impairment losses are presented in 'other expenses'.
- Fair value through profit or loss: Assets that do not meet the criteria for amortized cost or fair value through other comprehensive income are measured at fair value through profit or loss. A gain or loss on a debt investment that is subsequently measured at fair value through profit or loss and is not part of a hedging relationship is recognized in profit or loss and presented net in the statement of comprehensive income within 'finance income or expenses' in the year in which it arises.

B. Equity instruments

The Group subsequently measures all equity investments at fair value. Where the Group's management has elected to present fair value gains and losses on equity investments, which held for long-term investment or strategic purpose, in other comprehensive income, there is no subsequent reclassification of fair value gains and losses to profit or loss following the derecognition of the investment. Dividend income from such investments continue to be recognized in profit or loss as 'other income' when the right to receive payments is established.

Changes in the fair value of financial assets at fair value through profit or loss are recognized in 'finance income and costs' in the statement of comprehensive income as applicable. Impairment loss (reversal of impairment loss) on equity investments measured at fair value through other comprehensive income are not reported separately from other changes in fair value.

(c) Impairment

The Group assesses on a forward looking basis the expected credit losses associated with its debt instruments carried at amortized cost and fair value through other comprehensive income. The impairment methodology applied depends on whether there has been a significant increase in credit risk.

(d) Recognition and Derecognition

Regular way purchases and sales of financial assets are recognized or derecognized on trade-date, the date on which the Group commits to purchase or sell the asset. Financial assets are derecognized when

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the rights to receive cash flows from the financial assets have expired or have been transferred and the Group has transferred substantially all the risks and rewards of ownership.

If a transfer does not result in derecognition because the Group has retained substantially all the risks and rewards of ownership of the transferred asset, the Group continues to recognize the transferred asset in its entirety and recognizes a financial liability for the consideration received. The Group classified the financial liability as “borrowings” in the statement of financial position.

(e) Offsetting of financial instruments

Financial assets and liabilities are offset and the net amount reported in the statements of financial position where there is a legally enforceable right to offset the recognized amounts and there is an intention to settle on a net basis or realize the assets and settle the liability simultaneously. The legally enforceable right must not be contingent on future events and must be enforceable in the normal course of business and in the event of default, insolvency or bankruptcy of the Group or the counterparty.

2.7 Derivatives

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

The Group applies cash flow hedge accounting to hedge the interest rate risk on its floating rate borrowings. The effective portion of changes in fair value of derivatives that are designated and qualify as cash flow hedges is recognized in other comprehensive income, and the ineffective portion is recognized in 'finance income (costs)'.

2.8 Inventories

Inventories are stated at the lower of cost and net realizable value, and the cost of inventory is determined by using the gross average method or moving-weighted average method, except for materials-in-transit, which is measured using the individual cost method.

2.9 Non-current Assets (or Disposal Group) Held for sale

Non-current assets (or disposal group) are classified as held for sale when their carrying amount is to be recovered principally through a sale transaction rather than through continuing use and a sale is considered highly probable. The assets are measured at the lower amount between their carrying amount and the fair value less costs to sell.

2.10 Property, Plant and Equipment

Land is shown at fair value based on valuations by independent external appraisers. Valuations are performed with sufficient regularity to ensure that the fair value of a revalued asset does not differ materially from its carrying amount. When the Group carries out revaluation, the net amount is restated to the revalued amount of the asset.

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All other property, plant and equipment are stated at historical cost less accumulated depreciation and accumulated impairment losses, except for land. Historical cost includes expenditure that is directly attributable to the acquisition of the items.

Increases in the carrying amount of net of tax arising on revaluation of land are credited to other comprehensive income and shown as revaluation surplus in equity. However, the increase shall be recognized in profit or loss to the extent that it reverses a revaluation decrease of the same asset previously recognized in profit or loss. Decreases that offset previous increases of the same asset are charged to other comprehensive income and debited against the revaluation surplus directly; all other decreases are charged to the statement of comprehensive income.

Land is not depreciated. Depreciation on other assets is measured using the straight-line method to allocate the difference between their cost and their residual values over their estimated useful lives, as follows:

	Useful lives
Buildings	10 - 60 years
Structures	10 - 40
Machinery	5 - 20
Tools and furniture	2 - 6
Vehicles	4 - 6
Aircrafts	8 - 12
Mold	2

The depreciation method, residual values and useful lives of property, plant and equipment are reviewed, and adjusted if appropriate, at the end of each reporting period. An asset's carrying amount is adjusted to its recoverable amount if the asset's carrying amount is greater than its estimated recoverable amount. Gains and losses on disposals are determined by comparing the proceeds with the carrying amount and are recognized as 'other income and expenses' in the statement of comprehensive income.

When revalued assets are sold, the amounts included in revaluation surplus are transferred to retained earnings.

2.11 Intangible Assets

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

Development costs that are directly attributable to internally generated by the Group are recognized when the criteria; such as, technically feasible, generating probable future economic benefits and other, are met. This asset is amortized by the straight-line method using the table below.

Business license for international joint projects that are the payments to join a development and manufacturing new product with foreign company are amortized using the straight-line method over the

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expected periods.

Certain intangible assets that have an indefinite useful life are not subject to amortization because there is no foreseeable limit to the period over which the assets are expected to be utilized. The Group amortizes intangible assets with a limited useful life using the straight-line method over the following periods:

	Useful lives
Development cost	3 - 20 years
Industrial rights	5 - 31
Business license for international joint projects	30
Technical license	15 - 20
Software	3 - 10
Backlog	2 - 11
Customer relationships	1 - 16
Others	3 - 10

2.12 Investment Property

Investment property is property held to earn rentals or for capital appreciation or both. An investment property is measured initially at its cost.

2.13 Impairment of Non-financial Assets

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

2.14 Financial Liabilities

(a) Classification and measurement

The Group's financial liabilities at fair value through profit or loss are financial instruments held for trading. A financial liability is held for trading if it is incurred principally for the purpose of repurchasing in the near term. A derivative that is not a designated as hedging instruments and an embedded derivative that is separated are also classified as held for trading.

The Group classifies all non-derivative liabilities, except for financial liabilities at fair value through profit or loss, financial guarantee contracts and financial liabilities that arise when a transfer of financial assets does not qualify for derecognition, as financial liabilities carried at amortized cost and present them as

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'trade payables', 'borrowings' and 'other financial liabilities', in the statement of financial position.

(b) Derecognition

Financial liabilities are removed from the statement of financial position when the contractual obligation is extinguished due to discharging, cancellation, expiration, or when the terms of an existing financial liability are substantially modified.

2.15 Provisions

Provisions for service warranties, make good obligation, and legal claims are recognized when the Group has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources will be required to settle the obligation and the amount can be reliably estimated. Provisions are measured at the present value of management's best estimate of the expenditure required to settle the present obligation at the end of the reporting period, and the increase in the provision due to the passage of time is recognized as interest expense.

2.16 Current and Deferred Tax

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

The tax expense is measured at the amount expected to be paid to the taxation authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation. The Group recognizes current income tax on the basis of amounts expected to be paid to the tax authorities.

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

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

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

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

2.17 Employee Benefits

(a) Post-employment benefits

The Group operates defined benefit pension plans. Generally, post-employment benefits are payable after the completion of employment, and the benefit amount depended on the employee's age, periods of service or salary levels. The liability recognized in the statement of financial position in respect of defined benefit pension plans is the present value of the defined benefit obligation at the end of the reporting period less the fair value of plan assets. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds that are denominated in the currency in which the benefits will be paid, and that have terms approximating to the terms of the related obligation. Remeasurement gains and losses arising from experience adjustments and changes in actuarial assumptions are recognized in the period in which they occur, directly in other comprehensive income.

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

(b) Long-term employee benefits

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

2.18 Revenue Recognition

The Group identified the prototype development as a performance obligation that is satisfied over time. Because the Group manufactures or improves the value of assets under the customer's controls, revenues from prototype development is recognized under the percentage-of-completion method.

However, the Group identified manufacturing of mass-production as a performance obligation that is satisfied at a point in time. To determine whether the customer has controls over the promised asset and the Group satisfies its obligations, the Group considers the right to payment, legal ownership, physical possession, and significant risks and rewards.

The Group estimates an amount of variable consideration by using the expected value which the Group expects to better predict the amount of consideration. The Group recognizes revenue at transaction price including variable consideration only to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty has been

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resolved.

2.19 Segment Reporting

Operating segments are reported in a manner consistent with the internal reporting provided to the chief operating decision-maker. The Group disclosed information relating to its operating segments in Note 27 to the consolidated financial statements in accordance with Korean IFRS 1108.

2.20. Business Combination of Entities under a Common Control

The Group applies the book amount method to account for business combinations of entities under a common control. Identifiable assets acquired and liabilities assumed in a business combination are measured at their book amounts on the consolidated financial statements of the Ultimate Parent Company. However, if the consolidated financial statements are not available, the Group applies the carrying amount of assets and liabilities accounted on acquiree's financial statements. In addition, the difference between the sum of consolidated book amounts of the assets and liabilities transferred and accumulated other comprehensive income; and the consideration paid is recognized as reserves.

2.21 Lease

As explained in Note 2.2 above, the Group has changed its accounting policy for leases. The impact of the new accounting policies is disclosed in Note 36.

The Group leases various offices, equipment and cars. Lease contracts are typically made for fixed periods of 3 to 10 years, but may have extension options.

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

From January 1, 2019, leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the Group.

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

- Fixed payments (including in-substance fixed payments), less any lease incentives receivable
- Variable lease payment that are based on an index or a rate, initially measured using the index or rate as at the commencement date
- Amounts expected to be payable by the Group (the lessee) under residual value guarantees
- The exercise price of a purchase option if the Group (the lessee) is reasonably certain to exercise that option, and
- Payments of penalties for terminating the lease, if the lease term reflects the Group (the lessee) exercising that option

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Lease liability measurement also include payments to be made in option periods if the lessee is reasonably certain to exercise an option to extend the lease.

The lease payments are discounted using the interest rate implicit in the lease. If that rate cannot be determined, the lessee's incremental borrowing rate is used, being the rate that the lessee would have to pay to borrow the funds necessary to obtain an asset of similar value in a similar economic environment with similar terms and conditions.

The Group determines the incremental borrowing rate as follows:

- The interest rate of publicly-subscribed corporate bonds that the Group can issue and finance to third parties

Each lease payment is allocated between the liability and finance cost. The finance cost is charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period.

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

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

The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. If the Group is reasonably certain to exercise a purchase option, the right-of-use asset is depreciated over the underlying asset's useful life.

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

2.22 Approval of Issuance of the Financial Statements

The consolidated financial statements 2019 were approved for issue by the Board of Directors on February 21, 2020 and are subject to change with the approval at the annual shareholder's meeting.

3. Critical Accounting Estimates and Assumptions

The preparation of financial statements requires the Group to make estimates and assumptions concerning the future. Management also needs to exercise judgement in applying the Group's accounting policies. Estimates and assumptions are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable

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under the circumstances. As the resulting accounting estimates will, by definition, seldom equal the related actual results, it can contain a significant risk of causing a material adjustment.

The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below. Additional information of significant judgement and assumptions of certain items are included in relevant notes.

(a) Estimated goodwill impairment

The Group tests whether goodwill has suffered any impairment on an annual basis. The recoverable amount of a cash generating unit (CGU) is determined based on value-in-use calculations (Note 15).

(b) Business license for international joint projects

The recoverable amount of a cash generating unit (CGU) to test whether business license for international joint projects has suffered any impairment is determined based on value-in-use calculations.

(c) Income taxes

The Group's taxable income generated from these operations are subject to income taxes based on tax laws and interpretations of tax authorities in numerous jurisdictions. There are many transactions and calculations for which the ultimate tax determination is uncertain.

If certain portion of the taxable income is not used for investments or increase in wages, the Group is liable to pay additional income tax calculated based on the tax laws. Accordingly, the measurement of current and deferred income tax is affected by the tax effects from the new tax system. As the Group's income tax is dependent on the investments, increase in wages, there is an uncertainty measuring the final tax effects (Note 21).

(d) Net defined benefit liability

The present value of net defined benefit liability depends on a number of factors that are determined on an actuarial basis using a number of assumptions including the discount rate (Note 20).

(e) Construction contracts

(i) Uncertainty of the estimated total contract revenue

Total contract revenue is measured based on contractual amount initially agreed. Yet the measurement of contract revenue is liable to various uncertainties of the future events, as the contract revenue can be increased by additional contract work, claims and incentive payments in the course of construction, or decreased by the penalty when the completion of contract is delayed due to the Group's fault. The change in contract revenue is recognized when it is probable that the customer will approve the increase in revenue due to the changes in contract work and the amount of changes can be measured reliably.

(ii) Estimated total contract costs

Total contract costs are estimated based on future estimates of material costs, labour costs and others.

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There is uncertainty in the estimated total contract costs, such as changes in order or contract period.

(f) Business Combination

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 acquisition-date 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 recognized in profit or loss as incurred.

The identifiable assets acquired and the liabilities assumed are recognized at their fair value at the acquisition date.

4. Financial Risk Management

4.1 Financial Risk Factors

The Group's activities expose it to a variety of financial risks: market risk (including foreign exchange risk, interest rate risk and others), credit risk and liquidity risk. The Group's overall risk management program focuses on the unpredictability of financial markets and seeks to minimize any adverse effects on the financial performance of the Group.

4.1.1 Market risk

(a) Foreign exchange risk

The Group operates internationally and is exposed to foreign exchange risk arising from foreign currency transactions, primarily with respect to the US dollar and the Euro. Foreign exchange risk arises from recognized assets and liabilities and net investments in foreign entities. Additionally, the Group evaluates, manages and reports the risks of exchange rate fluctuation periodically by the managing system of receivables and payables.

The table below summarizes the impact of weakened/strengthened Korean won on the Group's profit before tax for the year. The analysis is based on the assumption that Korean won has weakened/strengthened by 10% with all other variables held constant.

(in thousands of Korean won)

	2019			
	10% Weakened		10% Strengthened	
USD	w	(13,281,689)	w	13,281,689
EUR		3,426,231		(3,426,231)
JPY		(99,454)		99,454
GBP		103,315		(103,315)
CNY		3,028,382		(3,028,382)

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(b) Interest rate risk

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

As at December 31, 2019, the profit before income tax shall be increased/decreased by ₩ 5,573 million, if the interest rate on floating rate borrowings increases/decreases by 1% with all other variables held constant.

4.1.2 Credit Risk

The Group manages credit risk by establishing policies and procedures in order to reduce credit risks related to financial assets. The Group is provided collateral or guarantee from the customers when entering into a new contract. For the financial assets for which collections are overdue, status of overdue collection and collection plan are reported to management and the Group subsequently takes actions corresponding to reasons of overdue.

The maximum exposure to credit risk equals to the carrying amount and the maximum guaranteed amount of all financial assets (excluding equity securities), such as cash and cash equivalents deposited at the financial institutions and trade and other receivables.

4.1.3 Liquidity Risk

Contractual maturities of the Group's non-derivative financial liabilities as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019						
	Carrying amount	Contractual cash flows	Less than 6 months	Between 6 months and 1 year	Between 1 year and 2 years	Between 2 years and 5 years	Over 5 years
Trade and other payables	₩ 1,031,081,969	₩ (1,040,361,017)	₩ (756,381,558)	₩ (6,729,406)	₩ (56,432,076)	₩ (90,055,638)	₩ (130,762,339)
Borrowings - NEGO	19,044,288	(19,044,288)	(19,044,288)	-	-	-	-
General facility loan	1,198,968,749	(1,259,506,385)	(348,521,291)	(115,421,314)	(114,804,955)	(467,562,401)	(213,196,424)
Defend industry fund	1,954,000	(1,979,462)	(1,118,200)	(379,021)	(482,241)	-	-
Publicly issued debentures	668,162,855	(718,022,219)	(8,128,025)	(38,128,025)	(208,660,466)	(463,105,703)	-
Privately issued debentures	204,388,289	(221,132,690)	(2,660,811)	(13,523,705)	(48,439,342)	(156,508,832)	-
Lease liabilities	82,736,240	(88,899,305)	(15,676,519)	(15,226,432)	(14,201,248)	(35,051,311)	(8,743,795)
	<u>₩ 3,206,336,390</u>	<u>₩ (3,348,945,366)</u>	<u>₩ (1,151,530,692)</u>	<u>₩ (189,407,903)</u>	<u>₩ (443,020,328)</u>	<u>₩ (1,212,283,885)</u>	<u>₩ (352,702,558)</u>

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<i>(in thousands of Korean won)</i>	2018						
	Carrying amount	Contractual cash flows	Less than 6 months	Between 6 months and 1 year	Between 1 year and 2 years	Between 2 years and 5 years	Over 5 years
Trade and other payables	₩ 785,094,020	₩ (795,570,458)	₩ (625,821,157)	₩ -	₩ (18,885,783)	₩ (96,057,399)	₩ (54,806,119)
Borrowings - NEGO	73,293,536	(73,293,536)	(73,293,536)	-	-	-	-
General facility loan	954,583,946	(997,776,778)	(278,258,241)	(194,078,057)	(317,141,574)	(186,566,946)	(21,731,960)
Defend industry fund	4,222,840	(4,314,934)	(1,182,792)	(1,151,065)	(1,498,482)	(482,595)	-
Publicly issued debentures	528,795,171	(562,311,802)	(116,557,650)	(105,494,500)	(38,915,000)	(301,344,652)	-
Privately issued debentures	173,202,314	(182,740,009)	(2,210,129)	(101,716,818)	(12,434,677)	(66,378,385)	-
	<u>₩ 2,519,191,827</u>	<u>₩ (2,616,007,517)</u>	<u>₩ (1,097,323,505)</u>	<u>₩ (402,440,440)</u>	<u>₩ (388,875,516)</u>	<u>₩ (650,829,977)</u>	<u>₩ (76,538,079)</u>

4.2 Capital Risk Management

The purpose of the Group's capital management is to maintain a sound capital structure and to maximize shareholder's profit. The Group monitors financial ratios such as debt ratio and net borrowings ratio to optimize capital structure and performs financial structure improvements as necessary.

