Hanwha Total Petrochemical Co., Ltd. and its subsidiaries

Consolidated financial statements
for the years ended December 31, 2019 and 2018
with the independent auditor's report

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Independent auditor's report

The Shareholders and Board of Directors
Hanwha Total Petrochemical Co., Ltd.

Opinion

We have audited the consolidated financial statements of Hanwha Total Petrochemical Co., Ltd. (the "Company") and its subsidiaries (collectively referred to as the "Group"), which comprise the consolidated statements of financial position as of 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 of December 31, 2019 and 2018 and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with Korean International Financial Reporting Standards (KIFRS).

Basis for opinion

We conducted our audit in accordance with Korean Auditing Standards (KGAAS). 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 that are relevant to our audit of the consolidated financial statements in the Republic of Korea, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

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 KIFRS, and for such internal control as management determines is necessary to enable the preparation of the 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, or has no realistic alternative but to do so.

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

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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 KGAAS 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 KGAAS, 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 Group'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.

March 16, 2020

This audit report is effective as of March 16, 2020, the independent auditor's report date. Accordingly, certain material subsequent events or circumstances may have occurred during the period from the auditor's report date to the time this report is used. Such events and circumstances could significantly affect the accompanying consolidated financial statements and may result in modifications to this report.

Hanwha Total Petrochemical Co., Ltd.
and its subsidiaries

Consolidated financial statements
for the years ended December 31, 2019 and 2018

"The accompanying consolidated financial statements, including all footnotes and disclosures, have been prepared by, and are the responsibility of, the Company."

Hyek Woong Kwon & Jean-Marc Otero del Val
Chief Executive Officers
Hanwha Total Petrochemical Co., Ltd.

Hanwha Total Petrochemical Co., Ltd. and its subsidiaries
Consolidated statements of financial position
as of December 31, 2019 and 2018
(Korean won)

	Notes	2019	2018
Assets			
Current assets:			
Cash and cash equivalents	3	₩ 368,644,459,888	₩ 259,217,545,462
Trade and other accounts receivable, net	3,4,13, 22,24	828,016,299,699	955,880,335,491
Prepaid expenses		13,165,106,658	14,391,785,190
Other current assets		3,522,632,866	3,468,879,811
Inventories, net	5	1,232,322,655,434	1,410,443,126,039
Total current assets		2,445,671,154,545	2,643,401,671,993
Non-current assets:			
Long-term investment securities	3,6	12,167,615,478	12,209,886,880
Long-term loans, net	3,4	262,975,703	454,040,479
Long-term accounts receivable, net	3,4,24	3,788,023,385	3,181,509,850
Long-term prepaid expenses		54,588,551,372	42,636,055,187
Property, plant and equipment, net	7,8,23	4,517,823,813,389	4,079,911,969,362
Intangible assets, net	9,23	32,963,059,867	59,744,665,824
Other non-current assets	3	15,500,000	15,500,000
Deferred tax assets	18	9,929,433,794	2,936,621,085
Total non-current assets		4,631,538,972,988	4,201,090,248,667
Total assets		**₩ 7,077,210,127,533**	**₩ 6,844,491,920,660**

(Continued)

Hanwha Total Petrochemical Co., Ltd. and its subsidiaries
Consolidated statements of financial position
as of December 31, 2019 and 2018 (cont'd)
(Korean won)

	Notes		2019		2018
Liabilities					
Current liabilities:					
Trade and other accounts payable	3,13,14,22	₩	830,246,977,710	₩	676,350,423,324
Short-term borrowings	3,4,10, 21,24		134,025,576,583		122,334,401,888
Current portion of bonds payable and long-term borrowings	3,8,10, 21,24		424,291,143,279		544,849,221,136
Income tax payable			41,998,213,264		125,449,149,692
Other current liabilities	11		11,113,333,623		14,627,199,761
Total current liabilities			1,441,675,244,459		1,483,610,395,801
Non-current liabilities:					
Bonds payable, net	3,10,21,24		1,736,815,858,250		937,293,714,712
Long-term borrowings	3,8,10,21,24		290,137,225,646		640,000,000,000
Long-term accounts payable	3		-		382,412,562
Defined benefit liabilities, net	12		2,069,809,182		8,099,546,289
Other non-current liabilities			8,298,176,411		7,307,604,783
Total non-current liabilities			2,037,321,069,489		1,593,083,278,346
Total liabilities			**3,478,996,313,948**		**3,076,693,674,147**
Equity					
Equity attributable to owners of the parent:					
Issued capital	16		95,826,580,000		95,826,580,000
Share premium	16		864,898,306,667		864,898,306,667
Accumulated other comprehensive losses	16		(1,074,259,885)		(393,443,582)
Retained earnings	16		2,638,563,186,803		2,807,466,803,428
			3,598,213,813,585		3,767,798,246,513
Non-controlling interests			-		-
Total equity			**3,598,213,813,585**		**3,767,798,246,513**
Total liabilities and equity		₩	**7,077,210,127,533**	₩	**6,844,491,920,660**

The accompanying notes are an integral part of the consolidated financial statements.

Hanwha Total Petrochemical Co., Ltd. and its subsidiaries
Consolidated statements of comprehensive income
for the years ended December 31, 2019 and 2018
(Korean won)

	Notes		2019		2018
Sales	22,23	₩	9,844,955,613,194	₩	11,209,384,568,479
Cost of goods sold	5,17,22		9,135,696,523,929		9,851,399,635,105
Gross profit			**709,259,089,265**		**1,357,984,933,374**
Selling and administrative expenses	15,17		242,263,111,100		295,279,794,650
Operating profit	23		**466,995,978,165**		**1,062,705,138,724**
Finance income	3,13,17		274,301,944,080		288,740,154,823
Finance costs	3,13,17		311,138,402,406		277,527,319,502
Other income	17		29,614,730,028		33,498,547,270
Other expenses	17		33,280,087,736		23,371,561,964
Profit before tax			**426,494,162,131**		**1,084,044,959,351**
Income tax expense	18		106,160,802,121		259,766,391,229
Profit for the year	23	₩	**320,333,360,010**	₩	**824,278,568,122**
Other comprehensive income					
Other comprehensive income to be reclassified to profit or loss in subsequent periods:					
Net loss on valuation of interest rate swaps	13		(1,048,651,741)		(1,975,652,043)
Exchange differences on translation of foreign operations			367,835,438		(138,855,847)
Net other comprehensive loss to be reclassified to profit or loss in subsequent periods		₩	**(680,816,303)**	₩	**(2,114,507,890)**
Other comprehensive income not to be reclassified to profit or loss in subsequent periods:					
Re-measurement gain (loss) on net defined benefit liabilities	12		2,669,023,365		(8,888,673,636)
Net gain on valuation of financial instruments measured at FVOCI			-		1,562,894,528
Net other comprehensive income (loss) not to be reclassified to profit or loss in subsequent periods		₩	**2,669,023,365**	₩	**(7,325,779,108)**
Other comprehensive income (loss) for the year, net of tax			**1,988,207,062**		**(9,440,286,998)**
Total comprehensive income for the year, net of tax		₩	**322,321,567,072**	₩	**814,838,281,124**
Profit for the year attributable to:					
Owners of the parent		₩	320,333,360,010	₩	824,278,568,122
Non-controlling interests			-		-
		₩	320,333,360,010	₩	824,278,568,122
Total comprehensive income for the year attributable to:					
Owners of the parent			322,321,567,072		814,838,281,124
Non-controlling interests			-		-
		₩	322,321,567,072	₩	814,838,281,124
Earnings per share:					
Basic and diluted, earnings per share	19	₩	16,714	₩	43,009

The accompanying notes are an integral part of the consolidated financial statements.

Hanwha Total Petrochemical Co., Ltd. and its subsidiaries
Consolidated statements of changes in equity
for the years ended December 31, 2019 and 2018
(Korean won)

		Issued capital		Share premium		Accumulated other comprehensive losses		Retained earnings		Equity attributable to owners of the parent		Non-controlling interests		Total equity
As of January 1, 2018	₩	95,826,580,000	₩	864,898,306,667	₩	158,169,780	₩	2,760,691,908,942	₩	3,721,574,965,389	₩	-	₩	3,721,574,965,389
Profit for the year		-		-		-		824,278,568,122		824,278,568,122		-		824,278,568,122
Net loss on valuation of interest rate swaps		-		-		(1,975,652,043)		-		(1,975,652,043)		-		(1,975,652,043)
Exchange differences on translation of foreign operations		-		-		(138,855,847)		-		(138,855,847)		-		(138,855,847)
Net gain on valuation of financial instruments measured at FVOCI		-		-		1,562,894,528		-		1,562,894,528		-		1,562,894,528
Re-measurement loss on net defined benefit liabilities		-		-		-		(8,888,673,636)		(8,888,673,636)		-		(8,888,673,636)
Total comprehensive income for the year		-		-		(551,613,362)		815,389,894,486		814,838,281,124		-		814,838,281,124
Dividend		-		-		-		(548,615,000,000)		(548,615,000,000)		-		(548,615,000,000)
Interim dividend								(220,000,000,000)		(220,000,000,000)				(220,000,000,000)
As of December 31, 2018	**₩**	**95,826,580,000**	**₩**	**864,898,306,667**	**₩**	**(393,443,582)**	**₩**	**2,807,466,803,428**	**₩**	**3,767,798,246,513**	**₩**	**-**	**₩**	**3,767,798,246,513**
As of January 1, 2019	₩	95,826,580,000	₩	864,898,306,667	₩	(393,443,582)	₩	2,807,466,803,428	₩	3,767,798,246,513	₩	-	₩	3,767,798,246,513
Profit for the year		-		-		-		320,333,360,010		320,333,360,010		-		320,333,360,010
Net loss on valuation of interest rate swaps		-		-		(1,048,651,741)		-		(1,048,651,741)		-		(1,048,651,741)
Exchange differences on translation of foreign operations		-		-		367,835,438		-		367,835,438		-		367,835,438
Re-measurement gain on net defined benefit liabilities		-		-		-		2,669,023,365		2,669,023,365		-		2,669,023,365
Total comprehensive income for the year		-		-		(680,816,303)		323,002,383,375		322,321,567,072		-		322,321,567,072
Dividend		-		-		-		(396,906,000,000)		(396,906,000,000)		-		(396,906,000,000)
Interim dividend		-		-		-		(95,000,000,000)		(95,000,000,000)		-		(95,000,000,000)
As of December 31, 2019	**₩**	**95,826,580,000**	**₩**	**864,898,306,667**	**₩**	**(1,074,259,885)**	**₩**	**2,638,563,186,803**	**₩**	**3,598,213,813,585**	**₩**	**-**	**₩**	**3,598,213,813,585**

The accompanying notes are an integral part of the consolidated financial statements.

Hanwha Total Petrochemical Co., Ltd. and its subsidiaries
Consolidated statements of cash flows
for the years ended December 31, 2019 and 2018

(Korean won)

		2019		2018
Cash flows from operating activities:				
Profit for the year	₩	320,333,360,010	₩	824,278,568,122
Non-cash adjustments to reconcile profit for the year to net cash flows provided by operating activities (Note 21)		564,234,531,439		633,518,477,536
Working capital adjustments (Note 21)		390,216,405,172		(370,805,968,689)
Interest received		4,510,995,544		3,837,544,926
Income tax paid		(197,186,996,724)		(312,736,388,076)
Net cash flows provided by operating activities		**1,082,108,295,441**		**778,092,233,819**
Cash flows from investing activities:				
Decrease in long-term loans		191,064,776		178,355,448
Increase in long-term loans		-		(100,000,000)
Proceeds from disposal of long-term investment securities		42,555,000		285,430,000
Acquisition of long-term investment securities		(282,598)		(3,200)
Decrease in long-term financial instruments		-		500,000
Decrease in long-term accounts receivable		151,621,858		56,354,698
Increase in long-term accounts receivable		(821,129,000)		(3,722,225)
Proceeds from disposal of property, plant and equipment		3,695,417,020		3,652,504,651
Acquisition of property, plant and equipment		(726,495,883,412)		(554,022,542,845)
Proceeds from disposal of intangible assets		1,200,000,000		-
Acquisition of intangible assets		(458,552,321)		(81,214,440)
Settlement of derivatives		(9,944,471,061)		43,530,723,861
Dividends received		241,998,725		264,924,920
Net cash flows used in investing activities		**(732,197,661,013)**		**(506,238,689,132)**
Cash flows from financing activities:				
Increase in bonds payable (Note 21)		852,080,000,000		700,000,000,000
Net increase in short-term borrowings (Note 21)		12,246,632,371		18,613,380,516
Repayment of current portion of bonds payable and long-term borrowings (Note 21)		(548,494,354,642)		(480,000,000,000)
Increase in long-term borrowings (Note 21)		-		280,000,000,000
Interest paid		(64,497,603,492)		(57,445,995,379)
Dividends paid to shareholders		(491,906,000,000)		(768,615,000,000)
Net cash flows used in financing activities		**(240,571,325,763)**		**(307,447,614,863)**
Net increase (decrease) in cash and cash equivalents		**109,339,308,665**		**(35,594,070,176)**
Cash and cash equivalents as of January 1		**259,217,545,462**		**294,905,675,197**
Net foreign exchange difference		**87,605,761**		**(94,059,559)**
Cash and cash equivalents as of December 31	₩	**368,644,459,888**	₩	**259,217,545,462**

The accompanying notes are an integral part of the consolidated financial statements.

1. General information

Corporate information

Hanwha Total Petrochemical Co., Ltd. (the “Company”) was incorporated on August 1, 2003 under the laws of the Republic of Korea in accordance with a joint venture agreement entered into on June 10, 2003, between Total Holdings UK Limited (“Total Holdings”) of the United Kingdom and Samsung General Chemical Co., Ltd. (“SGC”) of the Republic of Korea, and an in-kind contribution agreement entered into between the Company and SGC.

Upon the Company’s incorporation on August 1, 2003, SGC sold 50% of its equity interest in the Company to Total Holdings in accordance with a share purchase agreement entered into with Total Holdings, SGC and SGC’s two shareholders on June 10, 2003. At the time of establishment, the Company was named Samsung Atofina Co., Ltd. and changed to Samsung Total Petrochemical Co., Ltd. in October 2004.

On November 26, 2014, Hanwha Group and Samsung Group entered into a share transfer agreement of SGC. In accordance with a resolution at the shareholders’ meeting on April 30, 2015, the name of the Company was changed from Samsung Total Petrochemical Co., Ltd. to Hanwha Total Petrochemical Co., Ltd.

As of December 31, 2019, the issued and outstanding shares of the Company are equally owned by Total Holdings and Hanhwa General Chemical Co., Ltd. (“HGC”)

The Company acquired all of the equity interest of West Sea Utilities Investment Private Company in West Sea Power Co., Ltd. and West Sea Water Co., Ltd. (acquired companies) in January 2012 to enhance the stabilization and efficiency of operations and competitiveness through the integration of utility facilities. The acquired companies were merged into the Company as of March 28, 2012.

The primary business activity of the Company is the production and sale of various petrochemical and fuel products, including polyethylenes, polypropylenes, butadienes, styrene monomers, paraxylenes, jetoil and gasoline. The Company’s manufacturing plant is located in Seosan-si (the Seosan City), Choongchungnam-do.

Information about subsidiaries

The Company’s subsidiaries as of December 31, 2019 and 2018 are as follows:

Subsidiary	Principal activities	Equity interest (%)	Country of domicile
Dongguan Hanwha Total Engineering Plastic Co., Ltd.	Production and sale of synthetic resins and various plastics	100	China
Hanwha Total Petrochemical Trading (Shanghai) Co., Ltd.	Trading	100	China

Summarized financial information of the subsidiaries as of and for the years ended December 31, 2019 and 2018, which has been included in the accompanying consolidated financial statements, is as follows (Korean won in thousands):

	2019					
Subsidiary	Assets	Liabilities	Equity	Sales	Profit for the year	Total comprehensive income
Dongguan Hanwha Total Engineering Plastic Co., Ltd.	₩ 24,096,996	₩ 3,035,737	₩ 21,061,259	₩ 39,270,898	₩ 1,513,999	₩ 1,840,411
Hanwha Total Petrochemical Trading (Shanghai) Co., Ltd.	3,800,212	737,932	3,062,280	5,890,988	394,983	436,406

1. General information (cont'd)

	2018					
Subsidiary	Assets	Liabilities	Equity	Revenue	Profit for the year	Total comprehensive income
Dongguan Hanwha Total Engineering Plastic Co., Ltd.	₩ 22,303,425	₩ 3,082,577	₩ 19,220,848	₩ 39,971,327	₩ 794,733	₩ 676,496
Hanwha Total Petrochemical Trading (Shanghai) Co., Ltd.	3,274,287	648,413	2,625,874	5,610,895	378,791	358,172

There were no changes in the scope of consolidation for the years ended December 31, 2019 and 2018.

2. Basis of preparation and summary of significant accounting policies

Basis of preparation

The Group prepares its statutory consolidated financial statements in the Korean language in conformity with Korean International Financial Reporting Standards (KIFRS) enacted by the *Act on External Audit of Stock Companies*. The consolidated financial statements have been prepared on a historical cost basis, except for certain assets that have been measured at fair value in accordance with KIFRS. The accompanying consolidated financial statements have been translated into the English language from the Korean language financial statements. In the event of any differences in interpreting the financial statements or the independent auditors' report thereon, the Korean version, which is used for regulatory reporting purpose, shall prevail. The consolidated financial statements are presented in Korean won and all values are rounded to the nearest thousands, except when otherwise indicated.

