# Hanwha Total Petrochemical Co., Ltd. and its subsidiaries

Consolidated financial statements
for the years ended December 31, 2018 and 2017
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, 2018 and 2017, 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, 2018 and 2017 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 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.

**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.

Ernst & Young Han Young

19 March, 2019

This audit report is effective as of 19 March, 2019, 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, 2018 and 2017

"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, 2018 and 2017**
(Korean won)

| | Notes | | 2018 | | 2017 |
|---|---|---|---|---|---|
| **Assets** | | | | | |
| **Current assets:** | | | | | |
| Cash and cash equivalents | 3 | ₩ | 259,217,545,462 | ₩ | 294,905,675,197 |
| Trade and other accounts receivable, net | 3, 4, 12, 21, 23 | | 955,880,335,491 | | 1,085,495,318,143 |
| Prepaid expenses | | | 14,391,785,190 | | 11,397,050,941 |
| Other current assets | | | 3,468,879,811 | | 1,054,749,486 |
| Inventories, net | 5 | | 1,410,443,126,039 | | 1,247,046,270,237 |
| Total current assets | | | 2,643,401,671,993 | | 2,639,899,064,004 |
| **Non-current assets:** | | | | | |
| Long-term investment securities | 3, 6 | | 12,209,886,880 | | - |
| Available-for-sale financial assets | 3, 6 | | - | | 10,371,815,680 |
| Long-term loans, net | 3, 4 | | 454,040,479 | | 532,395,927 |
| Long-term accounts receivable, net | 3, 4, 23 | | 3,181,509,850 | | 3,155,043,022 |
| Long-term prepaid expenses | | | 42,636,055,187 | | 55,852,215,626 |
| Property, plant and equipment, net | 7, 22 | | 4,079,911,969,362 | | 3,904,018,474,366 |
| Intangible assets, net | 8, 22 | | 59,744,665,824 | | 59,124,851,793 |
| Other non-current assets | 3, 22 | | 15,500,000 | | 16,000,000 |
| Deferred tax assets | 17 | | 2,936,621,085 | | 11,121,009,410 |
| Total non-current assets | | | 4,201,090,248,667 | | 4,044,191,805,824 |
| **Total assets** | | **₩** | **6,844,491,920,660** | **₩** | **6,684,090,869,828** |

(Continued)

**Hanwha Total Petrochemical Co., Ltd. and its subsidiaries**
**Consolidated statements of financial position**
**as of December 31, 2018 and 2017 (cont'd)**
(Korean won)

| | Notes | 2018 | 2017 |
|---|---|---|---|
| **Liabilities** | | | |
| **Current liabilities:** | | | |
| Trade and other accounts payable | 3, 12, 13, 21 | ₩ 676,350,423,324 | ₩ 1,017,867,001,452 |
| Short-term borrowings | 3, 4, 9, 23 | 122,334,401,888 | 104,024,770,191 |
| Current portion of bonds payable and long-term borrowings | 3, 9, 23 | 544,849,221,136 | 479,745,395,856 |
| Income tax payable | | 125,449,149,692 | 189,940,096,735 |
| Other current liabilities | 10 | 14,627,199,761 | 17,163,176,573 |
| Total current liabilities | | 1,483,610,395,801 | 1,808,740,440,807 |
| **Non-current liabilities:** | | | |
| Bonds payable, net | 3, 9, 23 | 937,293,714,712 | 738,846,432,308 |
| Long-term borrowings | 3, 9, 23 | 640,000,000,000 | 404,828,283,377 |
| Long-term accounts payable | 3 | 382,412,562 | 1,097,040,744 |
| Employee benefit liability, net | 11 | 8,099,546,289 | 3,368,870,242 |
| Other non-current liabilities | | 7,307,604,783 | 5,634,836,961 |
| Total non-current liabilities | | 1,593,083,278,346 | 1,153,775,463,632 |
| **Total liabilities** | | **3,076,693,674,147** | **2,962,515,904,439** |
| **Equity** | | | |
| Equity attributable to equity holders of the Company: | | | |
| Issued capital | 15 | 95,826,580,000 | 95,826,580,000 |
| Share premium | 15 | 864,898,306,667 | 864,898,306,667 |
| Accumulated other comprehensive income | 12, 15 | (393,443,582) | 158,169,780 |
| Retained earnings | 15 | 2,807,466,803,428 | 2,760,691,908,942 |
| | | 3,767,798,246,513 | 3,721,574,965,389 |
| Non-controlling interests | | - | - |
| **Total equity** | | **3,767,798,246,513** | **3,721,574,965,389** |
| **Total liabilities and equity** | | **₩ 6,844,491,920,660** | **₩ 6,684,090,869,828** |