<i>(in thousands of Korean won)</i>	2019	2018
Liabilities (A)	₩ 5,853,055,428	₩ 4,760,935,791
Equity (B)	2,855,355,292	2,635,750,421
Debt ratio (A/B) (%)	<u>205.0%</u>	<u>180.6%</u>
Cash and cash equivalents (C)	₩ 1,000,121,610	₩ 636,721,975
Other current financial assets (D)	122,858,099	39,620,107
Borrowings and debentures (E)	2,092,518,181	1,734,097,808
Net borrowings ratio ((E-(C+D))/B) (%)	<u>34.0%</u>	<u>40.1%</u>

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5. Fair Value

5.1 Financial Instruments Measured at Fair Value

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

(in thousands of Korean won)

	2019		2018	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets				
Cash and cash equivalents	₩ 1,000,121,610	₩ 1,000,121,610	₩ 636,721,975	₩ 636,721,975
Financial assets at fair value through profit or loss	54,226,364	54,226,364	49,944,687	49,944,687
Financial assets at fair value through comprehensive income	549,615	549,615	1,354,683	1,354,683
Short-term financial instruments	122,858,099	122,858,099	39,620,106	39,620,106
Trade and other receivables	1,293,046,469	1,293,046,469	1,245,630,373	1,245,630,373
Current derivative assets	1,879,221	1,879,221	550,966	550,966
Long-term financial instruments	5,432,623	5,432,623	3,807,808	3,807,808
Long-term trade and other receivables	58,542,562	58,542,562	39,162,809	39,162,809
Non-current derivative assets	19,210,492	19,210,492	14,315,342	14,315,342
	<u>₩ 2,555,867,055</u>	<u>₩ 2,555,867,055</u>	<u>₩ 2,031,108,749</u>	<u>₩ 2,031,108,749</u>

(in thousands of Korean won)

	2019		2018	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial liabilities				
Trade and other payables	₩ 762,736,113	₩ 762,736,113	₩ 625,352,280	₩ 625,352,280
Current portion of borrowings and debentures	504,161,325	507,158,479	834,539,473	835,348,031
Current derivative liabilities	1,264,158	1,264,158	42,799	42,799
Long-term trade and other payables	268,345,856	268,345,856	159,741,740	159,741,740
Long-term borrowings and debentures	1,588,356,856	1,604,327,497	899,558,336	911,053,855
Non-current derivative liabilities	923,496	923,496	818,812	818,812
	<u>₩ 3,125,787,804</u>	<u>₩ 3,144,755,599</u>	<u>₩ 2,520,053,440</u>	<u>₩ 2,532,357,517</u>

5.2 Fair Value Hierarchy

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

- Quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1).

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- All inputs other than quoted prices included in level 1 that are observable for the asset or liability, either directly (that is, prices) or indirectly (that is, derived from prices) (Level 2).
- Unobservable inputs for the asset or liability (Level 3).

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

(in thousands of Korean won)

	2019			
	Level 1	Level 2	Level 3	Total
Financial assets at fair value through profit or loss	₩ 6,224,057	₩ -	₩ 48,002,307	₩ 54,226,364
Financial assets at fair value through comprehensive income	-	-	549,615	549,615
Derivative assets	-	3,340,880	17,748,833	21,089,713
Derivative liabilities	-	2,187,654	-	2,187,654

(in thousands of Korean won)

	2018			
	Level 1	Level 2	Level 3	Total
Financial assets at fair value through profit or loss	₩ 5,269,683	₩ -	₩ 44,675,004	₩ 49,944,687
Financial assets at fair value through comprehensive income	-	-	1,354,683	1,354,683
Derivative assets	-	994,041	13,872,267	14,866,308
Derivative liabilities	-	861,611	-	861,611

There have been no transfers between the levels of each fair value hierarchy of financial instruments during the years ended December 31, 2019 and 2018.

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5.3 Changes in Level 3 for Recurring Fair Value Measurements

Changes in level 3 for recurring fair value measurements for the years ended December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)

	2019		
	Financial assets at fair value through profit or loss	Financial assets at fair value through other comprehensive income	Derivative assets
Beginning balance	₩ 44,675,004	₩ 1,354,683	₩ 13,872,267
Acquisition	3,905,000	1,279,636	-
Disposal	(203,152)	-	-
Valuation	(374,545)	(2,084,704)	3,876,566
Ending balance	₩ 48,002,307	₩ 549,615	₩ 17,748,833

(in thousands of Korean won)

	2018		
	Financial assets at fair value through profit or loss	Financial assets at fair value through other comprehensive income	Derivative assets
Beginning balance	₩ 11,615,529	₩ -	₩ -
Acquisition	15,173	1,002,915	-
Disposal	(279,501)	-	-
Valuation	1,455,117	-	6,694,967
Changes due to business combination	1,899,043	-	-
Others ¹	29,969,643	351,768	7,177,300
Ending balance	₩ 44,675,004	₩ 1,354,683	₩ 13,872,267

¹ It has been added as a change in the method of measurement.

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6. Financial Instruments by Category

6.1 Carrying Amounts of Financial Instruments by Category

Categorizations of financial assets and liabilities as at December 31, 2019 and 2018, are as follows:

(a) Financial assets

<i>(in thousands of Korean won)</i>		2019		2018
Financial assets at fair value through profit or loss	₩	54,226,364	₩	49,944,687
Financial assets at fair value through comprehensive income		549,615		1,354,683
Financial assets at amortized cost				
Cash and cash equivalents		1,000,121,610		636,721,975
Other financial assets		128,290,722		43,427,914
Trade receivables		1,269,269,736		1,184,564,593
Other financial assets at amortized cost		82,319,295		100,228,589
Derivative instruments				
Option		17,748,833		13,872,267
Interest rate swap-cash flow hedge		-		374,740
Currency swap-cash flow hedge		986,231		-
Currency forward-cash flow hedge		-		445,118
Currency forward-fair value hedge		85,629		174,183
Currency swap-for trading		457,404		-
Currency forward-for trading		1,811,616		-
	₩	<u>2,555,867,055</u>	₩	<u>2,031,108,749</u>

(b) Financial liabilities

<i>(in thousands of Korean won)</i>		2019		2018
Financial liabilities at amortized cost				
Trade payables	₩	536,127,600	₩	411,361,889
Other financial liabilities at amortized cost		494,954,369		373,732,131
Borrowings and debentures, current		504,161,325		834,539,473
Borrowings and debentures, non-current		1,588,356,856		899,558,336
Derivative instruments				
Interest rate swap-cash flow hedge		168,924		80,978
Interest rate swap-for trading		133,715		-
Currency swap-cash flow hedge		-		733,433
Currency forward-fair value hedge		346,466		47,200

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Currency swap-for trading	683,311	-
Currency forward-for trading	855,238	-
	₩ 3,125,787,804	₩ 2,520,053,440

6.2 Net Gains or Losses by Category of Financial Instruments

Net gain or net loss on each category of financial instruments for the years ended December 31, 2019 and 2018, is as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Impairment loss		
Trade receivables	₩ (14,261,136)	₩ (5,099,666)
Other financial assets at amortized cost	(6,215)	6,121
Gain (loss) on foreign currency translation		
Trade receivables and other financial assets at amortized cost	(2,636,897)	(993,703)
Trade payables and other financial liabilities at amortized cost	(8,420,501)	(4,860,831)
Borrowings	(1,738,338)	478,405
Interest income (expenses)		
Cash and cash equivalents	7,891,195	4,452,581
Trade receivables and other financial assets at amortized cost	6,044,552	5,120,432
Trade payables and other financial liabilities at amortized cost	(2,418,349)	(1,822,247)
Borrowings	(54,820,258)	(44,681,984)
Dividend income		
Financial instruments at fair value through profit or loss	1,482,605	1,400,203
Loss on disposal of trade receivables	(320,302)	(565,293)
Gain (loss) on disposal of financial assets at fair value through profit or loss	109,838	(1,590)
Gain (loss) on valuation of financial assets at fair value through profit or loss		
Equity securities	954,374	2,532,664
Beneficiary certificates	(161,417)	(130,330)
Cooperative investments	(213,127)	964,577
Gain (loss) on valuation of financial assets at fair value through other comprehensive income ¹		
Equity securities	(2,084,704)	(41,108,002)
Derivative instruments		
Gain (loss) on valuation of option	3,876,567	6,694,967
Gain (loss) on valuation of interest rate swap-cash flow hedge ^{1,2}	(462,744)	(751,337)
Gain (loss) on valuation of interest rate swap-for trading	(133,715)	-

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Gain (loss) on valuation of currency swap-cash flow hedge ^{1,2}	(126,292)	-
Gain (loss) on valuation of currency swap-cash flow hedge	1,191,000	(78,477)
Gain (loss) on valuation of currency forward-fair value hedge	(286,485)	(994,206)
Gain (loss) on valuation of currency swap-for trading	429,049	-
Gain (loss) on valuation of currency forward-for trading	956,377	-
Gain (loss) on transaction of currency swap-cash flow hedge	-	96,000
Gain (loss) on transaction of currency forward-fair value hedge	(5,149,068)	(444,960)
Gain (loss) on transaction of currency swap-for trading	117,000	-
Gain (loss) on transaction of currency forward-for trading	(400,409)	-
	₩ (70,587,400)	₩ (79,786,676)

¹ Before income tax effect

² Gain (loss) on valuation was recognized in other comprehensive income.

7. Transfer of Financial Assets

Details of transferred financial assets that are not derecognized in their entirety as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Financial assets at amortized cost (trade receivables)				
Carrying amount of assets	₩	19,044,288	₩	73,293,536
Carrying amount of the associated liabilities ¹		(19,044,288)		(73,293,536)
Net position	₩	-	₩	-

¹ The Group raised funds by providing the export trade receivables as collateral and bears recourse for bank until the maturity of the trade receivables.

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8. Cash and Cash Equivalents

Cash and cash equivalents as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Cash on hand	₩	17,629,523	₩	6,546
Demand deposits		64,371,753		130,768,479
Other cash and cash equivalents		918,120,334		505,946,950
	₩	<u>1,000,121,610</u>	₩	<u>636,721,975</u>

Restricted financial instruments as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018		Restriction
Cash and cash equivalents	₩	3,368,573	₩	3,261,190	Technology development business agreement and others
Other current financial assets (short-term financial assets)		23,325,828		19,300,058	Deposit for mutual growth of large and small business
Other non-current financial assets (long-term financial assets)		514,030		285,808	Overdraft
	₩	<u>27,208,431</u>	₩	<u>22,847,056</u>	

9. Other Financial Assets

9.1 Financial assets at fair value through profit or loss

Financial assets mandatorily measured at fair value through profit or loss include the following classes of financial assets:

<i>(in thousands of Korean won)</i>	2019		2018	
Non-current				
Beneficiary certificates	₩	11,949,282	₩	11,205,699
Equity securities		6,224,057		5,269,683
Cooperative investments		36,053,025		33,469,305
	₩	<u>54,226,364</u>	₩	<u>49,944,687</u>

During 2019, the Group has sold portion of cooperative investments. The cooperative investments sold had a fair value of ₩ 271,932 thousand, and related accumulated other comprehensive income of ₩ 109,838 thousand is recognized as 'finance income and costs' after the disposal.

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9.2 Financial assets at fair value through comprehensive income

Equity securities at fair value through other comprehensive income comprise the following individual investments:

<i>(in thousands of Korean won)</i>	2019		2018	
Unlisted equity securities				
AMT Engineering Co., Ltd.	₩	350,000	₩	350,000
STX Offshore & Shipbuilding Co., Ltd.		1,768		1,768
Wevil Co., Ltd.		-		1,002,915
Lykke Corp.		197,847		-
	₩	<u>549,615</u>	₩	<u>1,354,683</u>

Upon disposal of these equity securities, any balance within the accumulated other comprehensive income for these equity investments is reclassified to retained earnings and is not reclassified to profit or loss.

9.3 Trade Receivables and Other Financial Assets at Amortized Cost

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

<i>(in thousands of Korean won)</i>	2019		2018	
	Current	Non-current	Current	Non-current
Trade receivables	₩ 1,267,312,061	₩ 30,376,739	₩ 1,185,736,916	₩ 13,344,950
Less: provision for impairment	<u>(26,480,232)</u>	<u>(1,938,832)</u>	<u>(13,619,185)</u>	<u>(898,088)</u>
Trade receivables - net	<u>₩ 1,240,831,829</u>	<u>₩ 28,437,907</u>	<u>₩ 1,172,117,731</u>	<u>₩ 12,446,862</u>

The Group has transferred trade receivables amounting to ₩ 19,044 million to a bank in exchange for cash for the year ended December 31, 2019. The Group may retain an obligation to compensate a bank for debtors' failure to make payment when they become due; therefore, the transaction has been accounted for as a collateralized borrowing (Note 18).

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Movements on the provision for impairment of trade and receivables for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Beginning balance	₩	14,517,283	₩	11,024,446
Provision for impairment of receivables during the year		14,261,136		5,099,666
Receivables written off during the year as uncollectible		(770,974)		(2,601,963)
Changes in scope of consolidation		331,001		1,497,347
Others		80,618		(502,223)
Ending balance	₩	<u>28,419,064</u>	₩	<u>14,517,273</u>

Other financial assets at amortized cost as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019				2018			
	Current		Non-current		Current		Non-current	
Financial instruments	₩	122,858,099	₩	5,432,623	₩	39,620,107	₩	3,807,808
Non-trade receivables		47,604,986		-		65,880,657		-
Accrued income		732,752		-		786,869		-
Deposits provided		3,800,597		25,979,993		6,836,341		22,279,172
Loans to employees		4,664		3,525,701		-		3,526,945
Loans		71,642		598,960		130,973		909,830
	₩	<u>175,072,740</u>	₩	<u>35,537,277</u>	₩	<u>113,254,947</u>	₩	<u>30,523,755</u>

10. Derivatives

Derivatives as at December 31, 2019 and 2018, consist of:

<i>(in thousands of Korean won)</i>	2019				2018			
	Current		Non-current		Current		Non-current	
Derivative assets								
Option ¹	₩	-	₩	17,748,833	₩	-	₩	13,872,267
Interest rate swap-cash flow hedge		-		-		-		374,740
Currency swap-cash flow hedge		-		986,231		-		-
Currency forward- cash flow hedge		-		-		445,118		-
Currency forward-fair value hedge		67,605		18,024		105,848		68,335
Currency swap-for trading		-		457,404		-		-
Currency forward-for trading		1,811,616		-		-		-

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	₩	1,879,221	₩	19,210,492	₩	550,966	₩	14,315,342
Derivatives liabilities								
Interest rate swap-cash flow hedge	₩	129,829	₩	39,094	₩	-	₩	80,978
Interest rate swap-for trading		-		133,715		-		-
Currency swap-cash flow hedge		-		-		-		733,433
Currency forward-fair value hedge		279,091		67,376		42,799		4,401
Currency swap-for trading		-		683,311		-		-
Currency forward-for trading		855,238		-		-		-
	₩	1,264,158	₩	923,496	₩	42,799	₩	818,812

¹ Detail of option of derivative assets as at December 31, 2019 and 2018 is as follows:

Details

Underlying assets	P&W NGPF Manufacturing Company Singapore. Ltd. (Remaining shares, 70%)
Call option exercise price	The price for 70% shares of P&W NGPF Manufacturing Company Singapore. Ltd. at the point of exercise plus \$11,800,000
Call option exercise period	January 1, 2022 ~ December 31, 2026
Owner of call option	Hanwha Aerospace Co., Ltd.
Discount rate	Interest curve of treasury bond of Singapore government

Cash flow hedge

The Group has entered into foreign exchange swap contracts, interest swap contracts and foreign exchange forward contracts to hedge the risk of volatility in foreign exchange rates and interest rate in USD. The Group also recognized currency swap derivative assets of ₩ 968,231 thousand, interest swap derivative liabilities of ₩ 168,923 thousand as at December 31, 2019.

Fair value hedge

The Group has entered into foreign exchange forward contracts to hedge the risk of volatility in foreign exchange rates between KRW and USD, and between KRW and EUR. The Group applied fair value hedge accounting, recognizing firm commitment assets of ₩ 130,648 thousand and firm commitment liabilities of ₩ 54,123 thousand as at December 31, 2019. In addition, the Group also recognized derivative assets of ₩ 85,629 thousand and derivative liabilities of ₩ 346,467 thousand as at December 31, 2019. The related valuation gain or loss from contracts was included in gain or loss on foreign currency translation in the statements of comprehensive income.