Basis of consolidation

The consolidated financial statements comprise the financial statements of the Company and its subsidiaries (collectively referred to as the "Group") as of December 31, 2019 and 2018. Control is achieved when the Group is exposed, or has rights, to variable returns from its involvement with the investee and has the ability to affect those returns through its power over the investee. Specifically, the Group controls an investee if and only if the Group has:

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

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

- The contractual arrangements with the other vote holders of the investee
- Rights arising from other contractual arrangements
- The Group's voting rights and potential voting rights

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

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

2. Basis of preparation and summary of significant accounting policies (cont'd)

A change in the ownership interest of a subsidiary, without a loss of control, is accounted for as an equity transaction. If the Group loses control over a subsidiary, it:

- Derecognizes the assets (including goodwill) and liabilities of the subsidiary
- Derecognizes the carrying amount of any non-controlling interests
- Derecognizes the cumulative translation differences recorded in equity
- Recognizes the fair value of the consideration received
- Recognizes the fair value of any investment retained
- Recognizes any surplus or deficit in profit or loss
- Reclassifies the parent's share of components previously recognized in OCI to profit or loss or retained earnings, as appropriate.

Current versus non-current classification
The Group presents assets and liabilities in the consolidated statement of financial position based on current/non-current classification.

An asset is current when it is either:

- Expected to be realized or intended to be sold or consumed in the normal operating cycle
- Held primarily for the purpose of trading
- Expected to be realized within twelve months after the reporting period, or
- Cash or cash equivalent unless restricted from being exchanged or used to settle a liability for at least twelve months after the reporting period

All other assets are classified as non-current.

A liability is current when either:

- It is expected to be settled in the normal operating cycle
- It is held primarily for the purpose of trading
- It is due to be settled within twelve months after the reporting period, or
- There is no unconditional right to defer the settlement of the liability for at least twelve months after the reporting period

The Group classifies all other liabilities as non-current.

Deferred tax assets and liabilities are classified as non-current assets and liabilities.

Fair value measurement
The Group measures financial instruments, such as, derivatives, at fair value at each balance sheet date. Fair value related disclosures for financial instruments that are measured at fair value, or where fair values are disclosed, are summarized in Note 3.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place either:

- In the principal market for the asset or liability, or
- In the absence of a principal market, in the most advantageous market for the asset or liability

The fair value of an asset or a liability is measured using the assumptions that market participants would use when pricing the asset or liability, assuming that market participants act in their economic best interest. The Group uses valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximizing the use of relevant observable inputs and minimizing the use of unobservable inputs.

2. Basis of preparation and summary of significant accounting policies (cont'd)

All assets and liabilities for which fair value is measured or disclosed in the consolidated financial statements are categorized within the fair value hierarchy, described as follows, based on the lowest level input that is significant to the fair value measurement as a whole:

Level 1: Quoted (unadjusted) market prices in active markets for identical assets or liabilities
Level 2: Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable
Level 3: Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable

For assets and liabilities that are recognized in the consolidated financial statements at fair value on a recurring basis, the Group determines whether transfers have occurred between levels in the hierarchy by re-assessing categorization (based on the lowest level input that is significant to the fair value measurement as a whole) at the end of each reporting period.

For the purpose of fair value disclosures, the Group has determined classes of assets and liabilities on the basis of the nature, characteristics and risks of the asset or liability and the level of the fair value hierarchy, as explained above.

Financial assets

Initial recognition and measurement
Financial assets are classified, at initial recognition, as subsequently measured at amortized cost, fair value through other comprehensive income (OCI), and fair value through profit or loss (FVTPL).

The classification of financial assets at initial recognition depends on the financial asset's contractual cash flow characteristics and the Group's business model for managing them. With the exception of trade receivables that do not contain a significant financing component or for which the Group has applied the practical expedient, the Group initially 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. Trade receivables that do not contain a significant financing component or for which the Group has applied the practical expedient are measured at the transaction price determined under KIFRS 1115.

In order for a financial asset to be classified and measured at amortized cost or fair value through OCI, it needs to give rise to cash flows that are 'solely payments of principal and interest (SPPI)' on the principal amount outstanding. This assessment is referred to as the SPPI test and is performed at an instrument level.

The Group's business model for managing financial assets refers to how it manages its financial assets in order to generate cash flows. The business model determines whether cash flows will result from collecting contractual cash flows, selling the financial assets, or both.

Purchases or sales of financial assets that require delivery of assets within a time frame established by regulation or convention in the market place (regular way trades) are recognized on the trade date, i.e., the date that the Group commits to purchase or sell the asset.

Subsequent measurement
For purposes of subsequent measurement, financial assets are classified in four categories:

- Financial assets at amortized cost (debt instruments)
- Financial assets at fair value through OCI with recycling of cumulative gains and losses (debt instruments)
- Financial assets designated at fair value through OCI with no recycling of cumulative gains and losses upon derecognition (equity instruments)
- Financial assets at FVTPL

2. Basis of preparation and summary of significant accounting policies (cont'd)

Financial assets at amortized cost (debt instruments)
The Group measures financial assets at amortized cost if both of the following conditions are met:
- The financial asset is held within a business model with the objective to hold financial assets in order to collect contractual cash flows, and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding

Financial assets at amortized cost are subsequently measured using the effective interest rate (EIR) method and are subject to impairment. Gains and losses are recognized in profit or loss when the asset is derecognized, modified or impaired.

Financial assets at fair value through OCI (debt instruments)
The Group measures debt instruments at fair value through OCI if both of the following conditions are met:
- The financial asset is held within a business model with the objective of both holding to collect contractual cash flows and selling, and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding

For debt instruments at fair value through OCI, interest income, foreign exchange revaluation and impairment losses or reversals are recognized in the consolidated statement of comprehensive income and computed in the same manner as for financial assets measured at amortized cost. The remaining fair value changes are recognized in OCI. Upon derecognition, the cumulative fair value change recognized in OCI is recycled to profit or loss.

Financial assets designated at fair value through OCI (equity instruments)
Upon initial recognition, the Group can elect to classify irrevocably its equity investments as equity instruments designated at fair value through OCI when they meet the definition of equity under KIFRS 1032 *Financial Instruments: Presentation* and are not held for trading. The classification is determined on an instrument-by-instrument basis.

Gains and losses on these financial assets are never recycled to profit or loss. Dividends are recognized as other income in the consolidated statement of comprehensive income when the right of payment has been established, except when the Group benefits from such proceeds as a recovery of part of the cost of the financial asset, in which case, such gains are recorded in OCI. Equity instruments designated at fair value through OCI are not subject to impairment assessment.

The Group may elect to classify irrevocably its non-listed equity investments under this category.

Financial assets at fair value through profit or loss
Financial assets at fair value through profit or loss include financial assets held for trading and financial assets designated upon initial recognition at fair value through profit or loss. Financial assets are classified as held for trading if they are acquired for the purpose of selling or repurchasing in the near term. Derivatives, including separated embedded derivatives, are also classified as held for trading unless they are designated as effective hedging instruments. Financial assets with cash flows that are not solely payments of principal and interest are classified and measured at fair value through profit or loss, irrespective of the business model. Notwithstanding the criteria for debt instruments to be classified at amortized cost or at fair value through OCI, as described above, debt instruments may be designated at fair value through profit or loss on initial recognition if doing so eliminates, or significantly reduces, an accounting mismatch.

Financial assets at fair value through profit or loss are carried in the consolidated statement of financial position at fair value with net changes in fair value recognized in the consolidated statement of comprehensive income.

2. Basis of preparation and summary of significant accounting policies (cont'd)

A derivative embedded in a hybrid contract, with a financial liability or non-financial host, is separated from the host and accounted for as a separate derivative if: the economic characteristics and risks are not closely related to the host; a separate instrument with the same terms as the embedded derivative would meet the definition of a derivative; and the hybrid contract is not measured at fair value through profit or loss. Embedded derivatives are measured at fair value with changes in fair value recognized in profit or loss. Reassessment only occurs if there is either a change in the terms of the contract that significantly modifies the cash flows that would otherwise be required or a reclassification of a financial asset out of the fair value through profit or loss category.

A derivative embedded within a hybrid contract containing a financial asset host is not accounted for separately. The financial asset host together with the embedded derivative is required to be classified in its entirety as a financial asset at fair value through profit or loss.

Derecognition
A financial asset (or, where applicable, a part of a financial asset or part of a group of similar financial assets) is primarily derecognized (i.e., removed from the Group's consolidated statement of financial position) when:

- The rights to receive cash flows from the asset have expired, or
- The Group has transferred its rights to receive cash flows from the asset or has assumed an obligation to pay the received cash flows in full without material delay to a third party under a 'pass-through' arrangement; and either (a) the Group has transferred substantially all the risks and rewards of the asset, or (b) the Group has neither transferred nor retained substantially all the risks and rewards of the asset, but has transferred control of the asset

When the Group has transferred its rights to receive cash flows from an asset or has entered into a pass-through arrangement, it evaluates if, and to what extent, it has retained the risks and rewards of ownership. When it has neither transferred nor retained substantially all of the risks and rewards of the asset, nor transferred control of the asset, the Group continues to recognize the transferred asset to the extent of its continuing involvement. In that case, the Group also recognizes an associated liability. The transferred asset and the associated liability are measured on a basis that reflects the rights and obligations that the Group has retained.

Continuing involvement that takes the form of a guarantee over the transferred asset is measured at the lower of the original carrying amount of the asset and the maximum amount of consideration that the Group could be required to repay.

Impairment of financial assets
Further disclosures relating to impairment of financial assets are also provided in the following notes:

	Notes
➢ Disclosures for significant assumptions	3
➢ Trade receivables	4

The Group recognizes an allowance for expected credit losses (ECLs) for all debt instruments not held at fair value through profit or loss. ECLs are based on the difference between the contractual cash flows due in accordance with the contract and all the cash flows that the Group expects to receive, discounted at an approximation of the original effective interest rate. The expected cash flows will include cash flows from the sale of collateral held or other credit enhancements that are integral to the contractual terms.

ECLs are recognized in two stages. For credit exposures for which there has not been a significant increase in credit risk since initial recognition, ECLs are provided for credit losses that result from default events that are possible within the next 12-months (a 12-month ECL). For those credit exposures for which there has been a significant increase in credit risk since initial recognition, a loss allowance is required for credit losses expected over the remaining life of the exposure, irrespective of the timing of the default (a lifetime ECL).

For trade receivables, the Group applies a simplified approach in calculating ECLs. Therefore, the Group does not track changes in credit risk, but instead recognizes a loss allowance based on lifetime ECLs at each reporting date. The Group has established a provision matrix that is based on its historical credit loss experience, adjusted for forward-looking factors specific to the debtors and the economic environment.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Financial liabilities

Initial recognition and measurement
Financial liabilities are classified, at initial recognition, as financial liabilities at fair value through profit or loss, loans and borrowings, payables, or as derivatives designated as hedging instruments in an effective hedge, as appropriate.

All financial liabilities are recognized initially at fair value and, in the case of loans and borrowings and payables, net of directly attributable transaction costs.

The Group's financial liabilities include trade and other payables, loans and borrowings including bank overdrafts and derivative financial instruments.

Subsequent measurement
The measurement of financial liabilities depends on their classification, as described below:

Financial liabilities at fair value through profit or loss
Financial liabilities at fair value through profit or loss include financial liabilities held for trading and financial liabilities designated upon initial recognition as of fair value through profit or loss.

Financial liabilities are classified as held for trading if they are incurred for the purpose of repurchasing in the near term. This category also includes derivative financial instruments entered into by the Group that are not designated as hedging instruments in hedge relationships as defined by KIFRS 1109. Separated embedded derivatives are also classified as held for trading unless they are designated as effective hedging instruments.

Gains or losses on liabilities held for trading are recognized in profit or loss.

Financial liabilities designated upon initial recognition at fair value through profit or loss are designated at the initial date of recognition, and only if the criteria in KIFRS 1109 are satisfied. The Group has not designated any financial liability as of fair value through profit or loss.

Loans and borrowings
After initial recognition, interest-bearing loans and borrowings are subsequently measured at amortized cost using the EIR method. Gains and losses are recognized in profit or loss when the liabilities are derecognized as well as through the EIR amortization process.

Amortized cost is calculated by taking into account any discount or premium on acquisition and fees or costs that are an integral part of the EIR.

Derecognition
A financial liability is derecognized when the obligation under the liability is discharged or cancelled or expires. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as the derecognition of the original liability and the recognition of a new liability. The difference in the respective carrying amounts is recognized in profit or loss.

Offsetting of financial instruments
Financial assets and financial liabilities are offset and the net amount is reported in the consolidated statement of financial position if, and only if, (a) there is a currently enforceable legal right to offset the recognized amounts and (b) there is an intention to settle on a net basis, or to realize the assets and settle the liabilities simultaneously.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Derivative financial instruments and hedge accounting

Initial recognition and subsequent measurement
The Group uses derivative financial instruments, such as forward currency contracts, interest rate swaps and forward commodity contracts, to hedge its foreign currency risks, interest rate risks and commodity price risks, respectively. Such derivative financial instruments are initially recognized at fair value on the date on which a derivative contract is entered into and are subsequently remeasured at fair value. Derivatives are carried as financial assets when the fair value is positive and as financial liabilities when the fair value is negative.

For the purpose of hedge accounting, hedges are classified as:
- Fair value hedges when hedging the exposure to changes in the fair value of a recognized asset or liability or an unrecognized firm commitment
- Cash flow hedges when hedging the exposure to variability in cash flows that is either attributable to a particular risk associated with a recognized asset or liability or a highly probable forecast transaction or the foreign currency risk in an unrecognized firm commitment

At the inception of a hedge relationship, the Group formally designates and documents the hedge relationship to which the Group wishes to apply hedge accounting and the risk management objective and strategy for undertaking the hedge.

Before January 1, 2018, the documentation includes identification of the hedging instrument, the hedged item or transaction, the nature of the risk being hedged and how the Group will assess the effectiveness of changes in the hedging instrument's fair value in offsetting the exposure to changes in the hedged item's fair value or cash flows attributable to the hedged risk. Such hedges are expected to be highly effective in achieving offsetting changes in fair value or cash flows and are assessed on an ongoing basis to determine that they actually have been highly effective throughout the financial reporting periods for which they were designated.

Beginning January 1, 2018, the documentation includes identification of the hedging instrument, the hedged item, the nature of the risk being hedged and how the Group will assess whether the hedging relationship meets the hedge effectiveness requirements (including the analysis of sources of hedge ineffectiveness and how the hedge ratio is determined). A hedging relationship qualifies for hedge accounting if it meets all of the following effectiveness requirements:

- There is 'an economic relationship' between the hedged item and the hedging instrument.
- The effect of credit risk does not 'dominate the value changes' that result from that economic relationship.
- The hedge ratio of the hedging relationship is the same as that resulting from the quantity of the hedged item that the Group actually hedges and the quantity of the hedging instrument that the Group actually uses to hedge that quantity of hedged item.

Hedges that meet the strict criteria for hedge accounting are accounted for, as described below:

Fair value hedges
The change in the fair value of a hedging derivative is recognized in profit or loss. The change in the fair value of the hedged item attributable to the risk hedged is recorded as part of the carrying value of the hedged item and is also recognized in profit or loss.

For fair value hedges relating to items carried at amortized cost, any adjustment to carrying value is amortized through profit or loss over the remaining term of the hedge using the EIR method. EIR amortization may begin as soon as an adjustment exists and no later than when the hedged item ceases to be adjusted for changes in its fair value attributable to the risk being hedged.

If the hedged item is derecognized, the unamortized fair value is recognized immediately in profit or loss.

When an unrecognized firm commitment is designated as a hedged item, the subsequent cumulative change in the fair value of the firm commitment attributable to the hedged risk is recognized as an asset or liability with a corresponding gain or loss recognized in profit or loss.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Cash flow hedges
The effective portion of the gain or loss on the hedging instrument is recognized in OCI in the cash flow hedge reserve, while any ineffective portion is recognized immediately in profit or loss. The cash flow hedge reserve is adjusted to the lower of the cumulative gain or loss on the hedging instrument and the cumulative change in fair value of the hedged item.

The Group uses interest rate swap contracts as hedges of its exposure to interest rate risk in long-term borrowings. The ineffective portion relating to interest rate swap contracts is recognized as other expense.

The amounts accumulated in OCI are accounted for, depending on the nature of the underlying hedged transaction. If the hedged transaction subsequently results in the recognition of a non-financial item, the amount accumulated in equity is removed from the separate component of equity and included in the initial cost or other carrying amount of the hedged asset or liability. This is not a reclassification adjustment and will not be recognized in OCI for the period. This also applies where the hedged forecast transaction of a non-financial asset or non-financial liability subsequently becomes a firm commitment for which fair value hedge accounting is applied.

For any other cash flow hedges, the amount accumulated in OCI is reclassified to profit or loss as a reclassification adjustment in the same period or periods during which the hedged cash flows affect profit or loss.

If cash flow hedge accounting is discontinued, the amount that has been accumulated in OCI must remain in accumulated OCI if the hedged future cash flows are still expected to occur. Otherwise, the amount will be immediately reclassified to profit or loss as a reclassification adjustment. After discontinuation, once the hedged cash flow occurs, any amount remaining in accumulated OCI must be accounted for depending on the nature of the underlying transaction as described above.