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, 2018 and 2017**
(Korean won)

| | Notes | 2018 | 2017 |
|---|---|---|---|
| Sales | 21, 22 | ₩ 11,209,384,568,479 | ₩ 9,677,486,655,399 |
| Cost of goods sold | 5, 16, 21 | 9,851,399,635,105 | 7,816,903,086,776 |
| **Gross profit** | | **1,357,984,933,374** | **1,860,583,568,623** |
| Selling and administrative expenses | 16 | 295,279,794,650 | 344,392,326,339 |
| **Operating profit** | 22 | **1,062,705,138,724** | **1,516,191,242,284** |
| Finance income | 3, 12, 16 | 288,740,154,823 | 228,542,380,232 |
| Finance costs | 3, 12, 16 | 277,527,319,502 | 283,844,347,797 |
| Other income | 16 | 33,498,547,270 | 19,142,271,591 |
| Other expenses | 16 | 23,371,561,964 | 27,463,751,626 |
| **Profit before tax** | | **1,084,044,959,351** | **1,452,567,794,684** |
| Income tax expense | 17 | 259,766,391,229 | 349,692,555,937 |
| **Net profit for the year** | 22 | **₩ 824,278,568,122** | **₩ 1,102,875,238,747** |
| **Other comprehensive income** | | | |
| *Other comprehensive income to be reclassified to profit or loss in subsequent periods:* | | | |
| Net gain (loss) on interest rate swaps | 12 | (1,975,652,043) | 1,216,707,679 |
| Exchange differences on translation of foreign operations | | (138,855,847) | (1,189,844,566) |
| **Net other comprehensive income (loss) to be reclassified to profit or loss in subsequent periods** | | **₩ (2,114,507,890)** | **₩ 26,863,113** |
| *Other comprehensive income not to be reclassified to profit or loss in subsequent periods:* | | | |
| Re-measurement gain (loss) on defined benefit plan | 11 | (8,888,673,636) | 847,751,775 |
| Net gain on valuation of financial instruments measured at FVOCI | 6 | 1,562,894,528 | - |
| **Net other comprehensive income (loss) not to be reclassified to profit or loss in subsequent periods** | | **₩ (7,325,779,108)** | **₩ 847,751,775** |
| **Other comprehensive income (loss) for the year, net of tax** | | **(9,440,286,998)** | **874,614,888** |
| **Total comprehensive income for the year, net of tax** | | **₩ 814,838,281,124** | **₩ 1,103,749,853,635** |
| Profit attributable to: | | | |
| Equity holders of the Company | | ₩ 824,278,568,122 | ₩ 1,102,875,238,747 |
| Non-controlling interests | | - | - |
| | | ₩ 824,278,568,122 | ₩ 1,102,875,238,747 |
| Total comprehensive income attributable to: | | | |
| Owners of the parent | | 814,838,281,124 | 1,103,749,853,635 |
| Non-controlling interests | | - | - |
| | | ₩ 814,838,281,124 | ₩ 1,103,749,853,635 |
| **Earnings per share:** | | | |
| Basic and diluted, earnings per share | 18 | ₩ 43,009 | ₩ 57,545 |