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11. Inventories

Inventories as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)

	2019		
	Acquisition cost	Valuation allowance	Carrying amount
Merchandise & finished goods	₩ 154,084,945	₩ (23,985,264)	₩ 130,099,681
Semi-finished goods	115,716,951	(1,250,221)	114,466,730
Work-in-progress	546,380,779	(1,017,637)	545,363,142
Raw materials	465,927,480	(24,439,572)	441,487,908
Supplies	3,775,989	(289,487)	3,486,502
Materials-in-transit	94,785,838	-	94,785,838
	<u>₩ 1,380,671,982</u>	<u>₩ (50,982,181)</u>	<u>₩ 1,329,689,801</u>

(in thousands of Korean won)

	2018		
	Acquisition cost	Valuation allowance	Carrying amount
Merchandise & finished goods	₩ 156,736,200	₩ (18,373,363)	₩ 138,362,837
Semi-finished goods	113,470,726	(3,581,569)	109,889,157
Work-in-progress	648,963,559	(1,003,049)	647,960,510
Raw materials	400,485,091	(22,131,142)	378,353,949
Supplies	4,990,912	(119,134)	4,871,778
Materials-in-transit	40,359,111	-	40,359,111
	<u>₩ 1,365,005,599</u>	<u>₩ (45,208,257)</u>	<u>₩ 1,319,797,342</u>

Details of cost of inventories recognized as expense and inventory write-down (reversal) recognized in cost of sales as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)

	2019	2018
Inventories recognized in cost	₩ 4,244,025,640	₩ 3,646,810,716
Loss on valuation of inventories (reversal)	(1,707,451)	8,357,569
	<u>₩ 4,242,318,189</u>	<u>₩ 3,655,168,285</u>

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12. Other Assets

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

<i>(in thousands of Korean won)</i>	2019		2018	
	Current	Non-current	Current	Non-current
Advanced payments	₩ 765,461,445	₩ 186,550	₩ 588,229,055	₩ -
Prepaid expenses	39,181,620	22,424,997	46,409,033	28,729,305
Firm commitment assets	63,272	67,376	40,496	4,401
	<u>₩ 804,706,337</u>	<u>₩ 22,678,923</u>	<u>₩ 634,678,584</u>	<u>₩ 28,733,706</u>

13. Property, Plant and Equipment

Details of property, plant and equipment as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019					
	Land	Buildings and structures	Machinery	Construction-in-progress and machinery-in-transit	Others	Total
Beginning balance	₩ 899,112,202	₩ 385,886,179	₩ 283,123,978	₩ 44,802,937	₩ 100,760,123	₩ 1,713,685,419
Acquisition	1,086,980	10,364,196	22,627,457	119,447,959	11,795,376	165,321,968
Disposal	(676,891)	(965,836)	(763,607)	-	(714,956)	(3,121,290)
Depreciation	-	(18,290,462)	(70,296,580)	-	(32,159,500)	(120,746,542)
Business combination	4,937,343	15,832,854	54,500,699	4,394,069	4,528,649	84,193,614
Others ¹	881,325	24,006,590	54,777,060	(92,710,320)	4,507,814	(8,537,531)
Reclassification	(2,833,036)	(5,998,480)	-	-	-	(8,831,516)
Ending balance	<u>₩ 902,507,923</u>	<u>₩ 410,835,041</u>	<u>₩ 343,969,007</u>	<u>₩ 75,934,645</u>	<u>₩ 88,717,506</u>	<u>₩ 1,821,964,122</u>
Acquisition cost	₩ 902,507,923	₩ 605,168,694	₩ 1,004,392,653	₩ 75,934,645	₩ 286,125,287	₩ 2,874,129,202
Accumulated depreciation	-	(193,940,439)	(655,038,766)	-	(197,376,522)	(1,046,355,727)
Accumulated impairment loss	-	(393,214)	(5,384,880)	-	(31,259)	(5,809,353)

¹ Reclassification and exchange differences are included.

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	2018					
	Land	Buildings and structures	Machinery	Construction-in-progress and machinery-in-transit	Others	Total
Beginning balance	₩ 805,260,587	₩ 265,659,896	₩ 198,240,432	₩ 95,408,407	₩ 62,044,065	₩ 1,426,613,387
Acquisition	752,581	32,566,684	10,615,038	103,016,550	28,024,135	174,974,988
Disposal	-	(111,203)	(3,391,438)	(65)	(1,383,289)	(4,885,995)
Depreciation	-	(14,188,132)	(58,291,494)	-	(24,248,981)	(96,728,607)
Business combination	27,605,365	54,200,144	40,741,811	3,026,996	6,560,123	132,134,439
Others ¹	12,036,631	35,483,844	95,209,628	(156,648,951)	29,764,070	15,845,222
Reclassification ²	31,149,650	12,274,946	1	-	-	43,424,597
Revaluation	22,307,388	-	-	-	-	22,307,388
Ending balance	<u>₩ 899,112,202</u>	<u>₩ 385,886,179</u>	<u>₩ 283,123,978</u>	<u>₩ 44,802,937</u>	<u>₩ 100,760,123</u>	<u>₩ 1,713,685,419</u>
Acquisition cost	₩ 899,112,202	₩ 537,584,297	₩ 827,452,011	₩ 44,802,937	₩ 277,491,663	₩ 2,586,443,110
Accumulated depreciation	-	(151,698,118)	(538,943,154)	-	(176,697,700)	(867,338,972)
Accumulated impairment loss	-	-	(5,384,880)	-	(33,841)	(5,418,721)

¹ The Group reclassified certain properties classified as assets held for sale to property, plant and equipment due to changes in the purpose of use.

² Reclassification and exchange differences are included.

Line items including depreciation in the consolidated statements of comprehensive income for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Cost of sales	₩ 91,542,444	₩ 71,348,708
Research and development	2,349,821	2,850,848
Selling and administrative expenses	26,854,277	22,529,051
	<u>₩ 120,746,542</u>	<u>₩ 96,728,607</u>

14. Investment property

Details of investment property as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019					Ending Balance
	Beginning Balance	Revaluation	Impairment	Transfer		
Land	₩ 1,670,316	₩ 52,260	₩ -	₩ (1,722,576)	₩ -	
Buildings	803,636	-	(393,215)	(410,421)	-	
	<u>₩ 2,473,952</u>	<u>₩ 52,260</u>	<u>₩ (393,215)</u>	<u>₩ (2,132,997)</u>	<u>₩ -</u>	

¹ Investment property was transferred to property, plant and equipment in 2019.

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(in thousands of Korean won)	2018		
	Cost	Accumulated depreciation	Book amount
Land	₩ 1,670,316	₩ -	₩ 1,670,316
Buildings	803,636	-	803,636
	<u>₩ 2,473,952</u>	<u>₩ -</u>	<u>₩ 2,473,952</u>

The Group recognized investment property from a business combination during the year ended December 31, 2018.

15. Intangible Assets

Details of intangible assets as at December 31, 2019 and 2018 are as follows:

(in thousands of Korean won)	2019							Total
	Development cost	Goodwill	Patents and trademarks	Business license for international joint projects	Technical license	Software	Others	
Beginning balance	₩ 241,833,858	₩ 797,004,281	₩ 9,663,198	₩ 222,439,679	₩ 26,514,656	₩ 91,240,903	₩ 83,743,659	₩1,472,440,234
Internally generated	76,207,138	-	-	-	-	-	-	76,207,138
Acquisition	-	-	3,246,040	60,121,568	21,318,000	10,663,819	15,840,581	111,190,008
Disposal	(69,143)	-	(35,542)	-	-	(266,566)	(472,295)	(843,546)
Amortization	(18,934,736)	-	(2,523,214)	(8,487,006)	(2,169,969)	(26,121,282)	(15,253,867)	(73,490,074)
Impairment	(2,451,208)	(3,149,607)	-	-	-	-	-	(5,600,815)
Business combination	59,900,422	168,552,000	5,153,577	-	-	-	71,113,356	304,719,355
Others ¹	(363,979)	(7,245,162)	7,426	(1,090,513)	(57,144)	16,726,310	(11,218,860)	(3,241,922)
Ending balance	<u>₩ 356,122,352</u>	<u>₩ 955,161,512</u>	<u>₩ 15,511,485</u>	<u>₩ 272,983,728</u>	<u>₩ 45,605,543</u>	<u>₩ 92,243,184</u>	<u>₩143,752,574</u>	<u>₩1,881,380,378</u>
Acquisition cost	494,689,114	955,161,512	32,493,945	306,178,200	53,484,761	206,065,186	229,107,153	2,277,179,871
Accumulated amortization ²	(138,566,762)	-	(16,982,460)	(33,194,472)	(7,879,218)	(113,822,002)	(85,354,579)	(395,799,493)

¹ Reclassification and exchange differences are included.

² Accumulated impairment losses are included.

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	2018							Total
	Development cost	Goodwill	Patents and trademarks	Business license for international joint projects	Technical license	Software	Others	
Beginning balance	₩ 177,695,328	₩ 461,455,845	₩ 8,898,693	₩ 173,985,848	₩ 28,589,637	₩ 56,795,971	₩ 46,512,230	₩ 953,933,552
Internally generated	41,748,220	-	-	-	-	-	-	41,748,220
Acquisition	-	-	3,143,539	66,021,065	-	6,447,139	7,518,600	83,130,343
Disposal	-	-	(35,923)	-	-	(284,670)	(70,000)	(390,593)
Amortization	(18,662,077)	-	(2,351,538)	(6,825,551)	(2,074,981)	(18,896,700)	(9,292,934)	(58,103,781)
Business combination	41,821,489	335,417,676	8,427	-	-	39,508,593	51,354,922	468,111,107
Others ¹	(769,102)	130,760	-	(10,741,683)	-	7,670,570	(12,279,159)	(15,988,614)
Ending balance	₩ 241,833,858	₩ 797,004,281	₩ 9,663,198	₩ 222,439,679	₩ 26,514,656	₩ 91,240,903	₩ 83,743,659	₩ 1,472,440,234
Acquisition cost	376,716,221	797,004,281	25,860,617	255,634,151	31,124,699	166,699,073	150,925,185	1,803,964,227
Accumulated amortization ²	(134,882,363)	-	(16,197,419)	(33,194,472)	(4,610,043)	(75,458,170)	(67,181,526)	(331,523,993)

¹ Reclassification and exchange differences are included.

² Accumulated impairment losses are included.

Impairment Tests for Goodwill

Goodwill is monitored by management at the operating segment level. The table below summarizes goodwill allocation for each operating segment (cash-generating unit). Goodwill allocation for the years ended December 31, 2019 and 2018, is as follows:

(in thousands of Korean won)	2019	2018
Hanwha Defense Systems Corp	₩ 272,825,375	₩ 272,825,375
Hanwha Systems Co., Ltd. – Defense division	127,333,294	127,333,294
Hanwha Systems Co., Ltd. – ICT division	331,756,852	331,756,852
Hanwha Systems Japan Co., Ltd.	511,217	3,660,824
Goodwill related to Security Solution CGU	57,043,889	57,043,889
Hanwha Aerospace USA Co.,	162,449,045	-
Others ¹	3,241,840	4,384,047
	₩ 955,161,512	₩ 797,004,281

¹ Exchange differences are included.

The recoverable amount of the CGU is calculated on a basis of the value in use. Key assumptions for calculation of value in use are as follows:

	Hanwha Techwin Co., Ltd.	Hanwha Defense Systems Corp	Hanwha Systems Co., Ltd. – Defense division	Hanwha Systems Co., Ltd. – ICT division
Gross margin rate ¹	7.19%	6.39%	4.80%	10.10%
Sales growth rate ²	5.38%	7.53%	11.70%	6.81%
Discount rate	7.90%	7.59%	7.76%	9.24%
Perpetual growth rate	1.00%	1.00%	1.00%	1.00%

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¹ The weighted average gross margin for estimating cash flows over the budgeted period

² The annual sales growth rate for estimating cash flows over the budgeted period

The impairment test suggests that the carrying amount of cash generating units does not exceed the recoverable amount.

Intangible assets that have indefinite useful lives as at December 31, 2019 and 2018, consist of:

<i>(in thousands of Korean won)</i>	2019		2018	
Golf membership rights	₩	23,050,492	₩	20,949,999
Other membership rights		1,697,473		1,632,088
	₩	<u>24,747,965</u>	₩	<u>22,582,087</u>

Line items including amortization in the consolidated statements of comprehensive income for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Cost of sales	₩	26,601,909	₩	20,859,996
Research and development		3,515,150		2,637,558
Selling and administrative expenses		43,373,015		34,606,227
	₩	<u>73,490,074</u>	₩	<u>58,103,781</u>

16. Investments in Associates

Details of investments in associates of the Group as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>			2019		2018	
Name of entity	Location	Main business	Percentage of ownership (%)	Carrying amount	Percentage of ownership (%)	Carrying amount
P&W NGPF Manufacturing Company Singapore. Ltd. ¹	Singapore	Manufacturing Gas Turbine Engine for Aircrafts	30.00%	₩ 56,247,556	30.00%	₩ 50,472,603
PBA-Hanwha Robotics PTE. LTD.	Singapore	Robot manufacturing and sales	49.00%	228,575	49.00%	322,756
Sermatech Korea Co., Ltd.	Korea	Plasma coating, etc.	49.00%	7,965,985	49.00%	7,184,582
				<u>₩ 64,442,116</u>		<u>₩ 57,979,941</u>

¹ On September 27, 2016, the Group entered into call option contract relating to 70% shares of P&W

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NGPF Manufacturing Company Singapore. Ltd. owned by United Technologies International Corporation- Asia Private Limited. Exercise period for the option is from January 1, 2022 to December 31, 2026 (Note 10).

Movements of investments in associates that are accounted for using the equity method for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019					
	Beginning balance	Acquisition	Share of profit of associates	Share of other comprehensive income of associates	Others ¹	Ending Balance
P&W NGPF Manufacturing Company Singapore. Ltd.	₩ 50,472,603	₩ -	₩ 4,026,580	₩ 1,748,373	₩ -	₩ 56,247,556
PBA-Hanwha Robotics PTE. LTD.	322,756	-	(106,358)	12,177	-	228,575
Sermatech Korea Co., Ltd.	7,184,582	-	4,262,845	-	(3,481,442)	7,965,985
	<u>₩ 57,979,941</u>	<u>₩ -</u>	<u>₩ 8,183,067</u>	<u>₩ 1,760,550</u>	<u>₩ (3,481,442)</u>	<u>₩ 64,442,116</u>

¹ Others include dividends.

<i>(in thousands of Korean won)</i>	2018					
	Beginning balance	Acquisition	Share of profit of associates	Share of other comprehensive income of associates	Others ¹	Ending Balance
P&W NGPF Manufacturing Company Singapore. Ltd.	₩ 41,673,253	₩ 4,492,320	₩ 2,270,558	₩ 2,036,472	₩ -	₩ 50,472,603
PBA-Hanwha Robotics PTE. LTD.	-	391,735	(83,056)	14,077	-	322,756
Sermatech Korea Co., Ltd.	6,541,058	-	3,483,309	-	(2,839,785)	7,184,582
	<u>₩ 48,214,311</u>	<u>₩ 4,884,055</u>	<u>₩ 5,670,811</u>	<u>₩ 2,050,549</u>	<u>₩ (2,839,785)</u>	<u>₩ 57,979,941</u>

¹ Others include dividends.

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The tables below provide summarized financial information for those associates and dividends received from the associates.

(in thousands of Korean won)	2019							
	Current assets	Non-current assets	Current liabilities	Non-current liabilities	Revenue	Profit for the year	Total comprehen- sive income	Dividends received from associates
P&W NGPF Manufacturing Company Singapore. Ltd.	₩ 85,264,464	₩ 133,399,525	₩ 24,185,310	₩ 8,547,404	₩ 85,917,600	₩ 13,421,935	₩ 19,249,845	₩ -
PBA-Hanwha Robotics PTE. LTD.	755,029	99,805	388,354	-	(25,877)	(217,055)	(192,206)	-
Sermatech Korea Co., Ltd.	17,218,691	14,288,639	9,147,575	6,102,629	40,406,646	8,699,690	8,699,690	3,481,442

(in thousands of Korean won)	2018							
	Current assets	Non-current assets	Current liabilities	Non-current liabilities	Revenue	Profit for the year	Total comprehen- sive income	Dividends received from associates
P&W NGPF Manufacturing Company Singapore. Ltd.	₩ 83,804,258	₩122,235,752	₩ 29,497,048	₩ 9,861,534	₩ 78,286,854	₩ 7,568,526	₩ 14,356,766	₩ -
PBA-Hanwha Robotics PTE. LTD.	970,908	112,375	424,598	-	472,874	(169,502)	(140,773)	-
Sermatech Korea Co., Ltd.	13,032,832	13,992,351	7,108,082	5,254,675	34,738,747	7,108,801	7,108,801	2,839,785

Details of adjustments from financial information of associates to the carrying amount of investments in associates as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019				
	Net asset	Ownership interests held by the Group	Interest in net asset	Difference between investment and interest in net asset	Carrying amount
P&W NGPF Manufacturing Company Singapore. Ltd.	₩ 185,931,275	30.00%	₩ 55,779,383	₩ 468,174	₩ 56,247,556
PBA-Hanwha Robotics PTE. LTD.	466,480	49.00%	228,575	-	228,575
Sermatech Korea Co., Ltd.	16,257,126	49.00%	7,965,985	-	7,965,985

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	2018				
	Net asset	Ownership interests held by the Group	Interest in net asset	Difference between investment and interest in net asset	Carrying amount
P&W NGPF					
Manufacturing Company Singapore. Ltd.	₩ 166,681,428	30.00%	₩ 50,004,428	₩ 468,174	₩ 50,472,603
PBA-Hanwha Robotics PTE. LTD.	658,685	49.00%	322,756	-	322,756
Sermatech Korea Co., Ltd.	14,662,426	49.00%	7,184,582	-	7,184,582

17. Trade and Other Payables

Trade and other payables as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)

	2019		2018	
	Current	Non-current	Current	Non-current
Trade payables	₩ 391,998,924	₩ 144,128,675	₩ 316,390,856	₩ 94,971,033
Non-trade payables	136,056,329	117,115,946	118,286,828	59,449,593
Accrued expenses	213,817,562	2,965,613	168,621,399	3,444
Withholdings	20,563,298	-	22,053,197	-
Deposits received	300,000	4,135,622	-	5,317,670
	₩ 762,736,113	₩ 268,345,856	₩ 625,352,280	₩ 159,741,740

18. Borrowings and Debentures

Details of debentures as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)

	Date of issuance	Date of maturity	Annual interest rate (%)	2019	2018
The 115-2nd non-guarantee debentures	2015.11.26	2020.11.26	2.79	₩ 30,000,000	₩ 30,000,000
The 116-1st non-guarantee debentures	2016.06.22	2019.06.22	-	-	110,000,000
The 116-2nd non-guarantee debentures	2016.06.22	2021.06.22	2.20	40,000,000	40,000,000
The 117th private bonds	2016.08.30	2019.08.30	-	-	70,000,000
The 118th private bonds	2016.10.28	2019.10.28	-	-	100,000,000
The 119th private bonds	2018.03.15	2023.03.15	3.50	20,000,000	20,000,000
The 120-1st public bonds	2018.05.02	2021.05.02	2.76	95,000,000	95,000,000

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<i>(in thousands of Korean won)</i>	Date of issuance	Date of maturity	Annual interest rate (%)	2019	2018
The 120-2nd public bonds	2018.05.02	2023.05.02	3.18	55,000,000	55,000,000
The 121-1st public bonds	2018.11.05	2021.11.05	2.71	60,000,000	60,000,000
The 121-2nd public bonds	2018.11.05	2023.11.05	2.98	40,000,000	40,000,000
The 122-1st public bonds	2019.04.30	2022.04.29	2.06	100,000,000	-
The 122-2nd public bonds	2019.04.30	2024.04.30	2.30	100,000,000	-
The 123-1st public bonds	2019.10.02	2022.09.30	1.84	70,000,000	-
The 123-2nd public bonds	2019.10.02	2024.10.02	2.10	80,000,000	-
The 3-1st non-guarantee private bonds	2019.07.05	2022.07.05	1.95	30,000,000	-
The 3-2nd non-guarantee private bonds	2019.07.05	2024.07.05	2.10	30,000,000	-
The 1st non-guarantee private bonds	2018.03.14	2021.03.12	3.48	10,000,000	10,000,000
The 1st non-guarantee private bonds	2017.09.28	2019.09.27	-	-	30,000,000
FRN private bonds ¹	2018.07.27	2021.07.27	3.30	34,734,000	33,543,000
The 2nd private bonds	2019.03.27	2024.03.27	2.76	50,000,000	-
The 3rd private bonds	2019.10.11	2022.10.11	1.89	20,000,000	-
The 1st private bonds	2018.11.28	2020.11.28	3.90	10,000,000	10,000,000
				874,734,000	703,543,000
Less: discount of debentures				(2,182,856)	(1,545,515)
Less: current portion of debentures				(39,972,897)	(309,748,340)
				₩ 832,578,247	₩ 392,249,145

¹ In relation to the bonds, the Group has entered into currency swap to hedge foreign currency risk and interest rate risk (Note 10).