Revenue from contracts with customers

(a) Sale of goods
For sale of goods contracts with customers, the Group generally expects that revenue is recognized when the control of the goods has passed to the buyer, usually on delivery of the goods. However, if the terms of the contract include inherent shipping and handling activities that occur after the transfer of the control to the customer, they are accounted for as separate promised services.

(b) Rendering of services
The shipping and handling services rendered prior to the control of the goods is transferred to a customer are order-related activities. However, if the control of goods has been transferred to the customer, shipping and handling services are provided in connection with the customer's goods, which indicates that the Group is rendering services to the customer. Accordingly, a portion of the proceeds from the sale of goods will be reclassified as revenue from rendering of services, and the timing of revenue recognition will depend on the transfer of control and the completion of the performance obligations.

Cash and cash equivalents
Cash and cash equivalents comprise cash at banks and on hand, short-term deposits and investments, with a maturity of three months or less from the date of acquisition, that can be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value.

Inventories
Inventories are valued at the lower of cost and net realizable value, with cost being determined using the weighted moving-average method except for materials-in-transit which are determined using the specific identification cost method. Acquisition costs relating to inventory include purchase costs, conversion costs and other costs incurred to bring the inventory to its current location and present condition. The cost of finished goods and semi-finished goods include cost of raw materials, direct labor costs and other direct costs and manufacturing overheads. Net realizable value is the estimated selling price in the ordinary course of business, less estimated costs of completion and the estimated costs necessary to make the sale.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Property, plant and equipment
Property, plant and equipment are stated at cost, net of accumulated depreciation and accumulated impairment losses, if any. Such cost includes the cost of replacing part of the property, plant and equipment and borrowing costs for long-term construction projects if the recognition criteria are met. When significant parts of property, plant and equipment are required to be replaced at intervals, the Group recognizes such parts as individual assets with specific useful lives and depreciates them accordingly. Likewise, when a major inspection is performed, its cost is recognized in the carrying amount of the plant and equipment as a replacement if the recognition criteria are satisfied. All other repair and maintenance costs are recognized in profit or loss as incurred.

Depreciation of property, plant and equipment is provided using the straight-line method over the estimated useful lives of the assets as follows:

	Years
Buildings	10~55
Structures	4~40
Machinery and equipment	5~20
Vehicles and others	4~6

An item of property, plant and equipment and any significant part initially recognized is derecognized upon disposal or when no future economic benefits are expected from its use or disposal. Any gain or loss arising on derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the consolidated statement of comprehensive income when the asset is derecognized. The residual values, useful lives and methods of depreciation of property, plant and equipment are reviewed at each financial year end, and adjusted prospectively, if appropriate.

Leases
The Group assesses at contract inception whether a contract is, or contains, a lease. That is, if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration.

Group as a lessee
The Group applies a single recognition and measurement approach for all leases, except for short-term leases and leases of low-value assets. The Group recognizes lease liabilities to make lease payments and right-of-use assets representing the right to use the underlying assets.

(a) Right-of-use assets
The Group recognizes right-of-use assets at the commencement date of the lease (i.e., the date the underlying asset is available for use). Right-of-use assets are measured at cost, less any accumulated depreciation and impairment losses and adjusted for any remeasurement of lease liabilities. The cost of right-of-use assets includes the amount of lease liabilities recognized, initial direct costs incurred, and lease payments made at or before the commencement date less any lease incentives received. Right-of-use assets are depreciated on a straight-line basis over the shorter of the lease term and the estimated useful lives of the assets, as follows:

	Years
Buildings	2~8
Structures	2~30
Machinery and equipment	2~10
Vehicles	2~8
Others	2~4

If ownership of the leased asset transfers to the Group at the end of the lease term or the cost reflects the exercise of a purchase option, depreciation is calculated using the estimated useful life of the asset.

As described in Note 2 "Impairment of non-financial assets" of the accounting policies section, right-of-use assets are also subject to impairment.

2. Basis of preparation and summary of significant accounting policies (cont'd)

(b) Lease liabilities
At the commencement date of the lease, the Group recognizes lease liabilities measured at the present value of lease payments to be made over the lease term. The lease payments include fixed payments (including in-substance fixed payments) less any lease incentives receivable, variable lease payments that depend on an index or a rate, and amounts expected to be paid under residual value guarantees. The lease payments also include the exercise price of a purchase option reasonably certain to be exercised by the Group and payments of penalties for terminating the lease, if the lease term reflects the Group exercising the option to terminate. Variable lease payments that do not depend on an index or a rate are recognized as expenses (unless they are incurred to produce inventories) in the period in which the event or condition that triggers the payment occurs.

In calculating the present value of lease payments, the Group uses its incremental borrowing rate at the lease commencement date because the interest rate implicit in the lease is not readily determinable. After the commencement date, the amount of lease liabilities is increased to reflect the accretion of interest and reduced for the lease payments made. In addition, the carrying amount of lease liabilities is remeasured if there is a modification, a change in the lease term, a change in the lease payments (e.g., changes to future payments resulting from a change in an index or rate used to determine such lease payments) or a change in the assessment of an option to purchase the underlying asset.

The Group's lease liabilities are included in Interest-bearing loans and borrowings (see Note 8).

(c) Short-term leases and leases of low-value assets
The Group applies the short-term lease recognition exemption to its short-term leases of some assets (i.e., those leases that have a lease term of 12 months or less from the commencement date and do not contain a purchase option). It also applies the lease of low-value assets recognition exemption to leases of office equipment that are considered to be low value. Lease payments on short-term leases and leases of low-value assets are recognized as expense on a straight-line basis over the lease term.

Intangible assets
Intangible assets acquired separately are measured at cost on initial recognition. The cost of intangible assets acquired in a business combination is their fair value at the date of acquisition. Following initial recognition, intangible assets are carried at cost less any accumulated amortization and accumulated impairment losses. Internally generated intangible assets, excluding capitalized development costs, are not capitalized and the related expenditure is reflected in the consolidated statement of comprehensive income in the year in which the expenditure is incurred.

The useful lives of intangible assets are assessed as either finite or indefinite. Intangible assets with finite lives are amortized over the useful economic life and assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortization period and the amortization method for an intangible asset with a finite useful life are reviewed at least at the end of each reporting period. Changes in the expected useful life or the expected pattern of consumption of future economic benefits embodied in the asset are considered to modify the amortization period or method, as appropriate, and are treated as changes in accounting estimates. The amortization expense on intangible assets with finite lives is recognized in the consolidated statement of comprehensive income as the expense category that is consistent with the function of the intangible assets.

Intangible assets with indefinite useful lives are not amortized, but are tested for impairment annually, either individually or at the cash-generating unit level. The assessment of indefinite life is reviewed annually to determine whether the indefinite life continues to be supportable. If not, the change in useful life from indefinite to finite is made on a prospective basis. Intangible assets with definite useful lives are amortized based on the straight-line method over the estimated useful lives between 4 and 30 years.

Gains or losses arising from derecognition of an intangible asset are measured as the difference between the net disposal proceeds and the carrying amount of the asset and are recognized in profit or loss when the asset is derecognized.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Borrowing costs

Borrowing costs directly attributable to the acquisition, construction or production of an asset that necessarily takes a substantial period of time to get ready for its intended use or sale are capitalized as part of the cost of the respective asset. All other borrowing costs are expensed in the period in which they are incurred. Borrowing costs consist of interest and other costs that the Group incurs in connection with the borrowing of funds.

Impairment of non-financial assets

The Group assesses, at each reporting date, whether there is an indication that an asset may be impaired. If any indication exists, or when annual impairment testing for an asset is required, the Group estimates the asset's recoverable amount. An asset's recoverable amount is the higher of an asset's or cash-generating unit's (CGU) fair value less costs of disposal and its value in use. Recoverable amount is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or groups of assets. When the carrying amount of an asset or CGU exceeds its recoverable amount, the asset is considered impaired and is written down to its recoverable amount.

In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In determining fair value less costs of disposal, recent market transactions are taken into account. If no such transactions can be identified, an appropriate valuation model is used. These calculations are corroborated by valuation multiples, quoted share prices for publicly traded companies or other available fair value indicators.

Impairment losses of continuing operations, including impairment on inventories, are recognized in the consolidated statement of comprehensive income in expense categories consistent with the function of the impaired asset, except for properties previously revalued with the revaluation taken to OCI. For such properties, the impairment is recognized in OCI up to the amount of any previous revaluation.

For assets excluding goodwill, an assessment is made at each reporting date to determine whether there is an indication that previously recognized impairment losses no longer exist or have decreased. If such indication exists, the Group estimates the asset's or CGU's recoverable amount. A previously recognized impairment loss is reversed only if there has been a change in the assumptions used to determine the asset's recoverable amount since the last impairment loss was recognized. The reversal is limited so that the carrying amount of the asset does not exceed its recoverable amount, nor exceed the carrying amount that would have been determined, net of depreciation, had no impairment loss been recognized for the asset in prior years. Such reversal is recognized in the consolidated statement of comprehensive income unless the asset is carried at a revalued amount, in which case, the reversal is treated as a revaluation increase.

Defined benefit liabilities

The Group operates a defined benefit plan, under which amounts to be paid as retirement benefits are determined by reference to a formula based on the employees' earnings and years of service. The defined benefit asset or liability comprises the present value of the defined benefit obligations, less the fair value of plan assets out of which the obligations are to be settled.

The cost of providing benefits under the defined benefit plan is determined using the projected unit credit method. Re-measurements, comprising of actuarial gains and losses and the return on plan assets (excluding net interest), are recognized immediately in the consolidated statement of financial position with a corresponding debit or credit to retained earnings through OCI in the period in which they occur. Re-measurements are not reclassified to profit or loss in subsequent periods.

Past service costs are recognized in profit or loss on the earlier of:

- The date of the plan amendment or curtailment, and
- The date that the Group recognizes restructuring-related costs or termination benefits

2. Basis of preparation and summary of significant accounting policies (cont'd)

Net interest is calculated by applying the discount rate to the net defined benefit liability or asset. The Group recognizes service costs and net interest expense or income in the net defined benefit obligation under 'cost of goods sold', and 'selling and administrative expenses' in the consolidated statement of comprehensive income.

The Group operates a defined contribution pension plan for vested employees, and the obligation of contribution to the defined contribution pension plan is recognized as retirement benefits and reflected in current profit or loss unless the contribution is included in the cost of plan assets on the date of contribution. The Group recognizes a shortfall of the contribution as a liability and an excess contribution as an asset to an extent that the excess contribution reduces future payments or cash is refunded.

Provisions and contingent liabilities

Provisions are recognized when (a) the Group has a present obligation (legal or constructive) as a result of a past event, (b) it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and (c) a reliable estimate can be made of the amount of the obligation. The amount that the Group recognizes as a provision is the best estimate for the expenditures which are required to perform a current obligation at the end of reporting period, in consideration of unavoidable risks and uncertainties for related events and circumstances. If the effect of the time value of money is material, provisions are discounted using a current pre-tax rate that reflects, where appropriate, the risks specific to the liability.

In addition, if an event occurred in the past but the Group has a potential obligation of which the existence is identified when an uncertain future event occurs, or if the past event or transaction causes a current obligation but resources are not likely to flow out of the Group, or if an amount required to perform the current obligation cannot be reliably estimated, the Group recognizes a contingent liability and discloses it in Note 15.

Functional currency and foreign currency translation

The Group's consolidated financial statements are presented in Korean won, which is the Group's functional currency. Transactions in foreign currencies are initially recorded by the Group at the functional currency spot rates at the date the transaction first qualifies for recognition. Monetary assets and liabilities denominated in foreign currencies are translated at the functional currency spot rate of exchange at the reporting date. Differences arising on settlement or translation of monetary assets and liabilities are recognized in profit or loss. Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rates as at the dates of the initial transactions. Non-monetary items measured at fair value in a foreign currency are translated using the exchange rates at the dates when the fair value is determined. The gain or loss arising on translation of non-monetary items is treated in line with the recognition of gain or loss on change in fair value of the item (i.e. translation differences on items whose fair value gain or loss is recognized in OCI or profit or loss are also recognized in OCI or profit or loss, respectively).

Income taxes

Current income tax

Current income tax assets and liabilities for the current period are measured at the amount expected to be recovered from, or paid to, the taxation authorities. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted, at the reporting date in the countries where the Group operates and generates taxable income.

Current income tax relating to items recognized directly in equity is recognized in equity and not in the consolidated statement of comprehensive income. Management periodically evaluates positions taken in the tax returns with respect to situations in which applicable tax regulations are subject to interpretation and establishes provisions where appropriate.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Deferred tax
Deferred tax is provided using the liability method on temporary differences between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes at the reporting date.

Deferred tax liabilities are recognized for all taxable temporary differences, except:

- When the deferred tax liability arises from the initial recognition of goodwill or an asset or liability in a transaction that is not a business combination and, at the time of the transaction, affects neither the accounting profit nor taxable profit or loss
- In respect of taxable temporary differences associated with investments in subsidiaries, associates and interests in joint ventures, when the timing of the reversal of the temporary differences can be controlled and it is probable that the temporary differences will not reverse in the foreseeable future

Deferred tax assets are recognized for all deductible temporary differences, the carry forward of unused tax credits and any unused tax losses. Deferred tax assets are recognized to the extent that it is probable that taxable profit will be available against which the deductible temporary differences, the carry forward of unused tax credits and unused tax losses can be utilized, except:

- When the deferred tax asset relating to the deductible temporary difference arises from the initial recognition of an asset or liability in a transaction that is not a business combination and, at the time of the transaction, affects neither the accounting profit nor taxable profit or loss
- In respect of deductible temporary differences associated with investments in subsidiaries, associates and interests in joint ventures, deferred tax assets are recognized only to the extent that it is probable that the temporary differences will reverse in the foreseeable future and taxable profit will be available against which the temporary differences can be utilized

The carrying amount of deferred tax assets is reviewed at each reporting date and reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow all or part of the deferred tax asset to be utilized. Unrecognized deferred tax assets are re-assessed at each reporting date and are recognized to the extent that it has become probable that future taxable profits will allow the deferred tax assets to be recovered.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the year when the asset is realized or the liability is settled, based on the tax rates (and tax laws) that have been enacted or substantively enacted at the reporting date.

Deferred tax relating to items recognized outside profit or loss is recognized outside profit or loss. Deferred tax items are recognized in correlation to the underlying transaction either in OCI or directly in equity.

Deferred tax assets and deferred tax liabilities are offset if a legally enforceable right exists to set off current tax assets against current tax liabilities and the deferred taxes relate to the same taxable entity and the same taxation authority.

Earnings per share
Basic earnings per share are calculated by dividing profit for the year attributable to owners of the parent by the weighted-average number of ordinary shares outstanding during the year.

Emission rights and emission liabilities
The Group is allocated emission allowances free of charge by the government in accordance with the Act on Allocation and Trading of Emission Allowances in the Republic of Korea. The emission allowances are allocated to the Group annually for the planned periods, and the Group is to deliver the equivalent quantity of emission allowances for actual emissions to the government.

The Group measures the emission allowances that it receives from the government free of charge at nil, and measures any purchased emission allowances at cost.

In addition, emission allowances are derecognized in the consolidated statement of financial position when they are delivered to the government or sold.

2. Basis of preparation and summary of significant accounting policies (cont'd)

A liability (emission obligation) is recognized only where actual emissions exceed the allocated emission allowances, and the cost of emissions is recognized as an operating cost. The liability is measured by adding the following (1) and (2).

(1) The carrying value of emission allowances for the year to be delivered to the government
(2) The best estimate of expenditures, as at the end of a reporting period, in performing emission obligations exceeding the above emission allowances

Where the Group borrows a part of the allocated emission allowances for any of future periods to deliver to the government, it recognizes the borrowed portion as deferred revenue when derecognizing the liability, and offsets the deferred revenue against the actual cost of emission, as it purchases the emission allowances to fill any shortfall in the period which the borrowed emission allowances belong to.

Significant accounting judgments, estimates and assumptions
The preparation of the Group's consolidated financial statements requires management to make judgments, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities, and the disclosure of contingent liabilities, at the end of the reporting period. However, uncertainty about these assumptions and estimates could result in outcomes that require a material adjustment to the carrying amount of the asset or liability in future periods.

The key assumptions concerning the future and other key sources of estimation uncertainty at the reporting date, that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year, are described below.

Defined benefit liabilities
The cost of the defined benefit pension plan and the present value of the pension obligation are determined using actuarial valuations. An actuarial valuation involves making various assumptions that may differ from actual developments in the future. These include the determination of the discount rate, future salary increases and mortality rates. Due to the complexity of the valuation, the underlying assumptions and its long-term nature, a defined benefit obligation is highly sensitive to changes in these assumptions. All assumptions are reviewed at each reporting date.

Fair value of financial instruments
When the fair value of financial assets and financial liabilities recorded in the consolidated statement of financial position cannot be derived from active markets, their fair value is determined using valuation techniques including the discounted cash flow model. The inputs to these models are taken from observable markets where possible, but where this is not feasible, a degree of judgment is required in establishing fair values. The judgments include considerations of inputs such as liquidity risk, credit risk and volatility. Changes in assumptions about these factors could affect the reported fair value of financial instruments.

Determining the lease term of contracts with renewal and termination options – Group as lessee
The Group determines the lease term as the non-cancellable term of the lease, together with any periods covered by an option to extend the lease if it is reasonably certain to be exercised, or any periods covered by an option to terminate the lease, if it is reasonably certain not to be exercised.

The Group has several lease contracts that include extension and termination options. The Group applies judgment in evaluating whether it is reasonably certain whether or not to exercise the option to renew or terminate the lease. That is, it considers all relevant factors that create an economic incentive for it to exercise either the renewal or termination. After the commencement date, the Group reassesses the lease term if there is a significant event or change in circumstances that is within its control and affects its ability to exercise or not to exercise the option to renew or to terminate (e.g., construction of significant leasehold improvements or significant customization to the leased asset).

2. Basis of preparation and summary of significant accounting policies (cont'd)

Application of amended standards
The accounting policies adopted are consistent with those of the previous financial year, except for the following amendments to KIFRS:

KIFRS 1116 Leases
KIFRS 1116 supersedes KIFRS 1017 *Leases*, KIFRS 2104 *Determining whether an Arrangement contains a Lease*, KIFRS 2015 *Operating Leases-Incentives* and KIFRS 2027 *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*. The standard sets out the principles for the recognition, measurement, presentation and disclosure of leases and requires lessees to recognize most leases on the balance sheet.

Lessor accounting under KIFRS 1116 is substantially unchanged from KIFRS 1017. Lessors will continue to classify leases as either operating or finance leases using similar principles as in KIFRS 1017. Therefore, KIFRS 1116 does not have an impact for leases where the Group is the lessor.

The Group adopted KIFRS 1116 using the modified retrospective method of adoption, with the date of initial application of January 1, 2019. Under this method, the standard is applied retrospectively with the cumulative effect of initially applying the standard recognized as an adjustment to the opening balance of retained earnings at the date of initial application. The Group did not elect to use the transition practical expedient to not reassess whether a contract is, or contains, a lease at January 1, 2019.

The effect of adopting KIFRS 1116 is, as follows:

Impact on the consolidated statement of financial position (increase/(decrease)) is as follows (Korean won in millions):

		Amount
Assets:		
Right-of-use assets (*1)	₩	21,123
Facility use right (*2)		(17,218)
Prepaid expenses		(556)
Total assets		3,349
Liabilities:		
Lease liabilities		3,349
Impact on net asset	₩	-

(*1) Right-of-use assets are recognized in other property, plant and equipment.
(*2) Facility use right is reclassified as right-of-use assets from intangible assets.

There was no significant impact on profit for the year, cash flows, other comprehensive income and basic and diluted earnings per share.

The Group has lease contracts for various items of plant, machinery, vehicles and other equipment. Before the adoption of KIFRS 1116, the Group classified each of its leases (as lessee) at the inception date as either a finance lease or an operating lease.

Upon adoption of KIFRS 1116, the Group applied a single recognition and measurement approach for all leases except for short-term leases and leases of low-value assets. The standard provides specific transition requirements and practical expedients, which have been applied by the Group.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Leases previously classified as operating leases
The Group recognized right-of-use assets and lease liabilities for those leases previously classified as operating leases, except for short-term leases and leases of low-value assets. The right-of-use assets for most leases were recognized based on the carrying amount as if the standard had always been applied, apart from the use of incremental borrowing rate at the date of initial application. In some leases, the right-of-use assets were recognized based on the amount equal to the lease liabilities, adjusted for any related prepaid and accrued lease payments previously recognized. Lease liabilities were recognized based on the present value of the remaining lease payments, discounted using the incremental borrowing rate at the date of initial application.

The lease liabilities as of January 1, 2019 can be reconciled to the operating lease commitments as of December 31, 2018, as follows (Korean won in millions):

Assets:		
Operating lease commitments as of December 31, 2018	₩	17,798
Weighted average incremental borrowing rate as of January 1, 2019		2.15%
Discounted operating lease commitments as of January 1, 2019		14,449
Less:		
Commitments relating to short-term leases		(9,336)
Commitments relating to leases of low-value assets		(1,764)
Lease liabilities as of January 1, 2019	₩	3,349

The Group also applied the available practical expedients wherein it:

- Used a single discount rate to a portfolio of leases with reasonably similar characteristics
- Relied on its assessment of whether leases are onerous immediately before the date of initial application
- Applied the short-term leases exemptions to leases with lease term that ends within 12 months of the date of initial application
- Excluded the initial direct costs from the measurement of the right-of-use asset at the date of initial application
- Used hindsight in determining the lease term where the contract contained options to extend or terminate the lease

Based on the above, as of January 1, 2019:

- Right-of-use assets of ₩21,123 million were recognized and presented as other property, plant and equipment in the consolidated statement of financial position.
- Facility use right of ₩17,218 million classified in intangible assets were reclassified as right-of-use assets.
- Additional lease liabilities of ₩3,349 million was recognized.
- Prepaid expenses of ₩556 million was reclassified as right-of-use assets.

2. Basis of preparation and summary of significant accounting policies (cont'd)

KIFRS 2123 ***Uncertainty over Income Tax Treatment***
The Interpretation addresses the accounting for income taxes when tax treatments involve uncertainty that affects the application of KIFRS 1012 *Income Taxes*. It does not apply to taxes or levies outside the scope of KIFRS 1012, nor does it specifically include requirements relating to interest and penalties associated with uncertain tax treatments. The Interpretation specifically addresses the following:

- Whether an entity considers uncertain tax treatments separately
- The assumptions an entity makes about the examination of tax treatments by taxation authorities
- How an entity determines taxable profit (tax loss), tax bases, unused tax losses, unused tax credits and tax rates
- How an entity considers changes in facts and circumstances

The Group determines whether to consider each uncertain tax treatment separately or together with one or more other uncertain tax treatments and uses the approach that better predicts the resolution of the uncertainty. The Group applies significant judgement in identifying uncertainties over income tax treatments. Since the Group operates in a complex multinational environment, it assessed whether the Interpretation had an impact on its consolidated financial statements.

Upon adoption of the Interpretation, the Group considered whether it has any uncertain tax positions, particularly those relating to transfer pricing. The Company's and the subsidiaries' tax filings in different jurisdictions include deductions related to transfer pricing and the taxation authorities may challenge those tax treatments. The Group determined, based on its tax compliance and transfer pricing study, that it is probable that its tax treatments (including those for the subsidiaries) will be accepted by the taxation authorities. The Interpretation did not have an impact on the consolidated financial statements of the Group.

Amendments to KIFRS 1109: ***Prepayment Features with Negative Compensation***
Under KIFRS 1109, a debt instrument can be measured at amortized cost or at fair value through other comprehensive income, provided that the contractual cash flows are 'solely payments of principal and interest on the principal amount outstanding' (the SPPI criterion) and the instrument is held within the appropriate business model for that classification. The amendments to KIFRS 1109 clarify that a financial asset passes the SPPI criterion regardless of an event or circumstance that causes the early termination of the contract and irrespective of which party pays or receives reasonable compensation for the early termination of the contract. These amendments had no impact on the consolidated financial statements of the Group.

Amendments to KIFRS 1019: ***Plan Amendment, Curtailment or Settlement***
The amendments to KIFRS 1019 address the accounting when a plan amendment, curtailment or settlement occurs during a reporting period. The amendments specify that when a plan amendment, curtailment or settlement occurs during the annual reporting period, an entity is required to determine the current service cost for the remainder of the period after the plan amendment, curtailment or settlement, using the actuarial assumptions used to remeasure the net defined benefit liability (asset) reflecting the benefits offered under the plan and the plan assets after that event. An entity is also required to determine the net interest for the remainder of the period after the plan amendment, curtailment or settlement using the net defined benefit liability (asset) reflecting the benefits offered under the plan and the plan assets after that event, and the discount rate used to remeasure that net defined benefit liability (asset). The amendments had no impact on the consolidated financial statements of the Group as it did not have any plan amendments, curtailments, or settlements during the period.

Amendments to KIFRS 1028: ***Long-term interests in associates and joint ventures***
The amendments clarify that an entity applies KIFRS 1109 to long-term interests in an associate or joint venture to which the equity method is not applied but that, in substance, form part of the net investment in the associate or joint venture (long-term interests). This clarification is relevant because it implies that the expected credit loss model in KIFRS 1109 applies to such long-term interests.

The amendments also clarified that, in applying KIFRS 1109, an entity does not take account of any losses of the associate or joint venture, or any impairment losses on the net investment, recognized as adjustments to the net investment in the associate or joint venture that arise from applying KIFRS 1028 *Investments in Associates and Joint Ventures*. These amendments had no impact on the consolidated financial statements as the Group does not have long-term interests in its associate and joint venture.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Annual Improvements 2015-2017 Cycle

KIFRS 1103 *Business Combinations*
The amendments clarify that, when an entity obtains control of a business that is a joint operation, it applies the requirements for a business combination achieved in stages, including remeasuring previously held interests in the assets and liabilities of the joint operation at fair value. In doing so, the acquirer remeasures its entire previously held interest in the joint operation.

An entity applies those amendments to business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after January 1, 2019, with early application permitted.

These amendments had no impact on the consolidated financial statements of the Group as there is no transaction where joint control is obtained.

KIFRS 1111 *Joint Arrangements*
An entity 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 as defined in KIFRS 1103. The amendments clarify that the previously held interests in that joint operation are not remeasured.

An entity applies those amendments to transactions in which it obtains joint control on or after the beginning of the first annual reporting period beginning on or after January 1, 2019, with early application permitted.

These amendments had no impact on the consolidated financial statements of the Group as there is no transaction where a joint control is obtained.

KIFRS 1012 *Income Taxes*
The amendments clarify that the income tax consequences of dividends are linked more directly to past transactions or events that generated distributable profits than to distributions to owners. Therefore, an entity recognizes the income tax consequences of dividends in profit or loss, other comprehensive income or equity according to where it originally recognized those past transactions or events.

An entity applies the amendments for annual reporting periods beginning on or after January 1, 2019, with early application permitted. When the entity first applies those amendments, it applies them to the income tax consequences of dividends recognized on or after the beginning of the earliest comparative period.

Since the Group's current practice is in line with these amendments, they had no impact on the consolidated financial statements of the Group.

KIFRS 1023 *Borrowing Costs*
The amendments clarify that an entity treats as part of general borrowings any borrowing originally made to develop a qualifying asset when substantially all of the activities necessary to prepare that asset for its intended use or sale are complete.

The entity applies the amendments to borrowing costs incurred on or after the beginning of the annual reporting period in which the entity first applies those amendments. An entity applies those amendments for annual reporting periods beginning on or after January 1, 2019, with early application permitted.

Since the Group's current practice is in line with these amendments, they had no impact on the consolidated financial statements of the Group.

2. Basis of preparation and summary of significant accounting policies (cont'd)

Standards issued but not yet effective

The accounting policies adopted are consistent with those of the previous financial year, except for the following amendments to KIFRS:

Amendments to KIFRS 1103: *Definition of a Business*
In October 2018, the IASB issued amendments to the definition of a business in KIFRS 1103 *Business Combinations* to help entities determine whether an acquired set of activities and assets is a business or not. They clarify the minimum requirements for a business, remove the assessment of whether market participants are capable of replacing any missing elements, add guidance to help entities assess whether an acquired process is substantive, narrow the definitions of a business and of outputs, and introduce an optional fair value concentration test. New illustrative examples were provided along with the amendments.

Since the amendments apply prospectively to transactions or other events that occur on or after the date of first application, the Group will not be affected by these amendments on the date of transition.

Amendments to KIFRS 1001 and KIFRS 1008: *Definition of Material*
In October 2018, the IASB issued amendments to KIFRS 1001 *Presentation of Financial Statements* and KIFRS 1008 *Accounting Policies, Changes in Accounting Estimates and Errors* to align the definition of 'material' across the standards and to clarify certain aspects of the definition. The new definition states that, 'Information is material if omitting, misstating or obscuring it could reasonably be expected to influence decisions that the primary users of general-purpose financial statements make on the basis of those financial statements, which provide financial information about a specific reporting entity.'

The amendments to the definition of material is not expected to have a significant impact on the Group's consolidated financial statements.

3. Financial instruments

Financial assets as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019				
	Financial assets at FVTPL	Financial assets at amortized cost	Financial assets at FVOCI	Financial assets designated as hedges	Total
Current assets:					
Cash and cash equivalents	₩ -	₩ 368,644,460	₩ -	₩ -	₩ 368,644,460
Trade and other accounts receivable:					
Trade accounts receivable	-	692,692,503	-	-	692,692,503
Other accounts receivable	197,173	107,903,920	-	27,088,393	135,189,486
Accrued income	-	21,390	-	-	21,390
Guarantee deposits	-	112,921	-	-	112,921
	197,173	1,169,375,194	-	27,088,393	1,196,660,760
Non-current assets:					
Long-term investment securities	-	194,515	11,973,100	-	12,167,615
Long-term loans	-	262,976	-	-	262,976
Long-term accounts receivable:					
Refundable deposits	-	3,788,023	-	-	3,788,023
Other non-current assets:					
Long-term financial instruments	-	15,500	-	-	15,500
	-	4,261,014	11,973,100	-	16,234,114
	₩ 197,173	₩ 1,173,636,208	₩ 11,973,100	₩ 27,088,393	₩ 1,212,894,874

3. Financial instruments (cont'd)

	2018				
	Financial assets at FVTPL	Financial assets at amortized cost	Financial assets at FVOCI	Financial assets designated as hedges	Total
Current assets:					
Cash and cash equivalents	₩ -	₩ 259,217,545	₩ -	₩ -	₩ 259,217,545
Trade and other accounts receivable:					
Trade accounts receivable	-	816,791,857	-	-	816,791,857
Other accounts receivable	25,509,618	112,926,897	-	407,755	138,844,270
Accrued income	-	225,524	-	-	225,524
Guarantee deposits	-	18,685	-	-	18,685
	25,509,618	1,189,180,508	-	407,755	1,215,097,881
Non-current assets:					
Long-term investment securities	-	236,800	11,973,087	-	12,209,887
Long-term loans	-	454,040	-	-	454,040
Long-term accounts receivable:					
Refundable deposits	-	3,181,510	-	-	3,181,510
Other non-current assets:					
Long-term financial instruments	-	15,500	-	-	15,500
	-	3,887,850	11,973,087	-	15,860,937
	₩ 25,509,618	₩ 1,193,068,358	₩ 11,973,087	₩ 407,755	₩ 1,230,958,818

Financial liabilities as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019			
	Financial liabilities at FVTPL	Financial liabilities designated as hedges	Financial liabilities at amortized cost	Total
Current liabilities:				
Trade and other accounts payable:				
Trade accounts payable	₩ -	₩ -	₩ 593,413,528	₩ 593,413,528
Other accounts payable	11,743,456	2,420,571	165,152,513	179,316,540
Accrued expenses	-	-	57,417,609	57,417,609
Deposits withheld	-	-	99,300	99,300
Short-term borrowings	-	-	134,025,577	134,025,577
Current portion of bonds payable and long-term borrowings	-	-	424,291,143	424,291,143
	11,743,456	2,420,571	1,374,399,670	1,388,563,697
Non-current liabilities:				
Bonds payable	-	-	1,736,815,858	1,736,815,858
Long-term borrowings	-	-	290,137,226	290,137,226
	-	-	2,026,953,084	2,026,953,084
	₩ 11,743,456	₩ 2,420,571	₩ 3,401,352,754	₩ 3,415,516,781

3. Financial instruments (cont'd)

	2018			
	Financial liabilities at FVTPL	Financial liabilities designated as hedges	Financial liabilities at amortized costs	Total
Current liabilities:				
Trade and other accounts payable:				
Trade accounts payable	₩ -	₩ -	₩ 433,682,621	₩ 433,682,621
Other accounts payable	2,197,213	1,403,527	129,720,974	133,321,714
Accrued expenses	-	-	109,246,788	109,246,788
Deposits withheld	-	-	99,300	99,300
Short-term borrowings	-	-	122,334,402	122,334,402
Current portion of bonds payable and long-term borrowings	-	-	544,849,221	544,849,221
	2,197,213	1,403,527	1,339,933,306	1,343,534,046
Non-current liabilities:				
Bonds payable	-	-	937,293,715	937,293,715
Long-term borrowings	-	-	640,000,000	640,000,000
Long-term accounts payable	-	-	382,413	382,413
	-	-	1,577,676,128	1,577,676,128
	₩ 2,197,213	₩ 1,403,527	₩ 2,917,609,434	₩ 2,921,210,174

Gains or losses by financial instrument for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019				
	Financial assets		Financial liabilities		
	Financial assets at FVTPL	Financial assets at amortized cost	Financial liabilities at FVTPL	Other financial liabilities	Total
Interest income	₩ -	₩ 4,306,862	₩ -	₩ -	₩ 4,306,862
Interest expenses	-	-	-	(46,162,993)	(46,162,993)
Gain (loss) on valuation of derivative instruments	197,173	-	(11,743,456)	-	(11,546,283)
Gain (loss) on settlement of derivative instruments	78,312,485	-	(88,256,956)	-	(9,944,471)

	2018				
	Financial assets		Financial liabilities		
	Financial assets at FVTPL	Financial assets at amortized cost	Financial liabilities at FVTPL	Other financial liabilities	Total
Interest income	₩ -	₩ 3,973,095	₩ -	₩ -	₩ 3,973,095
Interest expenses	-	-	-	(47,416,132)	(47,416,132)
Gain (loss) on valuation of derivative instruments	25,509,618	-	(2,197,213)	-	23,312,405
Gain (loss) on settlement of derivative instruments	135,992,962	-	(92,462,238)	-	43,530,724

Above gains or losses include selling and administrative expenses and finance income (costs) arising from the financial assets and liabilities.