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

<i>(in thousands of Korean won)</i>		Annual interest rate (%)	2019	2018
Lender	Details			
Kookmin Bank	General operating fund	2.74~2.99	₩ 70,000,00	₩70,000,000
Kookmin Bank	Facility loans	2.63~3.43	30,000,000	10,000,000
Korea Development Bank	General operating fund	-	-	30,000,000
Bank of China	General operating fund	2.49	20,000,000	20,000,000
Shinhan Bank ¹	General operating fund	4.58	1,500,000	1,500,000
Korea Investment & Securities Co., Ltd.	General operating fund	3.50	8,000,000	8,000,000
HI Investment & Securities Co., Ltd.	Private debt	2.87	40,000,000	40,000,000
Woori Bank	Other bill discount	-	-	20,000,000
Woori Bank	General operating fund	-	-	1,000,000
Woori Bank	General operating fund	3.50	10,000,000	10,000,000
Shinhan Bank New York	General operating fund	2.99	4,631,200	4,472,400
Hanwha International LLC	General operating fund	3.95	2,315,600	2,236,200

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Lender	Details	Annual interest rate (%)	2019	2018
Woori Bank Vietnam Ltd	General operating fund	6.11	4,366,104	5,398,400
Woori Bank Vietnam Ltd - Hanoi	General operating fund	2.49~2.76	11,588,750	-
Hana Bank (CHINA) Shanghai	General operating fund	5.22	7,292,560	8,582,120
			<u>₩209,694,214</u>	<u>₩231,189,120</u>

¹ In relation to the borrowings, the Group provided building and others amounting ₩3,000 million as collateral to Shinhan Bank (Note 34).

The Group sold trade receivables to Woori Bank and five other banks in accordance with foreign currency purchase agreement and other similar agreements. The amount of receivables which is not due in maturity is recorded as short-term borrowings. Related short-term borrowings as at December 31, 2019 and 2018 are ₩ 19,044 million and ₩ 73,294 million, respectively.

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

(in thousands of Korean won)

Lender	Details	Annual interest rate (%)	2019	2018
NH Nonghyup Bank	Munitions industry fund	1.65~2.00	₩ 1,954,000	₩ 4,222,840
	General operating fund	3.50	50,000,000	50,000,000
Shinhan Bank ²	BLCP	2.89	30,000,000	30,000,000
	General operating fund	2.34	20,000,000	-
Korea Development Bank	Facility loans	3.64	30,769,200	210,000,000
KH 3rd L.C.C. ¹	Facility loans	2.69	30,000,000	70,000,000
New Ari HT 4th L.C.C	General operating fund	2.73	50,000,000	50,000,000
Sunny Dream 5th Co., Ltd.	General operating fund	-	-	50,000,000
Kookmin Bank ²	Facility loans	2.83~2.99	103,333,333	120,000,000
Woori Bank	Facility loans	-	-	11,246,550
KEB Hana Bank – Amsterdam Branch ³	General operating fund	3.49	34,734,000	33,543,000
Industrial and Commercial Bank of China	Facility loans	3.20	100,000,000	-
	Facility loans	3.01	56,881,626	55,282,147
The Export-Import Bank of Korea	General operating fund	2.05~3.12	309,550,874	11,790,563
	General operating fund	3.15	34,734,000	-
Woori Bank Hong Kong	Facility loans	3.41~3.66	23,200,378	22,350,704
Woori Bank Bac Ninh	Facility loans	3.55~3.57	10,112,271	9,181,862
Woori Bank Hanoi	Facility loans	2.89~3.16	13,334,853	-
KEB Hana Bank, New York	General operating fund	3.31	81,046,000	-
Department of Economic and community Development	Facility loans	-	11,578,000	-

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Lender	Details	Annual interest rate (%)	2019	2018
			991,228,535	727,617,666
Less: current portion of long-term liabilities			(235,449,927)	(220,308,476)
			<u>₩755,778,608</u>	<u>₩507,309,190</u>

¹ In relation to the borrowing, land and buildings of Hanwha Defense Systems Corp. amounting to ₩168,000 million are provided as collateral to Korea Development Bank and KH 3rd L.C.C. (Note 34).

² The Group entered into interest rate swaps to hedge the cash flow interest rate risk in relation to the borrowings for ₩83,333 million from Kookmin Bank and ₩50,000 million from Shinhan Bank (Note 10).

³ The Group entered into currency swaps to hedge the cash flow interest rate risk in relation to borrowings (Note 10).

19. Other Liabilities

Details of other liabilities as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019		2018	
	Current	Non-current	Current	Non-current
Advances	₩ 1,939,994,660	₩ 6,823,441	₩ 1,580,157,095	₩ 9,400,102
Provisions ¹	65,803,792	5,196,957	70,416,712	3,052,861
Unearned revenues	-	-	145,317	-
Firm commitment liabilities	36,099	18,024	105,183	66,436
	<u>₩ 2,005,834,551</u>	<u>₩ 12,038,422</u>	<u>₩ 1,650,824,307</u>	<u>₩ 12,519,399</u>

¹ Provisions include product warranty, construction warranty and legal claims

Changes in provisions for the years ended December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019	2018
Beginning balance	₩ 73,469,574	₩ 74,942,724
Increase (reversal)	3,226,124	18,592,904
Decrease	(7,282,717)	(19,928,238)
Changes in scope of consolidation	1,565,974	665,581
Others	21,794	(803,397)
Ending balance	<u>₩ 71,000,749</u>	<u>₩ 73,469,574</u>

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20. Employee Benefits Liabilities

Details of employee benefits liabilities recognized in the statements of financial position as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Net defined benefit liabilities	₩ 473,699,902	₩ 432,001,332
Other long-term employee benefits	41,169,914	32,345,696
	<u>₩ 514,869,816</u>	<u>₩ 464,347,028</u>

(a) Net defined benefit liabilities

Details of net defined benefit liabilities recognized as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Present value of funded defined benefit obligations	₩ 592,039,075	₩ 534,709,437
Fair value of plan assets	(118,339,173)	(102,708,105)
Net defined benefit liabilities	<u>₩ 473,699,902</u>	<u>₩ 432,001,332</u>

Movements in the defined benefit obligations for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Beginning balance	₩ 534,709,437	₩ 413,418,440
Current service cost	60,727,983	48,334,902
Interest expense	18,717,961	17,256,125
Past service cost	(4,621,147)	239,107
Remeasurements:		
Actuarial loss (gain) from change in demographic assumptions	7,390	-
Actuarial loss (gain) from change in financial assumptions	15,576,287	24,109,135
Actuarial loss (gain) from experience adjustments	3,343,759	(6,207,775)
Transfer between affiliates	2,097,129	(12,498,214)
Benefit payments	(40,707,616)	(35,222,708)
Liabilities acquired in a business combination	2,180,359	85,268,529
Others ¹	7,533	11,896
Ending balance	<u>₩ 592,039,075</u>	<u>₩ 534,709,437</u>

¹ Exchange differences from foreign exchange rate fluctuation are included.

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Movements in the fair value of plan assets for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Beginning balance	₩	102,708,105	₩	107,355,501
Interest income		2,282,663		4,496,685
Remeasurements:				
Income of plan asset		(536,129)		(2,865,142)
Contributions		22,000,000		5,000,000
Transfer between affiliates		790,891		(5,202,724)
Benefit payments		(8,833,510)		(6,618,801)
Assets acquired in a business combination		-		542,586
Others		(72,847)		-
Ending balance	₩	<u>118,339,173</u>	₩	<u>102,708,105</u>

Plan assets as at December 31, 2019 and 2018, consist of:

<i>(in thousands of Korean won)</i>	2019		2018	
Severance insurance bonds	₩	117,798,513	₩	102,148,770
Others ¹		540,660		559,335
	₩	<u>118,339,173</u>	₩	<u>102,708,105</u>

¹ Contributions to the National Pension Fund are included.

The expenses recognized as profit or loss for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Current service cost	₩	56,106,836	₩	48,574,009
Net interest cost		16,435,298		12,759,440
	₩	<u>72,542,134</u>	₩	<u>61,333,449</u>

Line items including total expenses in the consolidated statements of comprehensive income the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Cost of sales	₩	49,120,130	₩	37,633,492
Research and development		7,371,619		6,696,695
Selling and administrative expenses		16,050,385		17,003,262
	₩	<u>72,542,134</u>	₩	<u>61,333,449</u>

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

	2019	2018
Discount rate	3.24~3.31%	3.60~3.74%
Salary growth rate	4.14~4.70%	4.17~4.72%

The sensitivity analysis of the defined benefit obligation to changes in the principal assumptions is as follows:

<i>(in thousands of Korean won)</i>	Changes in assumption	Impact on defined benefit obligation	
		Increase in assumption	Decrease in assumption
Discount rate	1% Increase/Decrease	₩ (51,137,616)	₩ 59,542,704
Salary growth rate	1% Increase/Decrease	59,367,158	(51,936,531)

The above sensitivity analyses are based on change in an assumption while holding all other assumptions constant. The sensitivity of the defined benefit obligation to changes in principal actuarial assumptions is measured using the projected unit credit method, the same method applied when calculating the defined benefit obligations recognized in the statement of financial position.

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

The Group reviews the funding level on an annual basis and has a policy of eliminating deficit from the fund.

The expected maturity analysis of undiscounted pension benefits as at December 31, 2019, is as follows:

<i>(in thousands of Korean won)</i>	Less than 1 year	Between 1 year and 2 years	Between 2 years and 5 years	Over 5 years	Total
Pension benefits	₩ 22,211,941	₩ 59,754,697	₩ 130,381,930	₩ 1,797,354,834	₩ 2,009,703,402

The weighted average duration of the defined benefit obligation is 9.1~10.5 years.

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21. Tax expense and Deferred tax

Income tax expense for the years ended December 31, 2019 and 2018, consists of:

<i>(in thousands of Korean won)</i>	2019		2018	
Current tax:				
Current tax on profits for the year	₩	41,866,122	₩	52,060,803
Adjustments in respect of prior years		(27,836,768)		602,274
		<u>14,029,354</u>		<u>52,663,077</u>
Deferred tax:				
Origination and reversal of temporary differences		(20,167,735)		(48,424,486)
		<u>(20,167,735)</u>		<u>(48,424,486)</u>
Income tax expense	₩	<u>(6,138,381)</u>	₩	<u>4,238,591</u>

The tax on the Group's profit before tax differs from the theoretical amount that would arise using the weighted average tax rate applicable to profits of the consolidated entities as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Profit before income tax expense	₩	156,288,937	₩	53,489,650
Tax at domestic tax rates applicable to profits in the respective countries		51,573,676		32,283,387
Tax effects of:				
Income not subject to tax		(9,694,898)		(9,600,163)
Expenses not deductible for tax purposes		2,455,728		10,930,952
Tax credit and tax cut		(9,377,737)		(23,526,210)
Income tax on effects of the tax refund		4,486,519		1,396,081
Adjustment in respect of prior years		(27,649,642)		329,689
Effect of unrecognized deferred tax		(16,916,872)		-
Others		(1,015,155)		(7,575,144)
Current adjustments		<u>(57,712,057)</u>		<u>(28,044,795)</u>
Income tax expense	₩	<u>(6,138,381)</u>	₩	<u>4,238,592</u>

The aggregate current and deferred tax relating to items that are charged or credited directly to equity for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		
	Before tax	Tax effect	After tax
Changes in the fair value of available-for-sale financial assets	₩ (2,084,704)	₩ 504,498	₩ (1,580,206)
Remeasurements of net defined benefit liabilities	(19,463,565)	4,677,278	(14,786,287)

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Share of other comprehensive income of associates and joint ventures	1,760,550	-	1,760,550
Exchange difference	575,627	-	575,627
Business combination of entities under a common control	-	-	-
Changes in accounting policy	-	-	-
Revaluation of assets	232,897	(56,361)	176,536
Gain (loss) on valuation of derivatives	(589,036)	142,547	(446,489)
	<u>₩ (19,568,231)</u>	<u>₩ 5,267,962</u>	<u>₩ (14,300,269)</u>

<i>(in thousands of Korean won)</i>	2018		
	Before tax	Tax effect	After tax
Changes in the fair value of available-for-sale financial assets	₩ (41,108,002)	₩ 9,948,137	₩ (31,159,865)
Remeasurements of net defined benefit liabilities	(19,119,096)	3,286,290	(15,832,806)
Share of other comprehensive income of associates and joint ventures	2,050,549	(118,922)	1,931,627
Exchange difference	1,649,392	(22,724)	1,626,668
Business combination of entities under a common control	(69,747,542)	16,010,327	(53,737,215)
Changes in accounting policy	(44,057,543)	10,895,136	(33,162,407)
Revaluation of assets	55,464,881	(13,422,501)	42,042,380
Gain (loss) on valuation of derivatives	(751,337)	181,824	(569,513)
	<u>₩ (115,618,698)</u>	<u>₩ 26,757,567</u>	<u>₩ (88,861,131)</u>

The movement in deferred tax assets and liabilities during the year, without taking into consideration the offsetting of balances within the same tax jurisdiction, is as follows:

(in thousands of Korean won)

	2019				
	Beginning balance	Statement of comprehensive income	Business combination	Equity	Ending balance
Defined benefit obligations	₩ 93,241,841	₩ 8,637,442	₩ 168,696	₩ 4,677,279	₩ 106,725,258
Financial assets at fair value through other comprehensive income	(630,367)	760,937	839,840	504,498	1,474,908
Investments in subsidiaries and associates	(35,562,240)	5,625,508	(25,457,089)	-	(55,393,821)
Depreciation	3,320,022	3,468,998	689,405	-	7,478,425
Provisions	16,208,829	9,221,953	(3,546,276)	-	21,884,506
Provision for impairment	1,302,230	309,320	-	-	1,611,550
Loss on valuation of	6,048,423	(374,883)	(282,516)	-	5,391,024

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inventories					
Accrued expenses and others	26,607,261	(733,037)	(1,806,938)	-	24,067,286
Long-term employee benefits and others	3,512,025	5,354,715	2,056,525	-	10,923,265
Right-of-use assets and lease liabilities	-	148,470	-	-	148,470
Gain on revaluation	(86,324,495)	456,514	(47,248)	(56,361)	(85,971,590)
Deferred tax credit	27,839,070	(12,281,309)	-	-	15,557,761
Deferred tax losses	-	4,841,687	-	-	4,841,687
Others	416,473	(5,268,580)	(8,502,191)	142,488	(13,211,810)
	<u>₩ 55,979,072</u>	<u>₩ 20,167,735</u>	<u>₩ (35,887,792)</u>	<u>₩ 5,267,904</u>	<u>₩ 45,526,919</u>

(in thousands of Korean won)

	2018				
	Beginning balance	Statement of comprehensive income	Business combination	Equity	Ending balance
Defined benefit obligations	₩ 71,087,758	₩ 7,471,758	₩ 11,396,035	₩ 3,286,290	₩ 93,241,841
Available-for-sale financial assets	(54,314,747)	43,736,243	-	9,948,137	(630,367)
Investments in subsidiaries and associates	(30,092,227)	(5,470,013)	-	-	(35,562,240)
Depreciation	3,224,867	95,155	-	-	3,320,022
Provisions	16,591,129	(434,352)	52,052	-	16,208,829
Provision for impairment	967,034	335,196	-	-	1,302,230
Loss on valuation of inventories	4,528,922	1,517,014	2,487	-	6,048,423
Accrued expenses and others	20,632,166	5,161,006	814,089	-	26,607,261
Long-term employee benefits and others	3,441,596	70,429	-	-	3,512,025
Gain on revaluation	(74,631,623)	1,729,629	-	(13,422,501)	(86,324,495)
Deferred tax credit	25,895,616	1,943,454	-	-	27,839,070
Deferred tax losses	13,305,434	(13,305,434)	-	-	-
Others	(16,840,594)	5,574,400	(15,262,974)	26,945,641	416,473
	<u>₩ (16,204,669)</u>	<u>₩ 48,424,485</u>	<u>₩ (2,998,311)</u>	<u>₩ 26,757,567</u>	<u>₩ 55,979,071</u>

The Group did not recognize deferred tax assets in consideration of future reliability for deductible temporary differences of ₩169,850,543 thousand related to investments in subsidiaries and associates and deferred tax credit of ₩31,008,719 thousand.

The maturity of unused tax credit is as follows:

<i>(in thousands of Korean won)</i>	Amount
2020	₩ 4,057,776
2021	11,140,076
2022	4,475,518

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2023		6,361,740
2024		4,973,609
	₩	<u>31,008,719</u>

The Group did not recognize deferred tax liabilities all for taxable temporary differences associated with of ₩300,808,711 thousand related to investments in subsidiaries and associates. Because the Group is able to control the timing of the reversal of the temporary differences and it is probable that the temporary differences will not be reversed in the foreseeable future.

The overseas subsidiaries of the Group have tax loss carryforwards whose deferred tax assets were not recognized, and the expiration dates of deduction are as follows:

<i>(in thousands of Korean won)</i>		Amount
2035	₩	955,684
2036		15,116,857
2037		12,006,818
No expiration date		37,210,354

22. Share Capital and Capital Surplus

The Parent Company's total number of authorized shares is 200,000,000 shares and the total number of ordinary shares issued is 51,560,000 shares with a par value of ₩ 5,000 per share. The Parent Company retired 1,570,000 shares, including 480,000 shares and 530,000 shares acquired in 2018 and 2019, by offsetting these against retained earnings in 2018 and 2019, respectively. As a result of these retirements, differences of ₩ 7,850 million occurred between the total par value of the shares issued and the share capital.

Details of capital surplus as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>		2019		2018
Share premium	₩	187,179,336	₩	187,179,336
Other capital surplus		224,872,367		212,521,687
	₩	<u>412,051,703</u>	₩	<u>399,701,023</u>

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23. Accumulated Other Comprehensive Income

Accumulated comprehensive income as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Financial assets at fair value through other comprehensive income	₩	(774,116)	₩	-
Revaluation surplus		344,737,250		344,560,714
Cash flow hedge		(215,400)		229,746
Exchange differences		(13,454,428)		(13,966,507)
Share of other comprehensive income of associates		2,133,042		372,492
	₩	<u>332,426,348</u>	₩	<u>331,196,445</u>

Changes in accumulated other comprehensive income for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019			
	Beginning balance	Increase (decrease)	Reclassification to profit or loss for the year	Ending balance
Financial assets at fair value through other comprehensive income	₩ -	₩ (774,116)	₩ -	₩ (774,116)
Revaluation surplus	344,560,714	176,536	-	344,737,250
Cash flow hedge	229,746	(445,146)	-	(215,400)
Exchange differences	(13,966,507)	512,079	-	(13,454,428)
Share of other comprehensive income of associates	372,492	1,760,550	-	2,133,042
	₩ <u>331,196,445</u>	₩ <u>1,229,903</u>	₩ -	₩ <u>332,426,348</u>

<i>(in thousands of Korean won)</i>	2018			
	Beginning balance	Increase (decrease)	Reclassification to profit or loss for the year	Ending balance
Changes in the fair value of available-for-sale financial assets	₩ 141,721,659	₩ (141,721,659)	₩ -	₩ -
Revaluation surplus	310,481,398	34,079,316	-	344,560,714
Cash flow hedge	772,588	(542,842)	-	229,746
Exchange differences	(15,615,900)	1,649,393	-	(13,966,507)
Share of other comprehensive income of associates	(1,559,134)	1,931,626	-	372,492
	₩ <u>435,800,611</u>	₩ <u>(104,604,166)</u>	₩ -	₩ <u>331,196,445</u>

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24. Retained Earnings

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

<i>(in thousands of Korean won)</i>	2019	2018
Legal reserves	₩ 30,916,736	₩ 30,916,736
Discretionary reserves	1,045,751,338	1,086,208,459
Retained earnings before appropriation	399,263,317	255,958,663
	<u>₩ 1,475,931,391</u>	<u>₩ 1,373,083,858</u>

25. Non-current Assets and Liabilities Held for Sale

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

<i>(in thousands of Korean won)</i>	2019	2018
Property, plant and equipment	₩ 11,305,467	₩ -

The Group has transferred property, plant and equipment amounting to ₩ 11,305,467 thousands to assets held for sale during the year ended December 31, 2019.

The Group will sell the supporting facility (carrying amount: ₩ 11,305 million) located in Yeosu-dong, Seongnam-si, at a price of ₩ 12,000 million to secure asset quality.

26. Construction Contracts

Changes in the remaining balance of construction contracts for the years ended December 31, 2019 and 2018 are as follows:

<i>(in thousands of Korean won)</i>	2019			
	Beginning balance	Increase (Decrease)	Construction revenue recognition	Ending balance
Aerospace engine	₩ 345,892,786	₩ 247,384,347	₩ (218,002,520)	₩ 375,274,613
Security	9,693,479	7,054,743	(11,702,939)	5,045,283
Power Systems	4,357,619	29,263,242	(10,556,506)	23,064,355
Defense	2,051,927,762	1,509,494,560	(857,833,543)	2,703,588,779
ICT	106,044,996	182,250,948	(159,271,900)	129,024,044
	<u>₩ 2,517,916,642</u>	<u>₩ 1,975,447,840</u>	<u>₩ (1,257,367,408)</u>	<u>₩ 3,235,997,074</u>

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Korean won)

		2018				
	Beginning balance	Increase (Decrease)	Construction revenue recognition	Business combination ¹	Changes in accounting policy	Ending balance
Aerospace engine	₩ -	₩ 144,534,338	₩ (163,859,533)	₩ 184,102,538	₩ 181,115,443	₩ 345,892,786
Security	10,856,415	4,100,820	(5,263,756)	-	-	9,693,479
Power Systems	42,523,916	14,652,839	(36,046,102)	-	(16,773,034)	4,357,619
Defense	1,727,546,659	1,300,413,371	(591,395,008)	-	(384,637,260)	2,051,927,762
ICT	-	83,492,265	(51,586,407)	74,139,138	-	106,044,996
	<u>₩1,780,926,990</u>	<u>₩1,547,193,633</u>	<u>₩(848,150,806)</u>	<u>₩ 258,241,676</u>	<u>₩(220,294,851)</u>	<u>₩2,517,916,642</u>

¹ During the year ended December 31, 2018, the Group received aircraft business from Hanwha Corp.

Details of recognized construction profit or loss for ongoing construction contracts as at December 31, 2019 and 2018, are as follows:

(in thousands of
Korean won)

		2019			
	Accumulated contract revenue	Accumulated contract cost	Accumulated contract profit	Advance received	Retention
Aerospace engine	₩ 291,772,942	₩ 275,301,292	₩ 16,471,650	₩ 104,341,111	₩ -
Security	34,163,972	28,307,642	5,856,330	-	-
Power Systems	143,005,798	131,631,750	11,374,048	6,502,622	-
Defense	2,447,728,955	2,197,049,341	250,679,614	664,349,805	-
ICT	247,718,547	198,393,137	49,325,410	20,518,448	-

(in thousands of
Korean won)

		2018			
	Accumulated contract revenue	Accumulated contract cost	Accumulated contract profit	Advance received	Retention
Aerospace engine	₩ 244,749,822	₩ 211,794,219	₩ 32,955,603	₩ 98,330,610	₩ -
Security	45,395,750	47,898,580	(2,502,829)	-	-
Power Systems	132,449,292	122,986,695	9,462,597	-	-
Defense	1,672,465,334	1,554,359,455	118,105,879	327,552,358	-
ICT	115,413,514	92,334,618	23,078,897	15,265,692	-

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Amounts due from and due to customers for contract work as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)

	2019					
	Due from customers¹		Due to customers²		Provisions for expected losses²	
Aerospace engine	₩	5,176,437	₩	104,341,111	₩	4,967,264
Security		4,827,734		-		40,900
Power Systems		14,939,091		6,502,622		-
Defense		184,867,765		313,556,192		13,695,829
ICT		17,253,149		20,518,448		-

(in thousands of Korean won)

	2018					
	Due from customers¹		Due to customers²		Provisions for expected losses²	
Aerospace engine	₩	5,049,439	₩	98,330,610	₩	6,734,922
Security		7,039,554		-		62,961
Power Systems		30,935,960		-		-
Defense		124,758,210		159,014,232		13,692,939
ICT		7,355,535		15,265,692		-

¹ Amounts are recognized as trade receivables in the statement of financial position.

² Amounts are recognized as advance received in the statement of financial position.

Due to the factors causing the rise in costs in 2019, the estimated total revenue and estimated total costs for contracts in progress have changed. Details of changes in estimated total contract costs, profits or loss for the year and the succeeding year, and the impact on due from customers for contract work are as follows:

(in thousands of Korean won)

	Changes in estimated total contract revenue		Changes in estimated total contract costs		Impact on profit or loss for the year		Impact on profit or loss for the succeeding year		Changes in due from customers for contract work	
Aerospace engine	₩	11,186,334	₩	22,217,968	₩	(5,230,213)	₩	(5,801,421)	₩	(5,230,213)
Security		6,162,531		1,379,605		3,938,263		844,663		3,938,263
Power Systems		808,627		(47,097)		855,626		98		855,626
Defense		68,687,991		61,503,785		12,896,172		(5,711,966)		12,896,172
ICT		(1,302,826)		4,782,995		(3,882,826)		(2,202,995)		(3,882,826)
	₩	85,542,657	₩	89,837,256	₩	8,577,022	₩	(12,871,621)	₩	8,577,022

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As at December 31, 2019, the information on major contracts for which the contract revenue amount is 5% or more of the previous fiscal year sales is as follows.

(in thousands of Korean won)	Contract date	Construction due date	Progress rate	Due from customers		Due to customers	
				Gross amount	Provision for impairment	Gross amount	Provision for impairment
Contract A	2018.12.05	2025.09.26	23%	₩ -	₩ -	₩ -	₩ -
Contract B	2019.06.28	2023.12.31	2%	-	-	-	-
				₩ -	₩ -	₩ -	₩ -

¹ The name of the contract was not separately indicated under the relevant laws and regulations.

27. Operating Segment Information

The Group classifies its operating segments by nature of products. Revenue-generating goods and services, and major clients by operating segment are summarized as follows:

	Major products and services	Major customers
Aerospace engine	Manufacture and sale of engine and components for aircraft	Ministry of Defense, Pratt and Whitney, General Electric and foreign others
Defense	Manufacture and sale of defense machinery	Defense Acquisition Program Administration and foreign others
ICT	IT consulting, SI, ITO, logistics and others	Affiliates of the Group
Security	Manufacture and sale of CCTV, Lead frame and others	Samsung Electronics Co., Ltd. and foreign others
Power systems	Manufacture and sale of industrial energy machinery	Domestic and foreign others
Industrial machinery	Manufacture and sale of SMT, machine tool and others	Samsung Electronics Co., Ltd. and foreign others

Financial performance by each service provided for the years ended December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019						
	Aerospace engine	Defense	ICT	Power systems	Security	Industrial machinery	Total
Revenues	₩1,268,767,443	2,453,138,929	379,343,393	226,892,482	580,139,923	355,832,205	5,264,114,375
Operating profit (loss)	₩ (66,267,682)	116,129,275	42,006,507	13,236,486	29,786,448	30,334,901	165,225,935
Reportable segment profit (loss) before tax	₩ (72,090,423)	116,950,710	38,306,594	14,660,043	27,155,921	31,306,092	156,288,937
Reportable segment profit	₩ (39,440,763)	108,317,531	24,450,531	16,830,463	21,345,327	30,924,229	162,427,318

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(loss) for the year								
Reportable segment interest income	₩	6,242,108	4,101,350	2,631,814	742,549	241,013	470,566	14,429,400
Reportable segment interest expenses	₩	39,100,690	11,429,587	1,487,582	143,865	4,034,886	3,208,056	59,404,666
Reportable segment depreciation ¹	₩	62,615,307	88,573,062	41,948,384	2,878,455	16,865,123	5,891,275	218,771,606
Reportable segment assets	₩	3,278,780,834	3,574,469,586	855,205,489	261,571,444	486,134,262	252,249,105	8,708,410,720
Reportable segment liabilities	₩	2,705,049,662	2,365,874,367	259,853,636	117,822,184	242,526,005	161,929,574	5,853,055,428

¹ Total amount of depreciation of property, plant and equipment and right-of-use assets and amortization of intangible assets.

(in thousands of Korean won)

		2018						Total
		Aerospace engine	Defense	ICT	Power systems	Security	Industrial machinery	
Revenues	₩	971,121,208	2,326,997,198	170,097,903	216,000,909	513,991,196	254,968,209	4,453,176,623
Operating profit (loss)	₩	(98,240,794)	112,748,925	7,916,037	3,312,453	1,284,394	26,156,324	53,177,339
Reportable segment profit (loss) before tax	₩	(93,651,138)	113,698,502	7,622,006	6,216,796	(9,421,710)	29,025,194	53,489,650
Reportable segment profit (loss) for the year	₩	(73,771,590)	96,830,007	5,135,144	5,300,746	(11,074,608)	26,831,360	49,251,059
Reportable segment interest income	₩	3,960,226	1,977,537	688,006	731,767	1,618,872	596,604	9,573,012
Reportable segment interest expenses	₩	20,777,385	12,967,930	325,132	20,194	12,257,793	155,797	46,504,231
Reportable segment depreciation ¹	₩	44,195,847	89,725,809	1,308	2,806,297	15,882,631	2,220,496	154,832,388
Reportable segment assets	₩	2,574,939,165	3,162,071,985	681,394,922	239,606,388	486,552,878	252,120,874	7,396,686,212
Reportable segment liabilities	₩	1,998,347,588	2,042,175,162	180,155,459	110,195,893	261,076,356	168,985,334	4,760,935,792

¹ Total amount of depreciation of property, plant and equipment and amortization of intangible assets.

Revenues of approximately 29% (2018: 41%), over 10% of the Group's revenue, are derived from a single external customers.

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28. Selling and Administrative Expenses

Details of selling and administrative expenses for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Salaries and allowances	₩ 209,197,905	₩ 155,733,760
Bonuses	23,156,591	26,634,268
Post-employment benefits	16,050,385	17,003,262
Employee welfare benefits	44,735,525	42,152,992
Depreciation	26,854,277	22,529,051
Amortization	43,373,015	34,606,227
Depreciation of right-of-use assets	12,842,936	-
Samples	4,017,626	3,335,231
Advertising	26,998,284	18,113,303
Training	4,083,807	2,885,358
Social	3,770,671	2,846,294
Impairment loss for trade receivables	14,261,136	5,099,666
Publications	334,517	335,494
Document forwarding fee	69,668	129,473
Distribution	29,193,709	25,580,558
Insurance	9,472,885	7,233,004
Services	19,024,043	26,871,720
Taxes and dues	10,372,744	7,191,205
Supplies	2,155,886	2,302,297
Repairs and maintenance	3,152,798	2,677,649
Travel	22,335,111	18,648,986
Utility	1,892,908	1,536,465
Print	598,289	899,620
Rent	5,616,905	15,237,565
Electronic data processing	12,970,688	8,796,559
Research	879,010	412,761
Commission fees	115,800,155	117,567,875
Communication	2,074,754	2,038,890
Sales promotion	10,150,599	13,916,715
Event	4,647,900	7,516,164
Conference	3,009,426	2,533,994
	₩ 683,094,153	₩ 592,366,406

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29. Breakdown of Expenses by Nature

Details of breakdown of expenses by nature for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Changes in inventories of finished goods, semi-finished goods and work in process	₩	39,661,290	₩	62,433,120
Purchase of merchandise		495,261,137		411,810,284
Raw materials and consumables used		2,087,172,616		2,074,931,145
Salary and wages ¹		931,175,528		749,380,056
Employee welfare benefits		151,387,677		121,211,318
Depreciation on property, plant and equipment		120,746,542		96,728,607
Amortization		73,490,074		58,103,781
Depreciation of right-of-use assets		24,534,990		-
Freight and custody charges		34,076,756		27,974,207
Taxes and dues		16,554,042		12,455,639
Repairs and maintenance		22,512,520		19,683,742
Utilities		20,696,853		16,817,272
Rent		17,792,011		30,343,263
Electronic data processing		60,360,981		48,298,059
Fees		230,790,624		186,677,905
Technical license fees		62,349,534		54,335,196
Outsourcing		491,317,870		314,099,433
Others		219,007,396		114,716,257
Total ²	₩	5,098,888,441	₩	4,399,999,284

¹ Salary and post-employment benefits are included.

² The amounts include cost of sales, selling and administrative expenses and research and development expenses in the consolidated statement of comprehensive income.

30. Other Income and Expenses

Details of other income and expenses for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Other income				
Rental income	₩	6,130,050	₩	5,528,345
Gain on foreign currency transactions		50,055,794		42,080,683
Gain on foreign currency translations		10,567,368		8,823,741
Gain on disposal of property, plant and equipment		1,293,040		494,489

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Gain on disposal of intangible assets	131,901	50
Dividends income	1,482,605	1,400,203
Gain on disposal of assets held for sale	-	29,683,083
Miscellaneous income	35,106,352	7,859,638
Reversal of provision for impairment on other receivables	-	14,844
Government grants income	67,097	-
	<u>₩ 104,834,207</u>	<u>₩ 95,885,076</u>
Other expenses		
Fees	₩ 2,921,168	₩ 988,763
Loss on foreign currency transactions	33,293,016	31,781,512
Loss on foreign currency translations	21,624,766	14,678,275
Loss on disposal of trade receivables	320,302	565,293
Loss on disposal of property, plant and equipment	601,923	201,933
Loss on disposal of intangible assets	123,542	223,467
Impairment loss of intangible assets	5,600,814	(33,200)
Impairment on other receivables	6,216	8,723
Donations	2,723,360	1,843,912
Miscellaneous expenses	6,871,197	17,875,244
	<u>₩ 74,086,304</u>	<u>₩ 68,133,922</u>

31. Finance Income and Costs

Details of finance income and costs for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019	2018
Finance income		
Interest income	₩ 14,429,400	₩ 9,573,012
Gain on foreign currency transactions	3,257,868	3,830,147
Gain on foreign currency translations	684,569	748,839
Gain on valuation of financial assets at fair value through profit or loss	1,324,736	3,497,241
Gain on disposal of financial assets at fair value through profit or loss	112,078	-
Gain on derivatives transactions	2,857,562	667,149
Gain on valuation of derivatives	8,221,306	7,871,752
	<u>₩ 30,887,519</u>	<u>₩ 26,188,140</u>
Finance costs		
Interest expenses	₩ 59,404,666	₩ 46,504,231
Loss on foreign currency transactions	5,485,675	8,868,720
Loss on foreign currency translations	2,422,907	270,434
Fees on guarantee	-	191,420

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Loss on disposal of investments	216,540	65,493
Loss on valuation of derivatives	2,188,513	2,249,468
Loss on derivatives transactions	8,290,039	1,016,109
Loss on valuation of financial assets at fair value through profit or loss	744,906	130,330
Loss on disposal of financial assets at fair value through profit or loss	2,240	1,590
	₩ 78,755,486	₩ 59,297,795

32. Earnings per Share

Basic earnings per share for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won, except for earnings per share)</i>	2019	2018
Profit attributable to the ordinary equity holders of the Parent Company	₩ 132,205,039	₩ 32,327,772
Weighted average number of ordinary shares outstanding	51,687,151	52,187,177
Basic earnings per share	₩ 2,558	₩ 619

Weighted average number of ordinary shares for the years ended December 31, 2019 and 2018, are as follows:

<i>(in shares)</i>	2019	2018
Beginning balance	52,040,000	52,600,000
Effect of treasury shares	(352,849)	(412,823)
Weighted average number of ordinary shares	51,687,151	52,187,177

The Group did not issue any potential ordinary shares.