3. Financial instruments (cont'd)

Set out below, is a comparison by class of the carrying amounts and fair value of the Group's financial instruments (Korean won in thousands):

	2019		2018	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets:				
Cash and cash equivalents	₩ 368,644,460	₩ 368,644,460	₩ 259,217,545	₩ 259,217,545
Trade and other accounts receivable:				
Trade accounts receivable	692,692,503	692,692,503	816,791,857	816,791,857
Other accounts receivable (derivative assets)	27,285,566	27,285,566	25,917,373	25,917,373
Other accounts receivable	107,903,920	107,903,920	112,926,897	112,926,897
Accrued income	21,390	21,390	225,524	225,524
Guarantee deposits	112,921	112,921	18,685	18,685
Long-term investment securities	12,167,615	12,167,615	12,209,887	12,209,887
Long-term loans	262,976	262,976	454,040	454,040
Long-term accounts receivable:				
Refundable deposits	3,788,023	3,788,023	3,181,510	3,181,510
Other non-current assets:				
Long-term financial instruments	15,500	15,500	15,500	15,500
	₩ 1,212,894,874	₩ 1,212,894,874	₩ 1,230,958,818	₩ 1,230,958,818

	2019		2018	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial liabilities:				
Trade and other accounts payable:				
Trade accounts payable	₩ 593,413,528	₩ 593,413,528	₩ 433,682,621	₩ 433,682,621
Other accounts payable (derivative liabilities)	14,164,027	14,164,027	3,600,740	3,600,740
Other accounts payable	165,152,513	165,152,513	129,720,974	129,720,974
Accrued expenses	57,417,609	57,417,609	109,246,788	109,246,788
Deposits withheld	99,300	99,300	99,300	99,300
Short-term borrowings	134,025,577	134,025,577	122,334,402	122,334,402
Current portion of bonds payable and long-term borrowings	424,291,143	424,291,143	544,849,221	544,849,221
Bonds payable	1,736,815,858	1,736,815,858	937,293,715	937,293,715
Long-term borrowings	290,137,226	290,137,226	640,000,000	640,000,000
Long-term accounts payable	-	-	382,413	382,413
	₩ 3,415,516,781	₩ 3,415,516,781	₩ 2,921,210,174	₩ 2,921,210,174

3. Financial instruments (cont'd)

The fair value of the financial assets and liabilities is included at the amount at which the instrument could be exchanged in a current transaction between willing parties, other than in a forced or liquidation sale. The following methods and assumptions were used to estimate the fair values:

- The Group enters into derivative financial instruments with various counterparties, principally financial institutions with investment grade credit ratings. Derivatives valued using valuation techniques with market observable inputs are mainly interest rate swaps and foreign exchange forward contracts. The most frequently applied valuation techniques include forward pricing and swap models, using present value calculations. The models incorporate various inputs including the credit quality of counterparties, foreign exchange spot and forward rates, interest rate curves and forward rate curves of the underlying asset.
- The Group applied discount cash flow method, discounting future cash flows by appropriate discount rate to evaluate long-term investment securities

The management assessed that the book value of financial instruments approximates their respective fair value except for derivative financial instruments.

The levels of fair value measurements of financial instruments as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019			
	Level 1	Level 2	Level 3	Total
Assets and liabilities measured at fair value:				
Derivative assets (other accounts receivable)	₩ -	₩ 27,285,566	₩ -	₩ 27,285,566
Derivative liabilities (other accounts payable)	-	14,164,027	-	14,164,027
Long-term investment securities	-	-	11,973,100	11,973,100
Assets and liabilities for which fair values are disclosed:				
Cash and cash equivalents	13,144	368,631,316	-	368,644,460
Trade accounts receivable	-	-	692,692,503	692,692,503
Other accounts receivable	-	-	107,903,920	107,903,920
Accrued income	-	-	21,390	21,390
Guarantee deposits	-	-	112,921	112,921
Long-term investment securities	-	-	194,515	194,515
Long-term loans	-	-	262,976	262,976
Refundable deposits	-	-	3,788,023	3,788,023
Long-term financial instruments	-	15,500	-	15,500
Trade accounts payable	-	-	593,413,528	593,413,528
Other accounts payable	-	-	165,152,513	165,152,513
Accrued expenses	-	-	57,417,609	57,417,609
Deposits withheld	-	-	99,300	99,300
Short-term borrowings	-	134,025,577	-	134,025,577
Current portion of bonds payable and long-term borrowings	-	424,291,143	-	424,291,143
Bonds payable	-	1,736,815,858	-	1,736,815,858
Long-term borrowings	-	290,137,226	-	290,137,226

3. Financial instruments (cont'd)

	2018			
	Level 1	Level 2	Level 3	Total
Assets and liabilities measured at fair value:				
Derivative assets (other accounts receivable)	₩ -	₩ 25,917,373	₩ -	₩ 25,917,373
Derivative liabilities (other accounts payable)	-	3,600,740	-	3,600,740
Long-term investment securities	-	-	11,973,087	11,973,087
Assets and liabilities for which fair values are disclosed:				
Cash and cash equivalents	24,868	259,192,677	-	259,217,545
Trade accounts receivable	-	-	816,791,857	816,791,857
Other accounts receivable	-	-	112,926,897	112,926,897
Accrued income	-	-	225,524	225,524
Guarantee deposits	-	-	18,685	18,685
Long-term investment securities	-	-	236,800	236,800
Long-term loans	-	-	454,040	454,040
Refundable deposits	-	-	3,181,510	3,181,510
Long-term financial instruments	-	15,500	-	15,500
Trade accounts payable	-	-	433,682,621	433,682,621
Other accounts payable	-	-	129,720,974	129,720,974
Accrued expenses	-	-	109,246,788	109,246,788
Deposits withheld	-	-	99,300	99,300
Short-term borrowings	-	122,334,402	-	122,334,402
Current portion of bonds payable and long-term borrowings	-	544,849,221	-	544,849,221
Bonds payable	-	937,293,715	-	937,293,715
Long-term borrowings	-	640,000,000	-	640,000,000
Long-term accounts payable	-	-	382,413	382,413

For the years ended December 31, 2019 and 2018, there have been no transfers between level 1 and level 2 fair value measurements. Derivatives assets and liabilities that the Group holds are over-the-counter derivatives and are included in level 2 as all of the significant inputs used in the fair value measurement are directly or indirectly observable.

Restricted deposits as of December 31, 2019 and 2018 consist of the following (Korean won in thousands):

	2019	2018	Description
Long-term financial instruments	₩ 15,500	₩ 15,500	Deposits for maintenance of checking accounts

4. Trade and other accounts receivable, net

Trade and other accounts receivable as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019		
	Costs	Allowance for doubtful accounts	Net book value
Trade accounts receivable	₩ 693,347,043	₩ (654,540)	₩ 692,692,503
Other receivables (*)	139,374,796	-	139,374,796
	₩ 832,721,839	₩ (654,540)	₩ 832,067,299

	2018		
	Costs	Allowance for doubtful accounts	Net book value
Trade accounts receivable	₩ 817,831,096	₩ (1,039,239)	₩ 816,791,857
Other receivables (*)	142,724,029	-	142,724,029
	₩ 960,555,125	₩ (1,039,239)	₩ 959,515,886

(*) Other receivables consist of other accounts receivable, accrued income, long-term loans, guarantee deposits and refundable deposits.

The Group has established a credit rating and credit limit system to estimate allowance for doubtful accounts by credit rating of customers. The allowance for doubtful account is established at the range from 1% to 5% of the balances of trade receivables by credit ratings, excluding transaction with subsidiaries of Hanwha Group and Total Group, government-owned companies, and major conglomerates (Samsung, Hyundai Motors, SK, LG, Lotte, etc.). For bad debts, 20% ~ 100% of the balances of trade receivables are established as an allowance for doubtful accounts by considering factors such as collaterals and the status of customers (court receivership, composition and default). Receivables for which credit enhancement has been made by commercial insurance, payment guarantees, and letters of credit are excluded from the allowance for doubtful accounts.

A reversal of allowance for doubtful accounts included in selling and administrative expenses amounted to ₩43,765 thousand and ₩16,295 thousand for the years ended December 31, 2019 and 2018, respectively.

The aging analysis of trade and other accounts receivable as of December 31, 2019 and 2018 is as follows (Korean won in thousands):

	2019					
	Neither past due	Past due but not impaired				
	nor impaired	Within 90 days	91 – 180 days	Over 180 days	Impaired	Total
Trade accounts receivable	₩ 689,687,572	₩ 2,785,956	₩ 75,412	₩ 143,563	₩ 654,540	₩ 693,347,042
Other receivables (*)	112,089,230	-	-	-	-	112,089,230
	₩ 801,776,802	₩ 2,785,956	₩ 75,412	₩ 143,563	₩ 654,540	₩ 805,436,272

(*) Financial assets at FVTPL relating to derivative instruments, such as forward currency contracts, are excluded from other receivables.

	2018					
	Neither past due	Past due but not impaired				
	nor impaired	Within 90 days	91 – 180 days	Over 180 days	Impaired	Total
Trade accounts receivable	₩ 798,869,795	₩ 17,493,607	₩ 58,623	₩ 369,832	₩ 1,039,239	₩ 817,831,096
Other receivables (*)	116,806,656	-	-	-	-	116,806,656
	₩ 915,676,451	₩ 17,493,607	₩ 58,623	₩ 369,832	₩ 1,039,239	₩ 934,637,752

(*) Financial assets at FVTPL relating to derivative instruments, such as forward currency contracts, are excluded from other receivables.

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4. Trade and other accounts receivable, net (cont'd)

The Group discounted trade accounts receivable pursuant to export bill discount agreements entered into with various financial institutions during the years ended December 31, 2019 and 2018. As the Group retains the risks and rewards relating to the provision of trade accounts receivable, the Group continues to recognize the discounted trade accounts receivable in its consolidated statements of financial position and recognizes short-term borrowings for the consideration received (See Note 10).

Discounted trade accounts receivable as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Book value:		
Discounted trade accounts receivable	₩ 56,063,210	₩ 44,912,075
Related short-term borrowings	56,063,210	44,912,075

There is no significant difference between the book value and fair value of discounted trade accounts receivable and related short-term borrowings, respectively.

5. Inventories

Inventories as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019		
	Costs	Valuation allowance	Net book value
Finished goods	₩ 241,592,835	₩ (3,908,446)	₩ 237,684,389
Semi-finished goods	127,752,066	(1,086,090)	126,665,976
Raw materials	219,847,138	-	219,847,138
Sub-materials	10,122,461	-	10,122,461
Supplies	112,632,819	-	112,632,819
By-products	54,713,782	-	54,713,782
Materials-in-transit	470,656,091	-	470,656,091
	₩ 1,237,317,192	₩ (4,994,536)	₩ 1,232,322,656

	2018		
	Costs	Valuation allowance	Net book value
Finished goods	₩ 314,377,951	₩ (21,468,402)	₩ 292,909,549
Semi-finished goods	144,289,120	(28,226,643)	116,062,477
Raw materials	315,634,834	-	315,634,834
Sub-materials	10,364,693	-	10,364,693
Supplies	96,248,593	-	96,248,593
By-products	52,869,975	(1,336,430)	51,533,545
Materials-in-transit	527,689,435	-	527,689,435
	₩ 1,461,474,601	₩ (51,031,475)	₩ 1,410,443,126

Loss (reversal of loss) on valuation of inventories included in cost of goods sold amounted to ₩(46,036,939) thousand and ₩49,825,165 thousand for the years ended December 31, 2019 and 2018, respectively.

6. Long-term investments securities

Long-term investments securities of the Group as of December 31, 2019 and 2018 are as following (Korean won in thousands):

	2019		2018
	Acquisition cost	Book value	Book value
Financial assets at FVOCI:			
Non-listed equity investments, etc.	₩ 11,973,100	₩ 11,973,100	₩ 11,973,087
Financial assets at amortized cost:			
National bonds	194,515	194,515	236,800
	₩ 12,167,615	₩ 12,167,615	₩ 12,209,887

7. Property, plant and equipment, net

The acquisition costs and net book value of property, plant and equipment as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019		
	Cost	Accumulated depreciation	Book value
Land	₩ 278,782,675	₩ -	₩ 278,782,675
Buildings	256,339,972	(63,576,648)	192,763,324
Structures	1,004,377,047	(371,362,909)	633,014,138
Machinery and equipment	5,095,973,361	(2,519,445,873)	2,576,527,488
Vehicles	12,082,193	(8,848,840)	3,233,353
Others	407,684,447	(239,468,095)	168,216,352
Construction-in-progress	665,286,483	-	665,286,483
	₩ 7,720,526,178	₩ (3,202,702,365)	₩ 4,517,823,813

	2018		
	Cost	Accumulated depreciation	Book value
Land	₩ 278,143,664	₩ -	₩ 278,143,664
Buildings	243,349,276	(56,588,968)	186,760,308
Structures	981,117,345	(337,552,364)	643,564,981
Machinery and equipment	4,525,182,525	(2,276,976,063)	2,248,206,462
Vehicles	15,927,289	(11,667,294)	4,259,995
Others	282,411,930	(185,005,915)	97,406,015
Construction-in-progress	621,570,544	-	621,570,544
	₩ 6,947,702,573	₩ (2,867,790,604)	₩ 4,079,911,969

Changes in the net book value of property, plant and equipment for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019					
	Jan. 1	Acquisitions	Disposals	Transfers (*)	Depreciation	Dec. 31
Land	₩ 278,143,664	₩ -	₩ -	₩ 639,011	₩ -	₩ 278,782,675
Buildings	186,760,308	28,917	(87,240)	13,050,760	(6,989,421)	192,763,324
Structures	643,564,981	32,752	-	23,326,611	(33,910,206)	633,014,138
Machinery and equipment	2,248,206,462	160,020	(6,243,039)	605,588,553	(271,184,508)	2,576,527,488
Vehicles	4,259,995	161,663	(550,395)	867,525	(1,505,435)	3,233,353
Others	97,406,015	4,497,548	(1,836,588)	122,976,904	(54,827,527)	168,216,352
Construction-in-progress	621,570,544	781,548,239	-	(737,832,300)	-	665,286,483
	₩ 4,079,911,969	₩ 786,429,139	₩ (8,717,262)	₩ 28,617,064	₩ (368,417,097)	₩ 4,517,823,813

(*) These transfers relate to construction-in-progress that was reclassified to property, plant and equipment and intangible assets, exchange rate effects and the recognition of right-of-use assets in accordance with KIFRS 1116 (See Note 8 and 9).

7. Property, plant and equipment, net (cont'd)

	2018					
	Jan. 1	Acquisitions	Disposals	Transfers (*)	Depreciation	Dec. 31
Land	₩ 277,187,470	₩ 3,660	₩ (912)	₩ 953,446	₩ -	₩ 278,143,664
Buildings	173,543,961	2,165,837	(3,011,805)	20,578,447	(6,516,132)	186,760,308
Structures	654,927,531	37,768	(30,512)	22,018,008	(33,387,814)	643,564,981
Machinery and equipment	2,351,652,269	25,462	(3,072,102)	166,986,465	(267,385,632)	2,248,206,462
Vehicles	1,710,417	18,470	(32,910)	3,743,392	(1,179,374)	4,259,995
Others	119,209,786	2,759,803	(1,648,770)	24,306,315	(47,221,119)	97,406,015
Construction-in-progress	325,787,040	549,708,880	-	(253,925,376)	-	621,570,544
	₩ 3,904,018,474	₩ 554,719,880	₩ (7,797,011)	₩ (15,339,303)	₩ (355,690,071)	₩ 4,079,911,969

(*) These transfers relate to construction-in-progress that was reclassified to property, plant and equipment and intangible assets and exchange rate effects (See Note 9).

Capitalization of borrowing costs

Borrowing costs capitalized as part of property, plant and equipment amounted to ₩17,627,370 thousand and ₩10,608,883 thousand for the years ended December 31, 2019 and 2018, respectively. Capitalization interest rate is 2.58% and 2.90% for the years ended December 31, 2019 and 2018, respectively.

8. Leases

Set out below are the carrying amounts of lease liabilities (included under interest-bearing loans and borrowings) and the changes during the year ended December 31, 2019 (Korean won in thousands):

As of January 1, 2019	₩	3,348,849
Additions		14,603,691
Interest expenses		170,239
Lease payments		(3,736,736)
Effects of foreign currency translation		72,143
As of December 31, 2019	₩	14,458,186

The maturity analysis of lease liabilities as of December 31, 2019 are as follows (Korean won in thousands):

Current liabilities:		
Lease liabilities (See note 10)	₩	4,320,960
Non-current liabilities:		
Lease liabilities (See note 10)		10,137,226
Total lease liabilities:		
Within 1 year		4,320,960
1 year ~ 5 years		8,644,238
Over 5 years		1,492,988

The followings are the amounts recognized in profit or loss for the year ended December 31, 2019 (Korean won in thousands):

Expenses relating to short-term leases	₩	9,444,619
Expenses relating to leases of low-value assets		1,784,953
Depreciation expenses of right-of-use assets		3,972,762
Interest expenses on lease liabilities		170,239
Loss on foreign currency translation		72,143

The Group had total cash outflows for leases of ₩3,737 million for the year ended December 31, 2019. The Group also had increases in right-of-use assets and lease liabilities by ₩17,807 million and ₩14,604 million for the year ended December 31, 2019, respectively.

8. Leases (cont'd)

Set out below are the carrying amounts of right-of-use assets recognized and the movements during the current reporting period (Korean won in thousands):

	Right-of-use assets (*1)											
		Buildings		Structures		Machinery and equipment		Vehicles		Others		Total
As of January 1, 2019	₩	2,454,796	₩	-	₩	608,435	₩	841,419	₩	-	₩	3,904,650
Additions		30,229		3,220,170		-		7,196,757		7,360,073		17,807,229
Transfers (*2)		-		17,217,944		-		-		-		17,217,944
Depreciation expense		(913,246)		(702,290)		(76,855)		(900,357)		(1,380,014)		(3,972,762)
Termination of contracts		-		-		-		(5,678)		-		(5,678)
	₩	1,571,779	₩	19,735,824	₩	531,580	₩	7,132,141	₩	5,980,059	₩	34,951,383

(*1) Right-of-use assets are recognized in other property, plant and equipment (See Note 7).
(*2) Includes contribution property of use earnings that is reclassified from intangible assets in accordance with the adoption of KIFRS 1116 (See Note 9).

9. Intangible assets, net

Changes in the net book value of intangible assets for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019											
		Jan. 1		Acquisitions		Disposals		Transfers (*)		Amortization		Dec. 31
Patents	₩	1,365,601	₩	-	₩	(20,243)	₩	194,278	₩	(225,780)	₩	1,313,856
Software		27,645,091		458,552		-		3,412,320		(15,804,076)		15,711,887
Facility use right		17,299,158		-		-		(17,217,944)		-		81,214
Land use right		1,099,619		-		-		20,614		(28,533)		1,091,700
Memberships		12,335,197		-		(1,226,400)		3,655,606		-		14,764,402
	₩	59,744,666	₩	458,552	₩	(1,246,643)	₩	(9,935,126)	₩	(16,058,389)	₩	32,963,059

(*) These transfers relate to construction-in-progress that was reclassified to intangible assets, exchange rate effects and the contribution property of use earnings reclassified to right-of-use assets in accordance with the adoption of KIFRS 1116 (See Note 7 and 8).

	2018											
		Jan. 1		Acquisitions		Disposals		Transfers (*)		Amortization		Dec. 31
Patents	₩	1,378,797	₩	-	₩	(10,462)	₩	210,539	₩	(213,273)	₩	1,365,601
Software		26,418,719		-		-		15,101,700		(13,875,328)		27,645,091
Facility use right		17,857,619		81,214		-		-		(639,675)		17,299,158
Land use right		1,133,683		-		-		(5,542)		(28,522)		1,099,619
Memberships		12,336,034		-		-		(837)		-		12,335,197
	₩	59,124,852	₩	81,214	₩	(10,462)	₩	15,305,860	₩	(14,756,798)	₩	59,744,666

(*) These transfers relate to construction-in-progress that was reclassified to intangible assets, and exchange rate effects.

Impairment testing of intangible assets with indefinite lives
The Group performed an impairment testing of memberships with indefinite lives and recognized no impairment loss for the years ended December 31, 2019 and 2018. Net realizable value of a membership is measured at the higher of net fair value or value in use, and if the net fair value cannot be reliably measured, net realizable value is measured at value in use.

10. Borrowings and bonds payable

Short-term borrowings as of December 31, 2019 and 2018 consist of the following (Korean won in thousands):

	Financial institution	2019 annual interest rate (%)		2019		2018
Bank overdrafts	Shinhan Bank	3.52	₩	77,962,367	₩	77,422,327
Discounted trade accounts receivable (*)	Woori Bank and others	2.10~4.00		56,063,210		44,912,075
			₩	134,025,577	₩	122,334,402

(*) The Group entered into factoring contracts with financial institutions such as Woori Bank, Shinhan Bank, KEB Hana Bank, and others and the amount of trade accounts receivable that has not yet matured but are factored to the financial institutions has been recognized as short-term borrowings in the consolidated statements of financial position (See Note 4).

Details of long-term bonds denominated in Korean won as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

Series	Issuance date	Maturity date	2019 annual interest rate (%)		2019		2018
11-2nd public placement bonds	2012.01.13	2019.01.13	-	₩	-	₩	130,000,000
17-2nd public placement bonds	2014.02.26	2019.02.26	-		-		170,000,000
18-2nd public placement bonds	2014.08.08	2019.08.08	-		-		200,000,000
18-3rd public placement bonds	2014.08.08	2021.08.08	3.33		100,000,000		100,000,000
19-1st public placement bonds	2017.04.27	2020.04.27	2.07		60,000,000		60,000,000
19-2nd public placement bonds	2017.04.27	2022.04.27	2.53		80,000,000		80,000,000
20-1st public placement bonds	2018.03.02	2021.03.02	2.62		110,000,000		110,000,000
20-2nd public placement bonds	2018.03.02	2023.03.02	3.01		190,000,000		190,000,000
21-1st public placement bonds	2018.10.22	2021.10.22	2.32		160,000,000		160,000,000
21-2nd public placement bonds	2018.10.22	2023.10.20	2.52		140,000,000		140,000,000
21-3rd public placement bonds	2018.10.22	2025.10.22	2.65		100,000,000		100,000,000
23rd private placement bonds	2019.09.06	2022.09.06	1.26		100,000,000		-
24-1st public placement bonds	2019.10.16	2022.10.14	1.64		140,000,000		-
24-2nd public placement bonds	2019.10.16	2024.10.16	1.87		80,000,000		-
24-3rd public placement bonds	2019.10.16	2026.10.16	1.87		80,000,000		-
					1,340,000,000		1,440,000,000
Less: discount on bonds					(3,253,499)		(2,823,672)
Less: current portion					(59,970,183)		(499,882,613)
				₩	1,276,776,318	₩	937,293,715

Details of long-term bonds denominated in foreign currency as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

Series	Issuance date	Maturity date	2019 annual interest rate (%)		2019		2018
Foreign currency bonds	2019.01.23	2024.01.23	3.88		463,120,000		-
Less: discount on bonds					(3,080,460)		-
Less: current portion					-		-
				₩	460,039,540	₩	-

10. Borrowings and bonds payable (cont'd)

Long-term borrowings as of December 31, 2019 and 2018 consist of the following (Korean won in thousands):

	Financial institution	2019 annual interest rate (%)	2019	2018
Facility loan	Mizuho Bank	2.56	₩ 100,000,000	₩ 100,000,000
Facility loan	MUFG Bank	3-month CD + additional rate	-	45,000,000
Facility loan	MUFG Bank	2.27	60,000,000	60,000,000
Facility loan	Credit Agricole CIB	3-month CD + additional rate	100,000,000	100,000,000
Facility loan	Credit Agricole CIB	3-month CD + additional rate	50,000,000	50,000,000
Commercial paper	Shinhan Bank	3-month CD + additional rate	100,000,000	100,000,000
Commercial paper	Shinhan Bank	3-month CD + additional rate	100,000,000	100,000,000
Commercial paper	Shinhan Bank	3-month CD + additional rate	50,000,000	50,000,000
Commercial paper	Shinhan Bank	3-month CD + additional rate	80,000,000	80,000,000
			640,000,000	685,000,000
Less: discount on bonds			-	(33,392)
Less: current portion			(360,000,000)	(44,966,608)
			₩ 280,000,000	₩ 640,000,000

Details of lease liabilities as of December 31, 2019 are as follows (Korean won in thousands):

Lease liabilities	₩ 14,458,186
Less: current portion	(4,320,960)
Non-current lease liabilities	₩ 10,137,226

11. Other current liabilities

Other current liabilities as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Advance receipts	₩ 6,537,817	₩ 4,388,283
Withholdings	4,575,517	10,238,917
	₩ 11,113,334	₩ 14,627,200

12. Defined benefit liabilities, net

The components of defined benefit liabilities as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Present value of defined benefit obligation	₩ 165,197,587	₩ 168,477,465
Fair value of plan assets	(163,127,778)	(160,377,919)
	₩ 2,069,809	₩ 8,099,546

12. Defined benefit liabilities, net (cont'd)

Gains and losses related to defined benefit liabilities for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

		2019		2018
Defined benefit plans:				
Current service cost	₩	16,006,159	₩	14,626,696
Interest cost		5,975,847		6,012,020
Expected return on plan assets		(5,520,975)		(5,710,805)
		16,461,031		14,927,911
Defined contribution plans:				
Retirement pension benefit		887,208		341,609
	₩	17,348,239	₩	15,269,520

Of the above amounts, ₩12,226,762 thousand and ₩10,550,045 thousand are recognized in cost of goods sold for the years ended December 31, 2019 and 2018, respectively, and ₩5,121,477 thousand and ₩4,719,475 thousand are recognized in selling and administrative expenses (including research and development) for the years ended December 31, 2019 and 2018, respectively.

Changes in the present value of the defined benefit obligation for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

		2019		2018
As of January 1	₩	168,477,465	₩	152,168,528
Current service cost		16,006,159		14,626,696
Interest cost		5,975,847		6,012,020
Benefits paid		(20,515,035)		(13,219,687)
Re-measurement loss (gain) in OCI:				
Actuarial loss arising from changes in demographic assumptions		4,739		141,371
Actuarial loss (gain) arising from changes in financial assumptions		(2,259,033)		7,747,912
Experience adjustments		(3,695,930)		955,672
Others (transferred from related parties)		1,203,375		44,953
As of December 31	₩	165,197,587	₩	168,477,465

12. Defined benefit liabilities, net (cont'd)

Changes in the fair value of plan assets for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

		2019		2018
As of January 1	₩	160,377,919	₩	148,799,658
Contribution by employer		13,000,000		20,500,000
Expected returns		5,520,975		5,710,805
Benefits paid		(14,585,631)		(11,466,058)
Re-measurement loss in OCI		(2,323,834)		(3,232,047)
Others (transferred from related parties)		1,138,349		65,561
As of December 31	₩	163,127,778	₩	160,377,919

Plan assets as of December 31, 2019 are composed of interest-bearing and principal-guaranteed financial assets such as time deposits.

The principal assumptions used in actuarial calculation as of December 31, 2019 and 2018 are as follows:

	2019	2018
Discount rate (%)	3.26	3.61
Future salary increase rate (%)	4.37	4.96

The result of sensitivity analyses, which are determined based on a method that extrapolates the impact on the defined benefit obligation as a result of reasonable changes in key assumptions occurring as of December 31, 2019 and 2018, is as follows (Korean won in thousand):

	2019			
		Increase by 1% point		Decrease by 1% point
Discount rate	₩	(13,602,257)	₩	15,996,551
Future salary increase rate		16,048,636		(13,888,508)

	2018			
		Increase by 1% point		Decrease by 1% point
Discount rate	₩	(14,032,285)	₩	16,477,855
Future salary increase rate		16,505,914		(14,307,817)

13. Derivative financial instruments

The Group entered into forward currency contracts to hedge the risk of volatility in US dollar exchange rates. Details of outstanding forward currency contracts which are not designated as hedging instruments as of December 31, 2019 and 2018 are presented as follows (Korean won in thousands and US dollar, except for contract exchange rate):

2019

Financial institution	Maturity date	Contract exchange rate	Contract amount		Fair value: Assets		Fair value: Liabilities	
Mizuho Bank	2020.01.03	1,179.93	USD	30,000,000	₩	-	₩	663,828
Credit Agricole CIB	2020.01.13	1,191.38	USD	15,000,000		-		508,980
					₩	-	₩	1,172,808

2018

Financial institution	Maturity date	Contract exchange rate	Contract amount		Fair value: Assets		Fair value: Liabilities	
Mizuho Bank	2019.01.04~15	1,117.59~1,123.77	USD	108,000,000	₩	228,069	₩	85,176
KDB	2019.01.08~16	1,117.40~1,128.05	USD	62,000,000		320,519		6,233
Shinhan Bank	2019.01.02~10	1,117.65~1,124.90	USD	107,000,000		400,709		18,798
ICBC	2019.01.07~14	1,117.51~1,127.60	USD	70,000,000		331,686		4,714
KEB Hana Bank	2019.01.17	1,117.70	USD	33,000,000		8,861		-
					₩	1,289,844	₩	114,921

A valuation gain (loss) on derivate instruments is recognized as finance income (costs) and derivative assets (liabilities) are included in other accounts receivable (payable).

Although the Group does not apply hedge accounting, the Group entered into commodity swaps for crude oil and petroleum products to hedge the exposure to variability in the future cash flows associated with price changes in petroleum products. As of December 31, 2019, the Group entered into 5 commodity swaps for 5,410,000 barrels and 50,000 tons. In relation to the contracts, ₩197,173 thousand and ₩24,219,774 thousand are recognized as gain on valuation of derivative financial instruments for the years ended December 31, 2019 and 2018 respectively, and ₩10,570,648 thousand and ₩2,082,292 thousand are recognized as loss on valuation of derivative financial instruments for the year ended December 31, 2019 and 2018 respectively, while the corresponding amounts are recorded as other accounts receivable and other accounts payable as of December 31, 2019 and 2018, respectively.

Details of the interest rate swap contracts entered into to hedge the risk of volatility in interest rates on borrowings to which the Group applies cash flow hedge as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

Financial institution	Contract date	Maturity	Contract amount	Received – variable interest rate	Paid – swap interest rate	2019 Valuation gain (loss)	2019 Receivables (payables)
Shinhan Bank	2016.6.27	2019.6.27	100,000,000	3-month CD	1.35%	(234,688)	-
	2016.9.27	2019.6.27	100,000,000	3-month CD	1.30%	(152,008)	-
	2018.9.13	2021.9.13	50,000,000	3-month CD	1.93%	(281,729)	(456,072)
	2018.9.13	2021.9.13	80,000,000	3-month CD	1.93%	(450,767)	(729,715)
MUFG	2016.3.31	2019.3.29	45,000,000	3-month CD	1.74%	(21,059)	-
Credit Agricole CIB	2017.12.14	2020.12.14	100,000,000	3-month CD	2.08%	(148,586)	(658,829)
	2018.4.20	2021.4.19	50,000,000	3-month CD	2.15%	(135,962)	(575,955)
			₩ 525,000,000			₩ (1,424,799)	₩ (2,420,571)

Financial institution	Contract date	Maturity	Contract amount	Received – variable interest rate	Paid – swap interest rate	2018 Valuation gain (loss)	2018 Receivables (payables)
Shinhan Bank	2015.8.27	2018.8.27	80,000,000	3-month CD	1.71%	₩ (24,767)	₩ -
	2016.6.27	2019.6.27	100,000,000	3-month CD	1.35%	(587,098)	234,688
	2016.9.27	2019.6.27	100,000,000	3-month CD	1.30%	(680,739)	152,008
	2018.9.13	2021.9.13	50,000,000	3-month CD	1.93%	(174,343)	(174,343)
	2018.9.13	2021.9.13	80,000,000	3-month CD	1.93%	(278,948)	(278,948)
MUFG	2016.3.31	2019.3.29	45,000,000	3-month CD	1.74%	(52,106)	21,059
BNP Paribas Bank	2015.12.17	2018.12.17	100,000,000	3-month CD	1.80%	(9,698)	-
Credit Agricole CIB	2017.12.14	2020.12.14	100,000,000	3-month CD	2.08%	(436,618)	(510,243)
	2018.4.20	2021.4.19	50,000,000	3-month CD	2.15%	(439,993)	(439,993)
			₩ 705,000,000			₩ (2,684,310)	₩ (995,772)

13. Derivative financial instruments (cont'd)

Details of the currency swap contracts entered into to hedge the risk of volatility in foreign currency exchange rates on borrowings denominated in foreign currencies to which the Group applies fair value hedge as of December 31, 2019 are as follows (Korean won in thousands)

			Contract amount		Interest rate		2019	
Financial institution	Contract date	Maturity date	Notional amount (USD)	Swapped amount (KRW)	Received – fixed USD rate	Paid – fixed KRW rate	Valuation gain	Receivable
Credit Agricole CIB	2019.01.23	2024.01.23	100,000,000	112,400,000	3.88%	2.38%	₩ 6,222,702	₩ 6,222,702
KDB Industrial Bank	2019.01.23	2024.01.23	100,000,000	112,300,000	3.88%	2.38%	6,538,716	6,538,716
KEB Hana Bank	2019.01.23	2024.01.23	200,000,000	224,420,000	3.88%	2.28%	14,326,975	14,326,975
			400,000,000	449,120,000			₩ 27,088,393	₩ 27,088,393

In relation to the currency swaps above, the Group recognized ₩11,040,000 thousand of loss on foreign currency translation in respect to borrowings denominated in foreign currencies and ₩27,088,393 thousand of gain on foreign currency translation from valuation of currency swaps for the year ended December 31, 2019.

14. Emission liabilities

In relation to greenhouse gas emissions, the Group recognizes estimated expenses for emissions exceeding the emission rights granted for the current year, which the Group can be held liable, for as trade and other accounts payable.