33. Related Party Transactions

Details of Parent Company of the Group as at December 31, 2019 is as follows:

Type	2019
Parent Company	Hanwha Corp.

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Transactions with related parties including operating revenues and expenses for the years ended December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019				
	Sales and others	Disposal of assets and others	Purchase of raw materials	Acquisition of assets and others	Others
Parent Company					
Hanwha Corp.	₩ 195,508,662	₩ 164,180	₩ 13,572,465	₩ 16,704	₩ 24,544,554
Associate					
Sermatech Korea Co., Ltd. ²	5,217,296	-	22,810,011	-	1,404
P&W NGPF Manufacturing Company Singapore PTE.Ltd	-	-	21,143,474	-	-
PBA-Hanwha Robotics PTE LTD	82,507	-	-	-	-
Others ¹					
Blue Albatross FZE	-	-	93,052	-	230,856
Dongguan Hanwha Total Engineering Plastic Co., Ltd.	127,281	-	-	-	-
Hanwha Advanced Materials America LLC	287,663	-	-	-	-
Hanwha Advanced Materials Beijing Co., Ltd.	159,544	-	-	-	-
Hanwha Advanced Materials Chongqing Co.,Ltd.	76,237	-	-	-	-
Hanwha Advanced Materials Europe, s.r.o.	404,341	-	-	-	-
Hanwha Advanced Materials Germany GmbH	1,236	-	-	-	-
Hanwha Advanced Materials Mexico S. De R.L. De C.V.	124,818	-	-	-	-
Hanwha Advanced Materials Shanghai Co., Ltd.	132,332	-	-	-	-
Hanwha AZDEL, Inc.	242,767	-	-	-	-
Hanwha Chemical (Ningbo) Co.,Ltd.	61,216	-	-	-	-
Hanwha Chemical (Thailand) Co.,Ltd.	90,268	-	-	-	-
Hanwha Chemical(Shanghai)Co.,Ltd	41,737	-	-	-	-
Hanwha Energy Corporation Japan	90,378	-	-	-	-
Hanwha Europe GmbH	19,317,073	-	1,392,189	-	925,156
Hanwha International LLC.	1,067,637	-	772,620	-	2,045,455
Hanwha Machinery America Inc.	7,844,058	-	-	-	-
Hanwha Q CELLS Australia Pty Ltd.	-	-	-	-	15,539

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(in thousands of Korean won)	2019				
	Sales and others	Disposal of assets and others	Purchase of raw materials	Acquisition of assets and others	Others
Hanwha Q CELLS Co., Ltd. (Qidong)	265,496	-	-	-	-
Hanwha Q CELLS Gmbh	464,084	-	-	-	-
Hanwha Q CELLS Japan Co., Ltd.	27,599,518	-	64,211	-	78,826
Hanwha Q CELLS Malaysia Sdn. Bhd.	545,040	-	-	-	-
Hanwha Q CELLS USA, Inc.(DE)	1,885,533	-	-	-	-
Hanwha Total Petrochemical (Shanghai) Co., Ltd.	9,327	-	-	-	-
TRI ENERGY GLOBAL PTE.LTD.	187,588	-	-	-	-
World Corporation	378,935	-	-	-	-
Dreamplus Global Seed Program	5,976	-	-	-	-
H-Solution Corporation	65,306	-	-	-	2,291,760
NHL Development co.ltd	932	-	-	-	-
YEOCHUN NCC Co., Ltd.	7,598,470	-	-	-	-
Daesan Green Energy Co. Ltd.	1,908	-	-	-	-
Gimhae Techno Valley Co.,Ltd	143,437	-	-	-	-
Gyeonggi Yongin Techno Valley Co., Ltd.	221,387	-	-	-	-
DATA ANALYTICS LAB Co.,LTD	3,648	-	-	-	-
Dreamplus Production., Co. Ltd.	35	-	-	-	-
SEOSAN TECHNO VALLEY	21,482	-	-	-	-
Hanwha Cultural Foundation	13,560	-	-	-	-
One O One Global Co., Ltd.	82	-	-	-	-
GTENTION	107	-	-	-	-
PLAZA D&C Co., Ltd.	202	-	-	-	-
Haedoji Solar Co., Ltd.	14,970	-	-	-	-
SIT	434,401	-	90,600	26,970	141,350
Gyeonggi Hwasung Bio Valley Co.,Ltd.	453,519	-	-	-	-
Carrot Co., Ltd	13,383,631	-	-	-	-
Hanwha 63 City Co., Ltd.	972,082	-	-	-	212,840
Hanwha Galleria Co., Ltd.	18,834,667	-	2,520	-	4,828,512
Hanwha Galleria Time World Co., Ltd.	3,510,539	-	-	-	-
Hanwha E&C Corp.	40,025,027	-	-	5,383,500	-

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(in thousands of Korean won)	2019				
	Sales and others	Disposal of assets and others	Purchase of raw materials	Acquisition of assets and others	Others
Hanwha City Development Co.,Ltd	265,857	-	-	-	-
Hanwha B&B Co., Ltd.	74,147	-	-	-	77,337
Hanwha Estate Co., Ltd.	1,748,631	-	-	14,327,400	10,190,006
Hanwha Eagles Professional Baseball Club	597,008	-	-	-	1,034,364
HANWHA SAVINGS BANK CO, LTD.	124,669	-	-	-	-
Bookil Academy	78,232	-	-	-	-
Hanwha Life Asset Co., Ltd	4,795	-	-	-	-
Hanwha Life Insurance Co., Ltd.	71,285,066	-	-	17,849,990	2,799,594
Hanwha General Insurance Co., Ltd.	22,532,140	-	2,036	-	5,590,525
HANWHA I&A Co., Ltd.	139,051	-	-	-	-
Hanwha Energy Corporation	3,268,389	-	-	-	-
Hanwha Station Development Co., Ltd.	256,638	-	-	-	5,842
Hanwha Asset Management Co., Ltd.	7,291,709	-	-	-	-
Hanwha General Chemical Co., Ltd.	5,555,602	-	-	-	-
Hanwha Global Asset Corporation (formerly, Hanwha Q CELLS & Advanced Materials Corporation)	9,617,323	-	-	-	1,071,723
Hanwha Q CELLS & Advanced Materials Corporation	5,138,173	-	-	-	598,957
Hanwha Compound Co.,Ltd	842,169	-	-	-	-
Hanwha Chemical Corporation	18,224,201	-	-	-	1,125,609
Hanwha Total Petrochemical Co., Ltd.	21,140,915	-	-	-	47,438
Hanwha Investment & Securities Co.,Ltd	13,074,236	-	-	-	150,000
Hanwha Hotels & Resorts Co., Ltd.	14,170,907	-	-	5,385,667	12,948,316
	<u>₩ 543,347,798</u>	<u>₩ 164,180</u>	<u>₩ 59,943,178</u>	<u>₩ 42,990,231</u>	<u>₩ 70,955,963</u>

¹ Include certain entities that belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

² Include dividends received.

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(in thousands of Korean won)	2018				
	Sales and others	Disposal of assets and others ²	Purchase of raw materials	Acquisition of assets and others ⁶	Others
Parent Company					
Hanwha Corp.	₩ 174,302,503	₩ 36,786,491	₩ 19,602,055	₩ 229,409,135	₩ 19,642,446
Associate					
Sermatech Korea Co., Ltd. ³	4,504,003	-	21,592,776	-	-
PBA-Hanwha Robotics PTE LTD	636,014	-	-	-	190,420
Others ¹					
Blue Albatross FZE	-	-	17,394	-	245,184
Dongguan Hanwha Total Engineering Plastic Co., Ltd.	600,305	-	-	-	-
Hanwha Advanced Materials America LLC	121,556	-	-	-	-
Hanwha Advanced Materials Beijing Co., Ltd.	55,893	-	-	-	-
Hanwha Advanced Materials Chongqing Co.,Ltd.	27,180	-	-	-	-
Hanwha Advanced Materials Europe, s.r.o.	77,330	-	-	-	-
Hanwha Advanced Materials Germany GmbH	5,491	-	-	-	-
Hanwha Advanced Materials Mexico S. De R.L. De C.V.	46,669	-	-	-	-
Hanwha Advanced Materials Shanghai Co., Ltd.	24,583	-	-	-	-
Hanwha AZDEL, Inc.	102,252	-	-	-	-
Hanwha Chemical (Ningbo) Co.,Ltd.	89,770	-	-	-	-
Hanwha Chemical (Thailand) Co.,Ltd.	225,934	-	-	-	-
Hanwha Chemical(Shanghai)Co.,Ltd	16,506	-	-	-	-
Hanwha Energy Corporation Japan	21,601	-	-	-	-
Hanwha Europe GmbH	-	-	2,914	-	129,230
Hanwha International LLC.	49,797	-	48,840	-	1,577,062
Hanwha Q CELLS Australia Pty Ltd.	-	-	-	-	16,440
Hanwha Q CELLS Co., Ltd. (Qidong)	39,603	-	-	-	-
Hanwha Q CELLS GmbH	2,578	-	-	-	-
Hanwha Q CELLS Japan Co., Ltd.	8,721,558	-	-	-	35,293
Hanwha Q CELLS Malaysia Sdn. Bhd.	182,993	-	-	-	-
Hanwha Q CELLS USA,	2,366,035	-	-	-	-

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(in thousands of Korean won)	2018				
	Sales and others	Disposal of assets and others ²	Purchase of raw materials	Acquisition of assets and others ⁶	Others
Inc.(DE)					
TRI ENERGY GLOBAL PTE.LTD.	43,201	-	-	-	-
Dreamplus Global Seed Program	13,446	-	-	-	-
H-Solution Corporation	50,351	-	-	-	-
YEOCHUN NCC Co., Ltd.	1,359,296	-	-	-	-
Gyeonggi Yongin Techno Valley Co., Ltd.	38,818	-	-	-	-
Gimhae Techno Valley Co.,Ltd	791,433	-	-	-	-
DATA ANALYTICS LAB Co.,LTD	4,232	-	-	-	-
Dreamplus Production., Co. Ltd.	27	-	-	-	-
SEOSAN TECHNO VALLEY	8,692	-	-	-	-
Hanwha Cultural Foundation	5,650	-	-	-	-
LAKEPARK-H Co., Ltd.	375	-	-	-	-
One O One Global Co., Ltd.	24	-	-	-	-
GTENTION	47	-	-	-	-
ASAN TECHNO VALLEY	1,102	-	-	-	-
SIT	159,917	-	173,307	874,810	227,628
SIT TECH Co.,Ltd.	1,279	-	-	-	-
Gyeonggi Hwasung Bio Valley Co.,Ltd.	684,777	-	-	-	-
Hanwha 63 City Co., Ltd.	471,773	-	-	-	536,252
Hanwha Galleria Co., Ltd.	4,270,523	-	-	-	3,791,862
Hanwha Galleria Time World Co., Ltd.	1,366,522	-	-	-	230
Hanwha E&C Corp.	31,214,230	-	-	-	75
Hanwha City Development Co.,Ltd	89,067	-	-	-	-
Hanwha B&B Co., Ltd.	29,376	-	-	-	83,475
Hanwha S&C Co., Ltd. ⁴	199,423	-	-	1,036,605	33,646,484
Hanwha Estate Co., Ltd.	331,344	-	-	2,881,442	8,455,360
Hanwha Eagles Professional Baseball Club	198,733	-	-	-	788,054
HANWHA SAVINGS BANK CO, LTD.	154,452	-	-	-	-
Bookil Academy	33,760	-	-	-	-
Hanwha Life Asset Co., Ltd	3,250	-	-	-	-
Hanwha Life Insurance Co., Ltd.	28,259,387	-	-	-	9,108,195

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(in thousands of Korean won)	2018				
	Sales and others	Disposal of assets and others ²	Purchase of raw materials	Acquisition of assets and others ⁶	Others
Hanwha General Insurance Co., Ltd.	8,873,116	-	-	-	5,473,280
HANWHA I&A Co., Ltd.	134,710	-	-	-	-
Hanwha Energy Corporation	1,016,524	-	-	-	-
Hanwha Station Development Co., Ltd.	91,082	-	-	-	18,276
Hanwha Asset Management Co., Ltd.	2,830,109	-	-	-	-
Hanwha General Chemical Co., Ltd.	560,460	-	-	-	-
Hanwha Q CELLS & Advanced Materials Corporation (formerly, Hanwha Advanced Materials Corporation) ⁷	3,213,826	-	-	-	640
Hanwha Compound Co.,Ltd	334,567	-	-	-	-
Hanwha Chemical Corporation	8,687,340	-	-	-	1,551,141
Hanwha Q CELLS Corp.	529,952	-	-	-	6,925
Hanwha Q CELLS Korea Corp. ⁸	3,370,135	-	-	-	1,654,786
Hanwha Total Petrochemical Co., Ltd.	8,734,699	-	-	-	18,992
Hanwha Investment & Securities Co.,Ltd	5,008,933	-	-	-	107,500
Hanwha Hotels & Resorts Co., Ltd.	5,541,929	-	-	5,427,581	10,565,642
Humanpower ⁵	-	-	-	27,579	272,572
	<u>₩ 310,932,043</u>	<u>₩ 36,786,491</u>	<u>₩ 41,437,286</u>	<u>₩ 239,657,152</u>	<u>₩ 98,143,444</u>

¹ Include certain entities that belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

² Include the transaction amount related to the transfer of photoelectron business of Hanwha Defense Co., Ltd., which is a consolidated entity, during the year ended December 31, 2018.

³ Include dividends received.

⁴ Presents the transaction amount from January 1 to July 31 because Hanwha S&C Co., Ltd. merged into Hanwha Systems Co., Ltd. on August 1, 2018.

⁵ Presents the transaction amount from January 1 to June 11 because Humanpower was excluded in the affiliates of the Group on June 11, 2018.

⁶ Includes the transaction amount in relation to transfer of aircraft business, purchase of Kyongju Aerospace Electrical Systems Co., Ltd.'s shares, transfer of machine tool business of Hanwha Precision

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Machinery Co., Ltd. and purchase of Hanwha TechM (Suzhou) Co., Ltd.'s shares during the year ended December 31, 2018.

⁷ On November 1, 2018, Hanwha Advanced Materials Corporation merged with Hanwha Q CELLS Korea Corp. and changed its name to Hanwha Q CELLS & Advanced Materials Corporation.

⁸ Presents the transaction amount from January 1 to October 31 because Hanwha Q CELLS Korea Corp. merged into Hanwha Advanced Materials Corporation on November 1, 2018.

Outstanding balances arising from sales/purchases of goods and services as at December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
Parent Company						
Hanwha Corp.	₩ 61,915,727	₩ 1,210,397	₩ 4,271,798	₩ 6,320,624	₩ 1,015,807	₩ 37,165,651
Associate						
Sermatech Korea Co., Ltd.	-	11,836	-	1,857,517	-	-
P&W NGPF Manufacturing Company Singapore PTE.Ltd	-	1,317,992	-	2,400,383	-	-
PBA Hanwha Robotics PTE LTD	348,790	-	-	-	-	-
Others ¹						
Hanwha Advanced Materials America LLC	26,728	-	-	-	-	-
Hanwha Advanced Materials Beijing Co., Ltd.	47,819	-	-	-	-	-
Hanwha Advanced Materials Chongqing Co.,Ltd	8,680	-	-	-	-	-
Hanwha Advanced Materials Germany GmbH	207	-	-	-	-	-
Hanwha Advanced Materials Mexico S De R.L. De C.V.	13,391	-	-	-	-	-
Hanwha AZDEL, Inc	22,725	-	-	-	-	-
Hanwha Chemical (Ningbo) Co., Ltd.	14,596	-	-	-	-	-
Hanwha Chemical	7,070	-	-	-	-	-

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(in thousands of Korean won)	2019					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
(Thailand) Co.,Ltd.						
Hanwha Chemical(Shangha Co.,Ltd	3,387	-	-	-	-	-
Hanwha Europe GmbH	6,900,045	-	180,918	4,969	5,787	-
Hanwha Internationa LLC.	52,185	-	-	102,369	926,529	2,315,600
Hanwha Machinery America Inc.	6,348,329	-	-	-	-	-
Hanwha Q CELLS Co., Ltd. (Qidong)	10,272	-	-	-	-	-
Hanwha Q CELLS GmbH	173,391	-	-	-	-	66,568
Hanwha Q CELLS Japan Co., Ltd.	4,880,702	-	-	3,418	11,854	-
Hanwha Q CELLS USA, Inc.(DE)	159,591	-	-	-	-	-
YEOCHUN NCC Co Ltd.	290,809	-	-	-	-	192,400
Gyeonggi Yongin Techno Valley Co., Ltd.	20,518	-	-	-	-	-
Gimhae Techno Valley Co.,Ltd	13,378	-	-	-	-	-
SEOSAN TECHNO VALLEY	1,969	-	-	-	-	-
SIT	34,643	-	-	25,916	-	-
SIT TECH Co.,Ltd.	10,923	-	-	-	-	-
Hanwha 63 City Co. Ltd.	67,395	-	-	-	226,666	-
Hanwha Galleria Co Ltd.	2,014,032	-	971,576	-	281,950	-
Hanwha Galleria Time World Co., Ltd.	169,930	-	-	-	-	-
Hanwha E&C Corp.	11,899,449	-	2,466,520	-	-	2,187,854
Hanwha City Development Co.,Ltd	23,487	-	-	-	-	-
Hanwha B&B Co., Ltd.	8,019	-	-	-	-	-
Hanwha Estate Co.,	44,828	-	-	-	10,027,210	-