Detail of annual emission allowances allocated and estimated greenhouse gas emissions as of December 31, 2019 is as follows (Unit: ton):

	2018	2019	2020
Allocated emission allowance	4,407,260	4,291,327	4,391,327
Estimated greenhouse gas emissions	4,407,622	4,277,983	4,690,700

Detail of annual emission allowances allocated and settled greenhouse gas emissions as of December 31, 2017 are as follows (Unit: ton):

	2015 (*)	2016 (*)	2017 (*)
Allocated emission allowance	4,267,529	4,336,065	4,368,688
Settled greenhouse gas emissions	4,267,529	4,438,807	4,322,261

(*) The estimated greenhouse gas emissions for the years 2015, 2016 and 2017 were permitted in the respective years.

Changes in emission liabilities for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
January 1	₩ 553,397	₩ 5,130,264
Changes in estimation	(544,347)	(5,130,264)
Decrease (emission allowances submitted)	(9,050)	-
Increase (cost of emissions recognized)	-	553,397
December 31	₩ -	₩ 553,397

14. Emission liabilities (cont'd)

Changes in emission allowances for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands, except for quantity information):

	2018		2019	
	Quantity	Book value	Quantity	Book value
January 1	13,685	₩ -	-	₩ -
Free allocation	4,393,575	-	4,391,327	-
Borrowed	362	-	(362)	-
Submitted to the government	(4,407,622)	-	-	-
Sold	-	-	(100,000)	-
December 31	-	₩ -	4,290,965	₩ -

15. Commitments and contingencies

The following table presents the available lines of credit from financial institutions as of December 31, 2019 and 2018 (Korean won in thousands and US dollar):

	2019		
	Financial institution	Korean won	US dollar
Bank overdrafts	Woori Bank and others	₩ 14,800,000	US$ -
Line of credit for general borrowings	Woori Bank and others	840,000,000	130,000,000
Line of credit for export and import financing	Woori Bank and others	320,000,000	1,052,000,000
Line of credit for export bill discounts	Woori Bank and others	-	150,000,000
		₩ 1,174,800,000	US$ 1,332,000,000

	2018		
	Financial institution	Korean won	US dollar
Bank overdrafts	Woori Bank and others	₩ 14,800,000	US$ -
Line of credit for general borrowings	Woori Bank and others	564,000,000	170,000,000
Line of credit for export and import financing	Woori Bank and others	30,000,000	1,076,000,000
Line of credit for export bill discounts	Woori Bank and others	-	70,000,000
		₩ 608,800,000	US$ 1,316,000,000

The Group has provided a blank check to Korea National Oil Corp. as collateral in connection with petroleum import duty as of December 31, 2019.

The Group entered into a contract for trademark rights with Hanwha Corporation and Total SA, effective from July 1, 2015. In accordance with the agreement, the Group paid fees amounting to ₩29.5 billion and ₩33.6 billion to Hanwha Corporation and Total SA for the years ended December 31, 2019 and 2018, respectively.

As of December 31, 2019, the Group has one pending lawsuit with total claim against the Group amounting to ₩2.1 billion, and its outcome is uncertain

15. Commitments and contingencies (cont'd)

Summary of major contracts as of December 31, 2019 are as follows:

Contract name	Contractor	Description	Contract date	Expiration date	Country
Plant gas trading and utilities supply contract	Linde Korea (BOC Gases Korea)	Sale of air separation equipment and gas supply	April 3, 1999	January 29, 2033	United Kingdom
Utilities supply contract	Hanwha General Chemical Co., Ltd.	Utility supply	December 18, 2000	December 31, 2024	Republic of Korea
Contracted service contract	General Electric International, Inc	Supply of water treatment equipment parts and maintenance parts	March 28, 2012	December 31, 2031	United States of America
Second hydrogen gas sales contract	Hyundai Oilbank Co., Ltd.	Hydrogen gas supply contract	January 16, 2013	November 30, 2021	Republic of Korea
Jet A-1 / Gasoil sales contract	Hyundai Oilbank Co., Ltd.	Supply contract of Jet A-1 / Gasoil	January 16, 2013	5 years from the date of initial supply	Republic of Korea
GASOIL 10PPM Sales contract	Hyundai Oilbank Co., Ltd.	Supply contract of GASOIL 10PPM	January 16, 2013	5 years from the date of initial supply	Republic of Korea
Business contract	Industrial Technology Services Co., Ltd.	Maintenance section	October 1, 2017	September 30, 2020	Republic of Korea
Hydrogen supply contract	HANWHA ENERGY CORPORATION	Hydrogen gas supply contract	May 17, 2018	May 16, 2028	Republic of Korea
EPC Contract for PP4 Project construction	HANWHA E&C	PP4 construction contract	December 26, 2018	February 28, 2021	Republic of Korea
EPC Contract for NCC side cracker expansion	HANWHA E&C	NCC side cracker expansion contract	January 10, 2019	January 31, 2021	Republic of Korea

16. Equity

In accordance with the Articles of Incorporation, the Company is authorized to issue 70 million ordinary shares, with a par value of ₩5,000 per share. As of December 31, 2019 and 2018, the number of ordinary shares issued and outstanding is 19,165,316 amounting to ₩95,826,580 thousand.

Share premium of the Group represents issued capital in excess of par value and is restricted in use except for being used to offset a deficit or transferred to issued capital in accordance with the Korean Commercial Code.

Accumulated other comprehensive loss of the Group as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Net loss on valuation of interest rate swaps	₩ (1,781,541)	₩ (732,889)
Net gain on valuation of financial instruments at FVOCI	1,562,895	1,562,895
Exchange differences on translation of foreign operations	(855,615)	(1,223,450)
	₩ (1,074,261)	₩ (393,444)

16. Equity (cont'd)

Retained earnings as of December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Appropriated:		
Legal reserve (*1)	₩ 47,913,290	₩ 47,913,290
Unappropriated	2,590,649,897	2,759,553,513
	₩ 2,638,563,187	₩ 2,807,466,803

(*1) In accordance with the Korean Commercial Code, an amount equal to at least 10% of cash dividends declared at the annual ordinary shareholders' meeting is required to be appropriated as a legal reserve until such reserve equals 50% of issued capital. The legal reserve may not be utilized for cash dividends but may only be used to offset a deficit, if any, or be transferred to issued capital. The legal reserve has reached 50% of issued capital as of December 31, 2019 and 2018.

17. Income and expenses

Details of selling and administrative expenses for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Salaries	₩ 39,332,475	₩ 95,519,020
Severance and retirement benefits	3,643,236	3,421,069
Employee welfare	24,709,321	23,727,557
Printing	1,185,293	1,054,621
Travel	3,234,651	3,231,837
Communications	550,201	556,801
Training	3,340,348	2,454,752
Supplies	1,487,720	943,342
Repairs	1,502,414	4,806,303
Entertainment	3,450,941	2,758,998
Meeting	762,820	519,905
Vehicle maintenance	607,460	616,562
Transportation	5,113,600	4,638,601
Taxes and dues	2,026,358	3,815,419
Insurance	1,847,202	1,887,531
Commissions and fees	45,325,528	49,037,522
Rents	11,219,358	10,138,712
Market research	2,615,945	2,518,863
Research and development	30,739,691	28,142,594
Depreciation	8,300,161	7,509,003
Amortization of intangible assets	12,050,788	10,083,407
Advertising	3,999,704	3,455,137
Samples	641,451	484,723
Promotion	-	55,541
Events	1,693,178	1,284,076
Packaging	16,386,554	15,828,996
Electronic data processing	15,452,486	15,755,748
Others	1,087,992	1,049,450
Reversal of bad debt expenses	(43,765)	(16,295)
	₩ 242,263,111	₩ 295,279,795

17. Income and expenses (cont'd)

Details of finance income for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Interest income	₩ 4,306,862	₩ 3,973,095
Gain on foreign currency transactions	134,521,888	120,625,183
Gain on foreign currency translation	56,963,536	2,639,297
Gain on settlement of derivative instruments	78,312,485	135,992,962
Gain on valuation of derivative instruments	197,173	25,509,618
	₩ 274,301,944	₩ 288,740,155

Details of finance costs for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Interest expenses	₩ 46,162,993	₩ 47,416,132
Loss on foreign currency transactions	123,619,227	132,020,494
Loss on foreign currency translation	41,355,770	3,431,243
Loss on settlement of derivative instruments	88,256,956	92,462,238
Loss on valuation of derivative instruments	11,743,456	2,197,213
	₩ 311,138,402	₩ 277,527,320

Details of other income for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Gain on disposal of property, plant and equipment	₩ 1,480,127	₩ 168,655
Dividend income	241,999	264,925
Rental income	443,553	250,015
Miscellaneous gain	27,449,051	32,814,952
	₩ 29,614,730	₩ 33,498,547

Details of other expenses for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Loss on disposal of property, plant and equipment	₩ 6,506,041	₩ 6,313,142
Loss on disposal of intangible assets	46,643	10,462
Loss on disposal of trade accounts receivable	4,611,301	5,111,724
Donations	8,966,370	7,078,944
Miscellaneous loss	13,149,733	4,857,290
	₩ 33,280,088	₩ 23,371,562

17. Income and expenses (cont'd)

Details of expenses classified based on nature of expenses in cost of goods sold and selling and administrative expenses for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Changes in finished goods and semi-finished goods	₩ 41,564,344	₩ (89,230,991)
Use of raw materials and others	4,970,836,483	5,911,369,914
Salaries and other benefits	231,594,084	274,109,428
Depreciation	368,417,097	355,690,071
Amortization of intangible assets	16,058,389	14,756,798
Transportation	74,752,940	76,066,654
Advertising	4,006,077	3,473,967
Rents	11,288,100	10,995,546
Others	3,659,442,121	3,589,448,043
	₩ 9,377,959,635	₩ 10,146,679,430

Details of salaries and other benefit expenses for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Salaries	₩ 160,370,188	₩ 206,788,604
Severance and retirement benefits	17,348,239	15,269,520
Employee welfare	53,875,657	52,051,304
	₩ 231,594,084	₩ 274,109,428

18. Income taxes

The major components of income tax expense for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Current income taxes	₩ 110,892,172	₩ 276,207,249
Additional income taxes (refund of) for prior period	2,842,664	(27,961,629)
Changes in deferred taxes	(6,992,812)	8,184,388
Income tax expense charged directly to equity	(581,222)	3,336,383
Income tax expense	₩ 106,160,802	₩ 259,766,391

Details of income tax expense charged directly to equity for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Loss on valuation of interest rate swaps	₩ 376,145	₩ 708,657
Re-measurement gain (loss) on net defined benefit liabilities	(957,367)	3,188,329
Gain on valuation of financial instruments at FVOCI	-	(560,603)
	₩ (581,222)	₩ 3,336,383

18. Income taxes (cont'd)

A reconciliation of profit before tax at the statutory tax rate to income tax expense at the effective income tax rate for the years ended December 31, 2019 and 2018 is as follows (Korean won in thousands):

	2019	2018
Profit before tax	₩ 426,494,162	₩ 1,084,044,959
Tax at the statutory income tax rate (*)	106,923,895	287,750,364
Reconciling items:		
Non-deductible expenses and non-taxable income for tax purposes	1,229,267	376,955
Tax credit	(4,762,021)	(1,341,102)
Additional income taxes (refund of) for prior periods	2,842,664	(27,961,629)
Others	(73,003)	941,803
Income tax expense at the effective income tax (2019: 24.89%, 2018: 23.96%)	₩ 106,160,802	₩ 259,766,391

(*) The Group is subject to corporate income taxes (including resident sur-taxes), at the aggregate rate of 11% on taxable income up to ₩200,000 thousand, 22% on taxable income from ₩200,000 thousand to ₩20,000,000 thousand, 24.2% on taxable income from ₩20,000,000 thousand to ₩300,000,000 thousand and 27.5% in excess of ₩300,000,000 thousand.

Significant changes in deferred tax assets (liabilities) for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019			
	Jan. 1	Recognized directly in profit or loss	Recognized directly in equity	Dec. 31
Defined benefit liabilities	₩ (269,840)	₩ 613,188	₩ (957,367)	₩ (614,019)
Depreciation	2,605,976	(1,375,117)	-	1,230,859
Accrued income	(59,538)	53,891	-	(5,647)
Capitalized interest costs	(2,452,072)	501,966	-	(1,950,106)
Loss on valuation of derivative instruments	262,884	-	376,145	639,029
Unrealized financing income	(8,815)	8,815	-	-
Gain (loss) on foreign currency translation	(388)	-	-	(388)
Accrued expenses	2,882,654	7,407,487	-	10,290,141
Accrued contribution	528,000	(528,000)	-	-
Loss on disposal of PP&E	8,363	(8,363)	-	-
Gain on valuation of financial instruments at FVOCI	(560,603)	-	-	(560,603)
Others	-	900,168	-	900,168
	₩ 2,936,621	₩ 7,574,035	₩ (581,222)	₩ 9,929,434

18. Income taxes (cont'd)

	2018			
	Jan. 1	Recognized directly in profit or loss	Recognized directly in equity	Dec. 31
Defined benefit liabilities	₩ -	₩ (3,458,169)	₩ 3,188,329	₩ (269,840)
Depreciation	6,237,722	(3,631,746)	-	2,605,976
Accrued income	(23,753)	(35,785)	-	(59,538)
Capitalized interest costs	(2,941,875)	489,803	-	(2,452,072)
Loss (gain) on valuation of derivative instruments	(445,773)	-	708,657	262,884
Unrealized financing income	(84,382)	75,567	-	(8,815)
Gain (loss) on foreign currency translation	(388)	-	-	(388)
Accrued expenses	8,379,458	(5,496,804)	-	2,882,654
Accrued contribution	-	528,000	-	528,000
Loss on disposal of PP&E	-	8,363	-	8,363
Gain on valuation of financial instruments at FVOCI	-	-	(560,603)	(560,603)
	₩ 11,121,009	₩ (11,520,771)	₩ 3,336,383	₩ 2,936,621

The Group applies the tax rates that are expected to apply in the year when the asset is realized or the liability is settled for temporary differences.

19. Earnings per share

The Group's basic and diluted earnings per share for the years ended December 31, 2019 and 2018 are computed as follows (Korean won, except for number of shares):

	2019	2018
Profit for the year attributable to owners of the parent	₩ 320,333,360,010	₩ 824,278,568,122
Weighted-average number of ordinary shares outstanding	19,165,316 shares	19,165,316 shares
Basic earnings per share attributable to owners of the parent	₩ 16,714	₩ 43,009

As the Group has no potential dilutive ordinary shares, the basic and diluted earnings per share are the same.

20. Dividends

Details of dividends declared and paid for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands, except for dividends per share):

		2019		2018
Dividends attributable to owners of the parent:				
Interim dividend (2019: ₩4,957, 2018: ₩11,479 per share)	₩	95,000,000	₩	220,000,000
Cash dividend (2019: ₩11,635, 2018: ₩20,710 per share)		222,992,000		396,906,000
	₩	317,992,000	₩	616,906,000

The Company's dividend payout ratios for the years ended December 31, 2019 and 2018 are computed as follows (Korean won in thousands):

		2019		2018
Dividends (A)	₩	317,992,000	₩	616,906,000
Profit for the year (B)		317,992,949		822,541,584
Dividend payout ratio (A/B)		99.99%		75.00%

21. Supplementary cash flow information

Details of non-cash transaction and working capital adjustments to reconcile profit for the year to net cash flows provided by operating activities for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

Non-cash transaction adjustments

		2019		2018
Severance and retirement benefits	₩	16,461,031	₩	14,927,911
Depreciation		368,417,097		355,690,071
Amortization of intangible assets		16,058,388		14,756,798
Reversal of allowance for doubtful accounts		(43,765)		(16,295)
Gain on foreign currency translation		(56,963,536)		(2,639,297)
Loss on foreign currency translation		41,355,770		3,431,243
Gain on disposal of property, plant and equipment		(1,480,127)		(168,655)
Loss on disposal of property, plant and equipment		6,506,041		6,313,142
Loss on disposal of intangible assets		46,643		10,462
Finance income (interest income)		(4,306,862)		(3,973,095)
Finance cost (interest expenses)		46,162,993		47,416,132
Loss on disposal of trade accounts receivable		4,611,301		5,111,724
Gain on valuation of derivative instruments		(197,173)		(25,509,618)
Loss on valuation of derivative instruments		11,743,456		2,197,213
Gain on settlement of derivative instruments		(78,312,485)		(135,992,962)
Loss on settlement of derivative instruments		88,256,956		92,462,238
Dividends income		(241,999)		(264,925)
Income tax expense		106,160,802		259,766,391
	₩	564,234,531	₩	633,518,478

21. Supplementary cash flow information (cont'd)

Working capital adjustments

	2019	2018
Trade accounts receivable	₩ 118,277,690	₩ 194,120,676
Other accounts receivable	30,968,198	(43,426,759)
Other current assets	(80,227)	(2,411,888)
Prepaid expenses	1,622,808	(2,826,046)
Guarantee deposits	(22,961)	(45,406)
Inventories	178,219,086	(163,392,999)
Long-term prepaid expenses	(12,492,131)	13,177,748
Trade accounts payable	162,191,134	(313,885,761)
Other accounts payable	(12,079,813)	(30,239,379)
Advance receipts	2,148,881	(1,816,976)
Withholdings	(5,682,208)	(715,341)
Accrued expenses	(54,980,246)	1,257,632
Other non-current liabilities	990,572	1,672,768
Retirement benefits transferred to (from) related parties	64,925	(20,608)
Payment of severance and retirement benefits	(5,929,303)	(1,753,630)
Contributions to plan assets	(13,000,000)	(20,500,000)
	₩ 390,216,405	₩ (370,805,969)

Significant non-cash transactions for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019	2018
Reclassification of current portion of long-term prepaid expenses	₩ -	₩ 186,000
Transfer of construction-in-progress to property, plant and equipment and intangible assets	737,296,833	253,913,401
Reclassification of current portion of bond payable and long-term borrowings	427,723,407	544,849,221
Changes in other accounts payable due to acquisition of property, plant and equipment	42,400,777	(9,911,546)
Reclassification of contribution property of use earnings to right-of-use assets (included in other property, plant and equipment)	17,217,944	-
Impact on lease liabilities in accordance with the adoption of KIFRS 1116	17,952,541	-
Reclassification to current portion of lease liabilities	4,320,960	-
Write-off of trade accounts receivable	340,934	-
Reclassification to current portion of long-term accounts payable	382,413	730,601
Changes in other accounts receivable due to disposal of property, plant and equipment	-	2,000,000

21. Supplementary cash flow information (cont'd)

Changes in liabilities arising from financing activities for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019					
	January 1	Cash flows from financing activities	Foreign exchange rate movement	Amortization	Transfer	December 31
Current liabilities						
Short-term borrowings	₩ 122,334,402	₩ 12,246,633	₩ (555,458)	₩ -	₩ -	₩ 134,025,577
Current portion of bonds payable and long-term borrowings	544,849,221	(548,494,355)	-	212,870	427,723,407	424,291,143
	667,183,623	(536,247,722)	(555,458)	212,870	427,723,407	558,316,720
Non-current liabilities						
Long-term borrowings	640,000,000	-	72,143	-	(349,934,917)	290,137,226
Bonds payable	937,293,715	852,080,000	11,040,000	(3,689,765)	(59,908,092)	1,736,815,858
	1,577,293,715	852,080,000	11,112,143	(3,689,765)	(409,843,009)	2,026,953,084
	₩ 2,244,477,338	₩ 315,832,278	₩ 10,556,685	₩ (3,476,895)	₩ 17,880,398	₩ 2,585,269,804

	2018					
	January 1	Cash flows from financing activities	Foreign exchange rate movement	Amortization	transfer	December 31
Current liabilities						
Short-term borrowings	₩ 104,024,770	₩ 18,613,381	₩ (303,749)	₩ -	₩ -	₩ 122,334,402
Current portion of bonds payable and long-term borrowings	479,745,396	(480,000,000)	-	254,604	544,849,221	544,849,221
	583,770,166	(461,386,619)	(303,749)	254,604	544,849,221	667,183,623
Non-current liabilities						
Long-term borrowings	404,828,283	280,000,000	-	138,325	(44,966,608)	640,000,000
Bonds payable	738,846,432	700,000,000	-	(1,670,104)	(499,882,613)	937,293,715
	1,143,674,715	980,000,000	-	(1,531,779)	(544,849,221)	1,577,293,715
	₩ 1,727,444,881	₩ 518,613,381	₩ (303,749)	₩ (1,277,175)	₩ -	₩ 2,244,477,338

22. Related party disclosures

Key management personnel are standing directors who have the authority and responsibility for planning, directing and controlling the business of the Group. Compensation for key management personnel consisted of salaries of ₩1,304,089 thousand (₩1,818,211 thousand in 2018) and ₩249,117 thousand of severance and retirement benefits in 2019 (₩124,919 thousand in 2018).

The related parties of the Company and their relationship with the company as of December 31, 2019 are as follows:

Relationship	Related party
Jointly controlling entities	Hanwha General Chemical Co., Ltd.
	Total Holdings UK Limited
Subsidiaries	Dongguan Hanwha Total Engineering Plastic Co., Ltd.
	Hanwha Total Petrochemical Trading (Shanghai) Co., Ltd.

All transactions and outstanding balances between the Company and its subsidiaries are eliminated in the preparation of the consolidated financial statements of the Group.

22. Related party disclosures (cont'd)

Significant transactions for 2019 and 2018 and the related outstanding balances as of December 31, 2019 and 2018 arising from such transactions between the Group and its related parties are as follows (Korean won in thousands):

	2019				
Related party	Sales and others	Purchase of inventories and others	Purchase of non-current assets	Receivables	Payables
Joint controlling:					
Hanwha General Chemical Co., Ltd.	₩ 476,925,138	₩ 15,757,449	₩ -	₩ 44,537,029	₩ 2,363,218
Total Holdings UK Limited	-	1,315,200	-	-	242,848
Other related parties:					
Hanwha Corporation	83,302,600	43,027,029	21,851,300	8,221,144	7,318,611
Hanwha Construction Co., Ltd	-	-	446,439,518	-	40,257,154
Hanwha Life Insurance Co., Ltd.	3,279,806	4,919,731	-	141,801,469	28,398
Hanwha General Insurance Co., Ltd.	88,043	17,761,248	709,863	-	6,333,591
Hanwha Systems Co., Ltd.	47,438	14,438,430	4,251,138	3,837	4,507,793
Hanwha Global Asset Corporation (formerly, Hanwha Q CELLS & Advanced Materials Corporation)	40,899,568	1,200,000	-	-	-
Hanwha Q CELLS & Advanced Materials Corporation	20,175,824	-	-	4,878,683	-
Hanwha Chemical Co, Ltd.	72,271	3,727,327	-	-	1,284,178
Hanwha Hotels & Resorts Co., Ltd.	-	3,129,726	4,368,062	-	186,489
Hanwha Energy Corporation	7,642,525	-	-	2,308,900	-
Hanwha Estate Co., Ltd.	10,929	637,233	2,946,399	520	1,504,826
Hanwha Power System Co. Ltd..	-	-	1,178,313	-	-
Hanwha Q CELLS Japan Co., Ltd.	3,618,953	8,285,844	-	36,477	-
TRI Energy Global Pte. Ltd.	558,400,357	508,298,739	-	18,465,011	-
Hanwha (H.K.) Co., Ltd.	-	5,439,682	-	-	-
Hanwha Chemical(Thailand) Co., Ltd.	11,233,640	-	-	1,076,896	-
Total Petrochemicals and Refining SA/NV	8,453,186	1,089,690	-	715,783	131,468
Total SA.	-	19,100,642	-	-	-
Total Trading Asia Pte. Ltd.	746,336,838	1,170,796,533	-	16,942,376	61,401,803
TOTSA Total Oil Trading SA	23,504,119	20,785,918	-	244,033	5,600,012
Total Petrochemicals (Hong Kong) LI	-	4,976,345	-	-	1,476,519
Total Petrochemicals and Refining USA	2,922,485	-	-	245,991	-
TOTAL PETROCHEMICALS (NINGBO) Ltd.	7,511,560	-	-	-	-
TOTAL OIL ASIA-PACIFIC PTE LTD	7,076,677	-	-	625,003	-
TOTAL Gas & Power North America, Inc	187,534,900	-	-	-	-
CSSA CHARTERING & SHIPPING SERVICES	-	1,481,249	-	-	-
Others	2,399,180	2,655,658	886,750	152,531	767,689
	₩ 2,191,436,037	₩ 1,848,823,673	₩ 482,631,343	₩ 240,255,683	₩ 133,404,597

22. Related party disclosures (cont'd)

	2018				
Related party	Sales and others	Purchase of inventories and others	Purchase of non-current assets	Receivables	Payables
Joint controlling:					
Hanwha General Chemical Co., Ltd.	₩ 540,794,502	₩ 20,148,950	₩ -	₩ 95,491,121	₩ 2,171,659
Total Holdings UK Limited	-	2,903,124	-	-	579,121
Other related parties:					
Hanwha Corporation	99,581,655	23,989,826	12,574,440	4,481,755	5,261,815
Hanwha Galleria Co., Ltd	-	1,079,935	-	-	149,155
Hanwha Construction Co., Ltd	-	-	364,176,751	-	25,673,222
Hanwha Life Insurance Co., Ltd.	2,641,450	4,318,828	-	142,648,340	52,280
Hanwha General Insurance Co., Ltd.	5,912,942	17,171,356	-	-	5,630,318
Hanwha Q CELLS & Advanced Materials Corporation	62,328,584	-	-	4,771,552	-
Hanwha Chemical Co, Ltd.	159,036	4,381,362	-	12,107	1,151,109
Hanwha Hotels & Resorts Co., Ltd.	-	2,125,981	2,091,798	-	175,168
Hanwha Estate Co., Ltd.	10,929	3,683,440	-	520	281,604
Hanwha Techwin Co., Ltd.	-	940,000	-	-	1,034,000
Hanwha Systems	46,381	15,904,304	4,009,809	3,791	5,215,893
Hanwha Q CELLS Japan Co., Ltd.	24,354,981	13,399,956	-	34,752	3,320,171
TRI Energy Global Pte. Ltd.	574,538,202	738,227,620	-	61,261,137	34,752
Total Marine Fuels Pte. Ltd.	5,329,179	-	-	-	-
Total Petrochemicals (Foshan) Ltd.	85,963	-	-	-	-
Total Petrochemical and Refining SA/NV	7,868,085	27,753	-	534,854	110,647
Total SA	6,601	16,746,947	-	-	-
Total Trading Asia Pte. Ltd	458,403,399	662,422,582	-	26,277,356	48,738,560
TOTSA Total Oil Trading SA	34,836,948	55,779,056	-	13,212,375	-
Atlantic Trading and Marketing Inc.	22,413,942	-	-	-	-
Total Petrochemicals and Refining USA	1,718,968	-	-	361,374	-
TOTAL PETROCHEMICALS (NINGBO) Ltd.	5,111,758	-	-	-	-
Others	2,563,690	1,301,939	3,723	460,457	185,094
	₩ 1,848,707,195	₩ 1,584,552,959	₩ 382,856,521	₩ 349,551,491	₩ 99,764,568

Terms and conditions of transactions with related parties

Outstanding balances at the year-end are unsecured, interest free and settled in cash. There have been no guarantees provided or received for any related party receivables or payables. For the years ended December 31, 2019 and 2018, the Group has not recognized any impairment of receivables relating to amounts owed by the related parties. This assessment is undertaken each financial year through examining the financial position of the related parties and the market in which the related parties operate.

23. Segment information

The financial information about geographic areas for the years ended December 31, 2019 and 2018 are as follows (Korean won in thousands):

	2019			
	Korea	China	Consolidation elimination	Total
Sales	₩ 9,837,450,679	₩ 45,161,885	₩ -	₩ 9,882,612,564
Inter-company sales	18,951,153	18,705,798	(37,656,951)	-
Net sales	9,818,499,526	26,456,087	-	9,844,955,613
Operating profit	464,131,106	2,410,694	454,178	466,995,978
Profit for the year	317,992,949	1,908,982	431,429	320,333,360
Non-current assets (*)	4,598,259,965	7,115,459	-	4,605,375,424

	2018			
	Korea	China	Consolidation elimination	Total
Sales	₩ 11,210,242,909	₩ 45,582,222	₩ -	₩ 11,255,825,131
Inter-company sales	24,182,219	22,258,343	(46,440,562)	-
Net sales	11,186,060,690	23,323,878	-	11,209,384,568
Operating profit	1,060,726,999	1,414,684	563,456	1,062,705,139
Profit for the year	822,541,584	1,173,524	563,460	824,278,568
Non-current assets (*)	4,176,233,634	6,059,056	-	4,182,292,690

(*) Financial instruments, deferred tax assets and others are excluded from the non-current assets.
The Group consists of only one operating segment.

24. Financial risk management objectives and policies

The Group's principal financial liabilities comprise borrowings, bonds payable, trade and other accounts payable. The main purpose of these financial liabilities is to finance the Group's operations. The Group also has various financial assets including trade and notes receivable and cash and cash equivalents that arise directly from its operations.

The Group is exposed to market risk, credit risk and liquidity risk and the Group's key management oversees the management of these risks. It is the Group's policy that no trading in derivatives for speculative purposes shall be undertaken.

Market risk
Market risk is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risks comprise three types of risk: interest rate risk, foreign currency risk and feedstock price risk.

Interest rate risk
Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Group's exposure to the risk of changes in market interest rates relates primarily to the Group's long-term debt obligations with floating interest rates. The Group manages its interest rate risk by having a balanced portfolio of fixed and variable rate loans and borrowings with the interest rate swap contracts. Borrowings with floating interest rates nominal amounts to ₩480,000,000 thousand and ₩525,000,000 thousand as of December 31, 2019 and 2018, respectively. The impact of changes in market interest rates on the fair value of future cash flows of the Group's financial instruments, after taking into account the currency swap contracts, is not material.

24. Financial risk management objectives and policies (cont'd)

Foreign currency risk
Foreign currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates. The Group's exposure to the risk of changes in foreign exchange rates relates primarily to the Group's operating activities (when revenue or expense is denominated in a different currency from the Group's functional currency) and the Group's net investment in foreign subsidiaries. The Group manages its foreign currency risk periodically, especially by entering into currency forward and currency interest rate swap contracts.

Significant monetary assets and liabilities denominated in foreign currencies as of December 31, 2019 and 2018 are as follows (US dollar and Korean won in thousands):

	2019			2018		
	Currency	Foreign currencies	Korean won	Currency	Foreign currencies	Korean won
Financial assets	USD	416,377	₩ 482,080,807	USD	581,781	₩ 650,488,784
	Others		20,003,928	Others		20,492,156
			₩ 502,084,735			₩ 670,980,940
Financial liabilities	USD	950,297	₩ 1,100,253,991	USD	410,643	₩ 459,139,936
	Others		8,057,102	Others		9,750,554
			₩ 1,108,311,093			₩ 468,890,490

The following table demonstrates the sensitivity to a reasonably possible changes in the US dollar exchange rate, with all other variables held constant. The Group's exposure to foreign currency changes for all other currencies is not material (Korean won in thousands):

	2019		2018	
	(+) 10%	(-) 10%	(+) 10%	(-) 10%
Increase (decrease) in profit for the year	₩ (4,122,457)	₩ 4,122,457	₩ (2,700,144)	₩ 2,700,144

Feedstock price risk
Feedstock price risk is the risk that the Group's income and cash flow will change due to the fluctuations in international market prices of the Group's feedstock including condensate. The Group entered into a commodity swap to hedge the risk of changes in feedstock. The commodity swap is exposed to the risk of changes in fair value. However, the price changes in fair value of the commodity swap can be offset with changes in operating margin. Therefore, the risk of changes in feedstock price is appropriately managed.

Credit risk
Credit risk is the risk that counterparty will not meet its obligations under a financial instrument or customer contract, leading to a financial loss of the Group.

Trade and other accounts receivable
Customer credit risk is managed by each business unit subject to the Group's established policy, procedures and control relating to customer credit risk management. Credit quality of the customer is assessed based on an extensive credit rating scorecard and individual credit limits are defined in accordance with this assessment. As of December 31, 2019, trade accounts receivable from the top five customers accounted for 24.6% or ₩170,348,669 thousand of total trade accounts receivable.

The requirement for impairment is analyzed at each reporting date on an individual basis for major customers. Additionally, a large number of minor receivables are grouped into homogenous groups and assessed for impairment collectively. The calculation is based on actually incurred historical data. The maximum exposure to credit risk at the reporting date is the carrying value of each class of financial assets disclosed in Note 3.

24. Financial risk management objectives and policies (cont'd)

Other financial assets
Credit risks associated with the Group's other financial assets which consist of bank deposits and long-term loans arise from the default by the counterparties. Maximum exposure to credit risks will be the carrying value of such financial assets. The Group deposits its surplus funds in the financial institutions whose credit ratings are high and, therefore, credit risks related to such financial institutions are considered limited.

Liquidity risk
Liquidity risk refers to the risk that the Group may default on the contractual obligations that become due. The Group monitors its risk to a shortage of funds using a recurring liquidity planning tool.

The Group's objective is to maintain a balance between continuity of funding and flexibility through the use of bank overdrafts, bank borrowings and bonds. The table below summarizes the maturity profile of the Group's financial liabilities based on contractual undiscounted payments (Korean won in thousands):

	2019				
	Within 3 months	3 months ~ 1 year	1 year ~ 5 years	Over 5 years	Total
Bonds payable and borrowings	₩ 194,025,577	₩ 360,000,000	₩ 1,843,120,000	₩ 180,000,000	₩ 2,577,145,577

	2018				
	Within 3 months	3 months ~ 1 year	1 year ~ 5 years	Over 5 years	Total
Bonds payable and borrowings	₩ 467,334,402	₩ 200,000,000	₩ 1,480,000,000	₩ 100,000,000	₩ 2,247,334,402

21.6% of the Group's financial liabilities will mature in less than one year as of December 31, 2019 based on the carrying value of bonds and borrowings reflected in the consolidated financial statements. The Group assessed the concentration of risk with respect to refinancing its debt and concluded it to be manageable.

Capital management
The primary objective of the Group's capital management is to ensure that it maintains a strong credit rating and healthy capital ratios in order to support its business and maximize shareholder value. The Group manages its capital structure and makes adjustments to it in light of changes in economic conditions. No changes were made in the objectives, policies or processes during the years ended December 31, 2019 and 2018. The Group's debt-to-equity ratios as of December 31, 2019 and 2018 are 96.7% and 81.7%, respectively.

25. Approval of financial statements

The consolidated financial statements of the Group for the year ended December 31, 2019 were approved by the Company's Board of Directors on January 31, 2020.