Hanwha Aerospace Co., Ltd. and Subsidiaries
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(in thousands of Korean won)	2019					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
Ltd.						
Hanwha Eagles Professional Baseball Club	48,111	174,570	122,199	-	-	-
Carrot Co., Ltd	-	-	2,171,694	-	-	-
PLAZA D&C Co., Ltd	165	-	-	-	-	-
Hanwha Life Asset Co., Ltd	10,314	-	-	-	-	-
Hanwha Life Insurance Co., Ltd.	12,831,318	-	79,982,564	-	5,602	38,792,867
Hanwha General Insurance Co., Ltd.	2,327,083	-	579,024	-	32,944	6,071,685
Hanwha Energy Corporation	455,043	-	-	-	-	125,606
Hanwha Station Development Co., Ltd.	23,246	-	-	-	-	67,721
Hanwha Asset Management Co., Ltd.	64,173	-	3,288,953	-	-	-
HANWHA SAVINGS BANK CO, LTD.	1,057	-	-	-	-	-
Hanwha General Chemical Co., Ltd.	1,038,489	-	-	-	-	6,000
Hanwha Global Assc Corporation (formerly, Hanwha Q CELLS & Advanced Material Corporation)	214	-	-	-	-	31,980
Hanwha Q CELLS & Advanced Material Corporation	3,292,950	-	271,469	658,853	-	1,729,539
Hanwha Compound Co.,Ltd	107,545	-	-	-	-	-
Hanwha Chemical Corporation	3,329,380	-	285,940	-	71,836	-
Hanwha Total Petrochemical Co., Ltd.	4,507,793	-	-	-	3,837	693,660
Hanwha Investment Securities Co.,Ltd	3,158,329	-	537,001	-	-	300,000
Hanwha Hotels & Resorts Co., Ltd.	4,590,079	33,578	21,654,476	-	605,492	206,959

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<i>(in thousands of Korean won)</i>	2019					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
	₩ 131,318,304	₩ 2,748,373	₩ 116,784,132	₩ 11,374,049	₩ 13,215,514	₩ 89,954,090

¹ Include certain entities that belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

<i>(in thousands of Korean won)</i>	2018					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
Parent Company						
Hanwha Corp.	₩ 38,193,127	₩ 9,065,655	₩ 3,547,277	₩ 7,068,420	₩ 12,071,646	₩ 19,352,685
Associate						
Sermatech Korea Co., Ltd.	-	11,836	-	1,815,762	-	-
PBA Hanwha Robotics PTE LTD	412,508	-	-	-	-	-
Others ¹						
Blue Albatross FZE	-	-	-	-	84,691	-
Dongguan Hanwha Total Engineering Plastic Co., Ltd.	384,174	-	-	-	-	-
Hanwha Advanced Materials America LLC	26,934	-	-	-	-	-
Hanwha Advanced Materials Beijing Co., Ltd.	27,557	-	-	-	-	-
Hanwha Advanced Materials Chongqing Co.,Ltd	38,781	-	-	-	-	-
Hanwha Advanced Materials Europe, s.r.o.	54,538	-	-	-	-	-
Hanwha Advanced Materials Germany GmbH	5,883	-	-	-	-	-
Hanwha Advanced Materials Mexico S De R.L. De C.V.	19,523	-	-	-	-	-
Hanwha Advanced Materials Shangha Co.,Ltd.	20	-	-	-	-	-
Hanwha Chemical	97,791	-	-	-	-	-

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(in thousands of Korean won)	2018					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
(Ningbo) Co., Ltd.						
Hanwha Chemical (Thailand) Co.,Ltd.	6,848	-	-	-	-	-
Hanwha Chemical(Shangha Co.,Ltd	3,281	-	-	-	-	-
Hanwha Europe GmbH	6,149,714	-	-	-	9,038	-
Hanwha Internationa LLC.	-	-	-	-	384,810	2,236,200
Hanwha Machinery America Inc.	4,620,496	14,113	-	-	-	-
Hanwha Q CELLS Co., Ltd. (Qidong)	16,687	-	-	-	-	-
Hanwha Q CELLS GmbH	3,287	-	-	-	-	-
Hanwha Q CELLS Japan Co., Ltd.	2,179,828	-	-	-	9,513	36,930
Hanwha Q CELLS Malaysia Sdn. Bhd	152,103	-	-	-	-	-
Hanwha Q CELLS USA, Inc.(DE)	1,785,630	-	-	-	-	-
TRI ENERGY GLOBAL PTE.LTD.	42,349	-	-	-	-	-
YEOCHUN NCC Co Ltd.	782,535	-	-	-	-	435,482
Gyeonggi Yongin Techno Valley Co., Ltd.	8,540	-	-	-	-	-
Gimhae Techno Valley Co.,Ltd	98,477	-	-	-	-	-
SEOSAN TECHNO VALLEY	1,912	-	-	-	-	-
SIT	33,128	-	-	35,225	-	-
SIT TECH Co.,Ltd.	1,279	-	-	-	-	-
Gyeonggi Hwasung Bio Valley Co.,Ltd.	676,831	-	-	-	-	9,424
Hanwha 63 City Co. Ltd.	74,309	-	-	-	810,840	-
Hanwha Galleria Co Ltd.	1,547,183	-	-	-	662,463	97,792
Hanwha Galleria Time World Co.,	351,038	-	-	-	-	-

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(in thousands of Korean won)	2018					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
Ltd.						
Hanwha E&C Corp.	18,894,544	-	-	-	-	3,589,217
Hanwha City Development Co.,Ltd	20,536	-	-	-	-	-
Hanwha B&B Co., Ltd.	8,687	-	-	-	1,974	-
Hanwha Estate Co., Ltd.	42,288	-	-	2,943	627,984	-
Hanwha Eagles Professional Baseball Club	45,283	301,180	-	-	-	-
Hanwha Life Asset Co., Ltd	6,398	-	-	-	-	-
Hanwha Life Insurance Co., Ltd.	7,457,680	-	73,517,808	-	71,973	2,102,804
Hanwha General Insurance Co., Ltd.	1,942,780	878	498,314	-	7,048	-
HANWHA I&A Co., Ltd.	18,533	-	-	-	-	-
Hanwha Energy Corporation	219,341	-	-	-	-	-
Hanwha Station Development Co., Ltd.	21,311	-	-	-	-	-
Hanwha Asset Management Co., Ltd.	54,576	-	-	-	-	658,857
Hanwha General Chemical Co., Ltd.	253,706	-	-	-	-	-
Hanwha Q CELLS & Advanced Material: Corporation (formerly, Hanwha Advanced Material: Corporation) ²	1,525,877	-	-	1,820,264	-	-
Hanwha Compound Co.,Ltd	110,163	-	-	-	-	-
Hanwha Chemical Corporation	3,606,215	-	-	-	111,716	358,669
Hanwha Total Petrochemical Co., Ltd.	6,249,893	-	-	-	3,791	1,539,630
Hanwha Investment	1,872,028	-	-	-	-	-

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(in thousands of Korean won)	2018					
	Receivables			Payables		
	Trade receivables	Non-trade receivables	Others	Trade payables	Non-trade payables	Others
Securities Co.,Ltd						
Hanwha Hotels & Resorts Co., Ltd.	3,259,964	-	19,113,216	-	592,485	459,474
	<u>₩ 103,406,094</u>	<u>₩ 9,393,662</u>	<u>₩ 96,676,615</u>	<u>₩ 10,742,614</u>	<u>₩ 15,449,972</u>	<u>₩ 30,877,164</u>

¹ Include certain entities that belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

² On November 1, 2018, Hanwha Advanced Materials Corporation merged with Hanwha Q CELLS Korea Corp. and changed its name to Hanwha Q CELLS & Advanced Materials Corporation.

Fund transactions with related parties for the years ended December 31, 2019 and 2018, are as follows:

(in thousands of Korean won)	2019					
	Borrowing transactions					
	Beginning balance	Loans	Collections	Others (exchange rate)	Ending balance	Contributions in cash
Other¹						
Hanwha International LLC.	₩ 2,236,200	₩ -	₩ -	₩ 79,400	₩ 2,315,600	₩ -

(in thousands of Korean won)	2018					
	Borrowing transactions					
	Beginning balance	Loans	Collections	Others (exchange rate)	Ending balance	Contributions in cash
Associate						
P&W NGPF Manufacturing company Singapore. Ltd.	₩ -	₩ -	₩ -	₩ -	₩ -	₩ 4,492,320
PBA-Hanwha Robotics PTE. LTD.	-	-	-	-	-	391,735
Other¹						
Hanwha International LLC.	2,142,800	-	-	93,400	2,236,200	-

¹ Include certain entities that belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

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Lease fund transactions with related parties for the year ended December 31, 2019 are as follows:

(in thousands of
Korean won)

	2019					
	Beginning balance	Changes in the accounting policy	New Agreement	Expense relating to lease	Interest expense (lease liabilities)	Ending balance
Parent Company						
Hanwha Corp.	-	6,094,197	16,704	(2,295,941)	121,782	3,936,742
Other¹						
Hanwha Life Insurance Co., Ltd.	-	25,383,501	17,849,990	(5,141,091)	670,918	38,763,318
Hanwha General Insurance Co., Ltd	-	6,575,370	-	(810,316)	222,260	5,987,314
Hanwha Station Development Co., Ltd.	-	105,097	-	(39,600)	2,224	67,721

¹ Include certain entities that belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

In 2019, the Group has entered into a repurchase agreements with Hanwha Investment & Securities Co.,Ltd, and the transaction amount is USD 37,800,000.

As at December 31, 2019 and 2018, the Group provides home mortgage loans to its employees.

The compensation paid or payable to the key management for employee services for the years ended December 31, 2019 and 2018, consists of:

(in thousands of Korean won)	2019		2018	
Short-term employee benefits	₩	6,684,623	₩	5,961,288
Post-employment benefits		1,116,028		861,881
	₩	7,800,651	₩	6,823,169

Key management includes executive directors who have significant authority and responsibility in respect to planning, operating and controlling of the Company's business activities.

34. Commitments and Contingencies

Details of agreements with financial institution, as at December 31, 2019, are as follows:

(in thousands of Korean won, USD and CNY)	Currency	Limit	Details
Korea Development Bank	KRW	95,000,000	General purpose loans
	KRW	10,000,000	Derivatives
	USD	13,000,000	Import L/C

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<i>(in thousands of Korean won, USD and CNY)</i>	Currency	Limit	Details
Woori Bank	KRW	118,000,000	Combined limits loan agreements
	KRW	3,500,000	Credit sales facility
	KRW	108,000,000	Limit loans
	KRW	5,500,000	Purchasing card
	USD	3,000,000	Other payment guarantee in other foreign currencies
	USD	10,000,000	Selling trade receivables denominated in foreign currencies
	USD	4,600,000	Derivatives
	USD	2,000,000	Import L/C
Woori Bank (Hanoi)	USD	30,000,000	Limit loans
KEB Hana Bank	KRW	15,000,000	Purchasing card
	KRW	15,000,000	Overdraft
	KRW	30,000,000	Limit loans (Working capital loans)
	KRW	9,000,000	Other payment guarantee
	KRW	15,500,000	Credit sales facility
	KRW	50,000,000	General purpose loans
	USD	5,000,000	Import L/C
	USD	25,000,000	Selling trade receivables denominated in foreign currencies
	USD	75,000,000	Other payment guarantee in other foreign currencies
	USD	14,200,000	Non-taxable deposits on derivatives
Shinhan Bank	KRW	23,500,000	Credit sales facility
	KRW	44,500,000	Limit loans
	KRW	50,000,000	Commercial paper acceptance agreements
	KRW	350,000	Derivatives
	KRW	5,000,000	General purpose loans
	USD	17,000,000	Selling trade receivables denominated in foreign currencies
	USD	11,000,000	Combined payment guarantee in other foreign currencies
	USD	28,914,000	Other payment guarantee in other foreign currencies
	USD	4,500,000	Derivatives
	Shinhan Bank (China)	CNY	3,000,000
USD		15,000,000	Selling trade receivables denominated in foreign currencies
USD		100,000	Import L/C
Shinhan Bank (Hong Kong)	USD	30,000,000	Other payment guarantee in other foreign currencies

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<i>(in thousands of Korean won, USD and CNY)</i>	Currency	Limit	Details
Kookmin Bank	KRW	20,000,000	Credit sales facility
	KRW	35,000,000	Limit loans
	KRW	45,000,000	Trade financing
	USD	7,500,000	Import L/C
	USD	10,000,000	General purpose loans
	USD	29,000,000	Selling trade receivables denominated in foreign currencies
	USD	8,500,000	Combined payment guarantee in other foreign currencies
Industrial Bank of Korea	KRW	18,000,000	Credit sales facility
	KRW	2,500,000	Purchasing card
	USD	14,000,000	Import L/C
	USD	2,000,000	Forward
NH Nonghyup Bank	KRW	25,000,000	General purpose loans
	KRW	10,000,000	Credit sales facility
	KRW	30,000,000	Limit loans
	USD	10,000,000	Import L/C
	USD	10,000,000	Loans in foreign currency
Korea Export-Import Bank	USD	60,000,000	Limit loans
	USD	90,000,000	Performance guarantee
	KRW	20,000,000	Import financing
Korea Investment & Securities	KRW	8,000,000	Limit loans

Details of guarantee provided by the others, as at December 31, 2019, are as follows:

<i>(in thousands of Korean won, AED, EUR, KWD, QAR, USD, INR, PHP)</i>	Details	Currency	Amount
Korea Defense Industry Association	Performance guarantee	KRW	3,224,400,851
Seoul Guarantee Insurance Company	Performance guarantee	EUR	12,682,256
	Performance guarantee	KRW	2,688,580,149
	Deposit guarantee	KRW	360,000
	Performance guarantee	USD	9,832,979
Korea Federation of Small and Medium Business	Performance guarantee	KRW	130,267,408
Korea Software Financial Cooperative	Performance guarantee	KRW	134,862,977
KEB Hana Bank	Performance guarantee	EUR	7,452,437

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(in thousands of Korean won,
AED, EUR, KWD, QAR, USD,
INR, PHP)

	Details	Currency	Amount
	Performance guarantee	PHP	128,603,010
	Performance guarantee	USD	25,092,801
Woori Bank	Performance guarantee	USD	1,959,860
Korea Export-Import Bank	Performance guarantee	KRW	85,822,041
	Performance guarantee	USD	148,156,420
	Performance guarantee	INR	30,000,000
Shinhan Bank	Performance guarantee	EUR	1,706,127
	Performance guarantee	PHP	113,746,952
	Performance guarantee	USD	48,880,300
Korea Housing & Urban Guarantee Corporation	Lease deposit return guarantee	KRW	390,000

Details of assets provided as collateral for the Group's debt as at December 31, 2019, are as follows:

(in thousands of Korean won)

Secured assets	Secured amount	Secured party	Details
Property, plant and equipment	KRW 171,000,000	Korea Development Bank, Shinhan Bank, KH 3rd L.C.C.	Secured borrowings and others
Cooperative investments	KRW 14,305,432	Korea Defense Industry Association, Korea Software Financial Cooperative, Plant & Mechanical Contractors Financial Cooperative, Korea Specialty Contractor Financial Cooperative	Issuance of guarantee insurance and others

As at December 31, 2019, the Group has provided two blank promissory notes and two checks to Korea Defense Industry Association as collateral.

For some of the Group's borrowing agreements, when below standards are exceeded, it is considered to be an event of default. Standards are differently applied for each borrowing, and include an excess of debt ratio over certain level, capital to collateral ratio, total asset to disposal of assets ratio, exclusion of mutual investment restriction group. In addition, for the borrowings of ₩100 billion from Industrial and Commercial Bank of China, limit can be reduced or loan transactions can be temporarily paused by a bank notice when the Group's credit ranking falls by more than two levels by a certified credit rating agency. Private bonds (₩30 billion of private bond in Hanwha systems 3-1 and 3-2, respectively) can be early repaid in relation to level by an external credit rating agency. However, upon the occurrence of an event of default, an obligation to repay exists only when there are an approval and written notice from the creditors.

The Group has technical assistance agreements with General Electric Company, etc. to develop and manufacture new products.

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The Group entered into Risk and revenue Sharing program (RSP) with Pratt & Whitney in the USA and others to promote engine parts business and expand the mid- to long-term business model. Through RSP, the Group is allocated with benefits and risks from business including development, mass production, and aftermarket sales of airplane engines in proportion to its participation. Pratt & Whitney and others, who are Consortium leaders (OEM, Original Equipment Manufacturer) of the agreement, have been providing products and services to aircraft manufacturers such as Airbus and others and transportation service company such as Korean Air and others. The Group bears rights and obligations up to the proportion of its participation (1~3% for each program classified by types of engines supplied by the Group) according to the agreement. Revenues in relation to the agreement mostly occur through supply of designated products, and some of the revenues occur by providing engine repair and other services. Also, costs of the agreement include manufacturing cost to supply products, business participation cost agreed to pay for participation in business, development cost to enhance capability of engines, program management cost, sales promotion cost paid to customers, and others. In addition, the Group has been distributed with arrangements such as borrowing limits provided by the program in accordance with the agreement up to its percentage of shares. According to the agreement, the Group has provided ₩121,217 million of borrowing limits to Indigo Airline, Delta Airline, and others.

During the year ended December 31, 2018, the Group entered into an agreement for mutual growth of large and small business with Woori Bank and Korea Development Bank. In accordance with the agreement, the Woori Bank and Korea Development Bank supports small business that cooperates with the Group, where Woori Bank and Korea Development Bank sets up a special fund which amounts to twice the deposit of ₩ 23 billion from the Group.

Korean Helicopter Development Project (KHP) had been completed in June 2012; however, the Defense Acquisition Program Agency (DAPA) did not compensate for the excess costs incurred due to inflation, rise of exchange rates, and change of layout and design. On January 29, 2014, Korea Aerospace Research Institute filed a lawsuit against DAPA claiming the payment of the excess charges. Five subcontractors of the Korea Aerospace Research Institute, including the Group attended the above case as intervenors on plaintiff's side on June 5, 2014. At the first trial, the Court acknowledged 80% of the claims of the plaintiff on January 30, 2015 and the plaintiff and the defendant both appealed to the Seoul High Court. The Seoul High Court reversed and transferred the case to the Seoul Administrative Court, and at the first trial, the claims of the plaintiff, Korea Aerospace Research, were dismissed on December 11, 2019. The Group, an intervenor on plaintiff's side, recognized ₩14.4 billion and ₩2.4 billion of provision for impairment on trade receivables. and impairment loss on intangible assets, respectively. Korea Aerospace Research appealed to the first trial, and the litigation is currently pending. The management is unable to predict the result of the cases.

Regarding the fire that erupted near the generator no. 4 in the data center of Samsung SDS in Gwacheon, on April 20, 2014, Samsung fire & Marine Insurance Co., Ltd. filed a lawsuit against the Group claiming the amount for indemnity of ₩ 14.8 billion, which is equivalent to the amount Samsung fire & Marine Insurance Co., Ltd. paid to Samsung SDS as benefit of fire insurance. Samsung SDS filed damage claim suit against the Group, demanding ₩ 68.3 billion which is the amount of damage that exceeds the insurance benefit from Samsung fire & Marine Insurance Co., Ltd. Samsung Heavy Industries filed a lawsuit against the group for claiming the amount for indemnity of ₩ 10 billion. All lawsuits are in the process of the first trial, and the management is unable to predict the result of the cases.

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On the grounds that one of the reasons for the crash of Surion Helicopter in December, 2015 is defect of engine that was supplied by the Group, the government of the Republic of Korea filed a damage claim suit against the Group and Korea Aerospace Industries, Ltd. as co-defendant, claiming ₩ 17.1 billion which is equivalent to the cost of the crashed helicopter. Additionally, the government also filed a damage claim suit against the aforementioned co-defendants, claiming repair cost of engines that are suspected to have the same defects. At first trial, claims of the government of the Republic of Korea were dismissed on September 6, 2019 and January 15, 2020, and the plaintiff appealed in September 2019 and February 2020, respectively. The management is unable to predict the result of the cases.

On July 27, 2017, Defense Acquisition Program Administration cancelled the certification of the Group's defense cost management system, due to the fact that cooperative firm of the Group had submitted fabricated cost data. Accordingly, the Group applied for an injunction that confirms that the Group is not on the status of having certification of its cost management system cancelled, and the Court accepted the Group's injunction on December 22, 2017. Furthermore, the Group filed a lawsuit against the government of the Republic of Korea regarding the same agenda on January 19, 2018. At the first trial, all of the Group's claims were acknowledged and the court confirmed the certification of the Group's defense cost management system on February 11, 2019. Currently, Defense Acquisition Program Administration appealed and the case is pending. The management is unable to predict the result of the case.

Fair Trade Commission held a meeting as Hanwha systems, a subsidiary, has exceeded accumulated penalty due to a breach of Fair Transactions in Subcontracting Act and decided to impose sanctions from government branches. Accordingly, for a certain period of time in the future, suspension of business and restriction in participation of bidding for national public institutions can be made in the field of construction. In August 2019, Hanwha systems charged a lawsuit to cancel the penalty imposed and cancel the decision of restriction in participation of bidding and suspension of business. Also, along with the original lawsuits, Hanwha systems requested for a suspension of penalty impose, restriction in participation of bidding, and decision on the suspension of business. In September 2019, request for suspension of penalty impose has been dismissed from Seoul High Court. However, an acceptance decision has been made for suspension of execution for suspension of sanctions imposed by Fair Trade Commission. Thus, until 30 days from the date the decision was made for the original lawsuit (restriction in participation of bidding and cancellation of requests), subsequent procedures such as sanction requests from government branches are suspended. Hanwha systems and Fair Trade Commission have submitted re-appeal for the Court's decision of dismissal and acceptance, which have been dismissed in December 2019 and January 2020, respectively, and thus, existing decisions of dismissal and acceptance are maintained. Original lawsuits (restriction in participation of bidding and cancellation of requests) is still on-going and the management is unable to predict the result of the cases.

In addition to the case discussed in Note 34, the Group is involved in 23 cases as a plaintiff aggregating to ₩ 27,734 million, and involved in 13 cases as a defendant aggregating to ₩ 36,748 million. The management is unable to predict the result of the cases.

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35. Cash Generated from Operations

Details of cash generated from operations for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	2019		2018	
Profit before income tax	₩	156,288,937	₩	53,489,650
Adjustments for:				
Depreciation		120,746,542		96,728,607
Technical license fees		31,628,982		33,596,777
Other long-term employee benefits		12,850,759		4,395,494
Loss on valuation of financial assets at fair value through profit or loss		744,906		130,330
Loss on disposal of financial assets at fair value through profit or loss		2,240		1,590
Amortization		73,490,074		58,103,781
Loss on disposal of intangible assets		123,542		223,467
Impairment loss of intangible assets		5,600,815		(33,200)
Loss on disposal of trade receivables		320,302		-
Loss on foreign currency translations		24,047,673		14,948,708
Loss on disposal of property, plant and equipment		601,923		201,933
Interest expenses		59,404,666		46,504,231
Post-employment benefits		72,542,134		61,336,545
Depreciation of right-of-use assets		24,534,990		-
Loss on valuation of inventories (reversal)		(1,707,451)		8,357,569
Provisions (reversal)		(5,515,812)		7,752,854
Impairment loss on trade receivables (reversal)		14,261,136		5,084,823
(Reversal of provision for) Impairment loss on other receivables		6,215		8,722
Dividends income		(1,482,605)		(1,400,203)
Loss on disposal of investments in subsidiaries		216,540		65,493
Fees		-		1,893,134
Miscellaneous loss		2,859,192		1,890,851
Loss on valuation of derivatives		2,188,513		2,249,468
Gain on foreign currency translations		(11,251,936)		(9,572,580)
Gain on disposal of assets held for sale		-		(29,683,083)
Gain on disposal of property, plant and equipment		(1,293,040)		(494,489)
Gain on disposal of intangible assets		(131,901)		(50)
Interest income		(14,429,400)		(9,573,012)
Gain on valuation of financial assets at fair value		(1,324,736)		(3,497,241)

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<i>(in thousands of Korean won)</i>	2019	2018
through profit or loss		
Gain on disposal of financial assets at fair value through profit or loss	(112,078)	-
Gain on valuation of derivatives	(8,221,306)	(7,871,752)
Share of profit of associates	(8,183,067)	(5,670,811)
Change in operating assets and liabilities		
Trade receivables	(85,521,448)	(60,743,524)
Non-trade receivables	5,438,950	(6,378,472)
Inventories	47,238,152	(82,666,284)
Deposits received	(381,353)	(1,411,989)
Other current assets	(170,585,196)	(224,953,742)
Other non-current assets	1,457,976	5,440,279
Long-term trade receivables	(2,851,100)	-
Trade payables	99,853,555	(53,203,361)
Non-trade payables	(9,488,878)	(21,825,758)
Accrued expenses	42,101,001	33,974,448
Withholdings	(1,442,418)	8,339,742
Other current liabilities	359,601,171	321,804,751
Other long-term employee benefits liabilities	(9,898,945)	(2,996,343)
Payments of post-employment benefits	(25,679,090)	(36,129,500)
Net transferred post-employment benefits to (from) associates	(429,531)	(4,377,055)
Pension plan assets	(21,927,153)	4,322,679
Cash generated from operations	<u>₩ 776,292,442</u>	<u>₩ 208,363,477</u>

Changes in liabilities arising from financial activities for the years ended December 31, 2019 and 2018, are as follows:

<i>(in thousands of Korean won)</i>	Short-term borrowings	Current portion of borrowings	Long-term borrowings	Debentures	Lease liabilities	Total
At January 1, 2019	₩ 304,482,657	₩ 220,308,476	₩ 507,309,190	₩ 701,997,485	₩ -	₩ 1,734,097,808
Changes in accounting policies	-	-	-	-	58,400,388	58,400,388
Cash flows	(94,770,947)	(242,450,707)	409,007,954	168,475,688	(25,169,135)	215,092,853
Gain (loss) on foreign currency translations	(78,494)	-	849,529	1,191,000	14,121	1,976,156

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Amortization of present value discounts	-	-	-	-	1,672,406	1,672,406
Amortization of bond discounts	-	-	-	886,971	-	886,971
Reclassification to current portion	-	257,592,157	(257,592,157)	-	-	-
Business combination	18,860,209	-	96,104,000	-	5,806,631	120,770,840
Others ¹	245,078	-	100,092	-	42,011,828	42,356,998
At December 31, 2019	₩ 228,738,503	₩ 235,449,926	₩ 755,778,608	₩ 872,551,144	₩ 82,736,239	₩ 2,175,254,420

¹ Exchange differences are included.

<i>(in thousands of Korean won)</i>	Short-term borrowings	Current portion of borrowings	Long-term borrowings	Debentures	Total
At January 1, 2018	₩ 322,786,281	₩ 53,338,338	₩ 519,547,742	₩ 449,073,311	₩ 1,344,745,672
Cash flows	(34,815,433)	(114,409,438)	255,265,359	243,336,090	349,376,578
Gain (loss) on foreign currency translations	(433,405)	-	-	(45,000)	(478,405)
Amortization of bond discounts	-	-	-	(630,160)	(630,160)
Reclassification to current portion	-	279,237,376	(279,237,376)	-	-
Business combination	16,661,440	2,142,200	10,175,450	9,978,068	38,957,158
Others ¹	283,774	-	1,558,015	285,176	2,126,965
At December 31, 2018	₩ 304,482,657	₩ 220,308,476	₩ 507,309,190	₩ 701,997,485	₩ 1,734,097,808

¹ Exchange differences are included.

36. Changes in Accounting Policies- Adoption of Korean IFRS 1116 Lease

As explained in Note 2.1.1, the Group has adopted Korean IFRS 1116, retrospectively, from January 1, 2019, but has not restated comparatives for the 2018 reporting period, as permitted under the specific transitional provisions in the standard. The reclassifications and the adjustments arising from the new leasing rules are, therefore, recognized in the consolidated statement of financial position on January 1, 2019.

(a) Practical expedients applied

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

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- the use of a single discount rate to a portfolio of leases with reasonably similar characteristics
- reliance on previous assessments on whether leases are onerous – there were no onerous contracts as at January 1, 2019
- the accounting for operating leases with a remaining lease term of less than 12 months as at January 1, 2019, as short-term leases
- the exclusion of initial direct costs for the measurement of the right-of-use asset at the date of initial application, and
- the use of hindsight in determining the lease term where the contract contains options to extend or terminate the lease

(b) Adjustments recognized on adoption of Korean IFRS 1116 Lease

On adoption of Korean IFRS 1116, the Group recognized lease liabilities in relation to leases which had previously been classified as ‘operating leases’ under the principles of Korean IFRS 1017. These liabilities were measured at the present value of the remaining lease payments, discounted using the lessee’s incremental borrowing rate as at January 1, 2019. The lessee’s weighted average incremental borrowing rate applied to the lease liabilities on January 1, 2019 was 2.3%~3.0%.

For leases previously classified as ‘finance leases’, the Group recognized the carrying amount of the lease asset and lease liability immediately before transition as the carrying amount of the right-of-use asset and the lease liability at the date of initial application. The measurement principles of Korean IFRS 1116 are only applied after that date. The remeasurements to the lease liabilities were recognized as adjustments to the related right-of-use assets immediately after the date of initial application.

(in millions of Korean won)

	2019
Operating lease commitments as at January 1, 2019	₩ 69,191,119
Discounted using the lessee’s incremental borrowing rate of at the date of initial application	(3,793,293)
Less: short-term leases recognized as expenses on a straight-line basis	(3,428,985)
Less: low-value leases recognized as expenses on a straight-line basis	(3,568,453)
Lease liability recognized as at January 1, 2019	<u>58,400,388</u>
Of which are:	
Current lease liabilities	18,157,734
Non-current lease liabilities	40,242,654
	<u>₩ 58,400,388</u>

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

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

<i>(in millions of Korean won)</i>	December 31, 2019	January 1, 2019
Right-of-use assets		
Properties	₩ 75,965,900	₩ 50,038,118
Machinery	105,588	-
Vehicles	2,667,610	2,456,195
IT tools and others	5,698,840	8,042,840
	<u>₩ 84,437,938</u>	<u>₩ 60,537,153</u>

<i>(in millions of Korean won)</i>	December 31, 2019	January 1, 2019
Lease liabilities		
Current	₩ 29,668,833	₩ 18,157,734
Non-current	53,067,407	40,242,654
	<u>₩ 82,736,240</u>	<u>₩ 58,400,388</u>

Additions to the right-of-use assets during the 2019 financial year were ₩ 42,012 million.

The consolidated statement of comprehensive income shows the following amounts relating to leases:

<i>(in millions of Korean won)</i>	2019	2018
Depreciation of right-of-use assets		
Properties	₩ 17,853,324	₩ -
Vehicles	1,800,174	-
IT tools	4,828,698	-
Machinery	52,794	-
	<u>₩ 24,534,990</u>	<u>₩ -</u>
Interest expense relating to lease liabilities (included in finance cost)	₩ 1,672,406	₩ -
Expense relating to short-term leases (included in cost of goods sold and administrative expenses)	7,659,722	-
Expense relating to leases of low-value assets that are not short-term leases (included in administrative expenses)	1,969,708	-
Expense relating to variable lease payments not included in lease liabilities (included in administrative expenses)	-	-

The total cash outflow for leases in 2019 was ₩ 34,798.565 million.

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37. Business Combinations

On September 30, 2019, the Group acquired a full share of EDAC Technologies Holding Company, which is controlling American aircraft engines and components manufacturer EDAC Technologies LLC, and changed its name into Hanwha Aerospace USA CO., in order to secure its business capacity in advance and expand the market.

Details of consideration transferred in the business combination, are as follows:

(in thousands of Korean won)

Name of company	Main business	Acquisition date	Consideration transferred
Hanwha Aerospace USA CO.,	Manufacture of aircraft engines and component	2019.09.30	₩ 239,682,476

Details of assets acquired and liabilities assumed as a result of the business combination, are as follows:

(in thousands of Korean won)

	Amount
Fair value of identifiable assets	₩ 310,054,282
Cash and cash equivalents	8,517,338
Trade and other receivables	19,009,058
Other assets	7,088,935
Inventories	55,077,983
Property, plant and equipment	84,193,613
Intangible assets	136,167,355
Fair value of identifiable liabilities	238,923,806
Trade and other payables	22,149,983
Borrowings and debentures	114,964,209
Other liabilities	66,334,024
Deferred tax liabilities	35,475,590
Net identifiable assets acquired	<u>71,130,476</u>
Goodwill	<u>168,552,000</u>
	<u>₩ 239,682,476</u>

The revenue and loss for the year of Hanwha Aerospace USA CO. after the acquisition date, which are included in statement of comprehensive income, are ₩ 49,876 million and ₩ 82 million, respectively. If Hanwha Aerospace USA CO. was consolidated on January 1, 2019, the revenue and profit for the year included in consolidated statement of comprehensive income would have been ₩ 193,691 million and ₩ 54,881 million, respectively, for the year ended December 31, 2019.

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38. Information for Non-controlling Interests

(a) Changes in Accumulated Non-controlling Interests

The profit or loss allocated to non-controlling interests and accumulated non-controlling interests of subsidiaries that are material to the Group for the years ended December 31, 2019, is as follows:

<i>(in thousands of Korean won)</i>	Non-controlling interest rate (%)	Accumulated non-controlling interests at the beginning of the year	Issuance of shares	Profit or loss allocated to non-controlling interests	Dividends paid to non-controlling interests	Others	Accumulated non-controlling interests at the end of the year
Hanwha Systems Co., Ltd.	51.01	₩ 264,745,911	₩ 85,975,078	₩ 30,208,100	₩ (7,450,404)	₩ (4,218,217)	₩ 369,260,468

(b) Summarized Financial Information on Subsidiaries

Set out below is summarized financial information for each subsidiary that has non-controlling interests that are material to the Group.

<i>(in thousands of Korean won)</i>	December 31, 2019				2019		Total comprehensive income
	Current assets	Non-current assets	Current liabilities	Non-current liabilities	Revenue	Profit for the year	
Hanwha Systems Co., Ltd.	₩ 1,524,614,487	₩ 884,630,053	₩ 1,170,276,823	₩ 270,527,127	₩ 1,545,983,880	₩ 72,896,110	₩ 64,620,710

Summarized statements of cash flows

(in thousands of Korean won)

2019

Cash flows from operating activities	₩ 408,620,564
Cash flows from investing activities	(133,425,033)
Cash flows from financing activities	84,594,220
Net decrease in cash and cash equivalents	359,789,751
Cash and cash equivalents at beginning of year	204,171,938
Effects of exchange rate changes on cash and cash equivalents	55,317
Cash and cash equivalents at end of year	₩ 564,017,008

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39. Interests in Unconsolidated Structured Entities

The Group is engaged in the structured company through investment trusts (beneficiary certificates). The investment trust (beneficiary certificates) is a trust-type 'collective investment organization' that invests and trusts the trust assets in accordance with instructions of the trustors.

Details of scale of unconsolidated structured entities and nature of the risks associated with the Group's interests in unconsolidated structured entities as at December 31, 2019, are as follows:

<i>(in thousands of Korean won)</i>	Trust
Total assets of unconsolidated structured entities	₩ 112,938,530
Assets recognized on the statement of financial position	
Financial assets at fair value through profit or loss	11,949,282
Maximum exposure to loss	11,949,282

40. Events after the Reporting Period

On February 21, 2020, the Parent Company decided to acquire and retire treasury shares in order to improve the profit of shareholders. The amount of treasury shares to be retired is ₩ 29,900 million (930,000 shares).

In January 2020, the Group acquired 4,285,714 shares (percentage ownership: 30%) of Overair in U.S.A., in the amount of ₩ 29,027 million in order to enter the PAV (Personal Air Vehicle) market through participating development of aircraft with the developing entities and securing technologies.