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, 2018 and 2017**
(Korean won)

| | Issued capital | Share premium | Accumulated other comprehensive income | Retained earnings | Equity attributable to equity holders of the Company | Non-controlling interests | Total equity |
|---|---|---|---|---|---|---|---|
| **As of January 1, 2017** | **₩ 95,826,580,000** | **₩ 864,898,306,667** | **₩ 131,306,667** | **₩ 2,496,327,918,420** | **₩ 3,457,184,111,754** | **₩ -** | **₩ 3,457,184,111,754** |
| Net profit for the year | - | - | - | 1,102,875,238,747 | 1,102,875,238,747 | - | 1,102,875,238,747 |
| Net gain on valuation of interest rate swaps | - | - | 1,216,707,679 | - | 1,216,707,679 | - | 1,216,707,679 |
| Exchange differences on translation of foreign operations | - | - | (1,189,844,566) | - | (1,189,844,566) | - | (1,189,844,566) |
| Re-measurement gain on defined benefit plan | - | - | - | 847,751,775 | 847,751,775 | - | 847,751,775 |
| Total comprehensive income for the year | - | - | 26,863,113 | 1,103,722,990,522 ` | 1,103,749,853,635 | - | 1,103,749,853,635 |
| Dividend | | - | - | (561,359,000,000) | (561,359,000,000) | - | (561,359,000,000) |
| Interim dividend | - | - | - | (278,000,000,000) | (278,000,000,000) | - | (278,000,000,000) |
| **As of December 31, 2017** | **₩ 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** |
| | | | | | | | |
| **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** |
| Net 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 defined benefit plan | - | - | - | (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** |

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, 2018 and 2017**
(Korean won)

| | 2018 | 2017 |
|---|---|---|
| **Cash flows from operating activities:** | | |
| Net profit for the year | ₩ 824,278,568,122 | ₩ 1,102,875,238,747 |
| Non-cash adjustments to reconcile profit for the year to net cash flows provided by operating activities (Note 20) | 633,518,477,536 | 765,657,898,026 |
| Working capital adjustments (Note 20) | (370,805,968,689) | (249,436,887,990) |
| Interest received | 3,837,544,926 | 4,625,660,068 |
| Income tax paid | (312,736,388,076) | (421,936,065,984) |
| **Net cash flows provided by operating activities** | **778,092,233,819** | **1,201,785,842,867** |
| **Cash flows from investing activities:** | | |
| Decrease in long-term loans | 178,355,448 | 180,867,448 |
| Increase in long-term loans | (100,000,000) | (17,073,375) |
| Proceeds from disposal of long-term investment securities | 285,430,000 | - |
| Increase in long-term investment securities | (3,200) | - |
| Proceeds from disposal of available-for-sale financial assets | - | 60,313,200 |
| Increase in available-for-sale financial assets | - | (6,400) |
| Decrease in long-term financial instruments | 500,000 | - |
| Decrease in long-term accounts receivable | 56,354,698 | 35,932,320 |
| Increase in long-term accounts receivable | (3,722,225) | (251,651,676) |
| Proceeds from disposal of property, plant and equipment | 3,652,504,651 | 3,889,906,993 |
| Acquisition of property, plant and equipment | (554,022,542,845) | (419,653,641,044) |
| Proceeds from disposal of intangible assets | - | 820,000,000 |
| Acquisition of intangible assets | (81,214,440) | - |
| Settlement of derivatives | 43,530,723,861 | 19,109,733,433 |
| Dividends received | 264,924,920 | 305,682,600 |
| **Net cash flows used in investing activities** | **(506,238,689,132)** | **(395,519,936,501)** |
| **Cash flows from financing activities:** | | |
| Increase in bonds | 700,000,000,000 | 140,000,000,000 |
| Net increase (decrease) in short-term borrowings | 18,613,380,516 | 58,251,358,946 |
| Repayment of current portion of long-term bonds and long-term borrowings | (480,000,000,000) | (550,000,000,000) |
| Increase in long-term borrowings | 280,000,000,000 | 160,000,000,000 |
| Interest paid | (57,445,995,379) | (54,564,638,010) |
| Dividends paid to shareholders | (768,615,000,000) | (839,359,000,000) |
| **Net cash flows used in financing activities** | **(307,447,614,863)** | **(1,085,672,279,064)** |
| **Net decrease in cash and cash equivalents** | **(35,594,070,176)** | **(279,406,372,698)** |
| **Cash and cash equivalents as of January 1** | **294,905,675,197** | **574,559,321,749** |
| **Net foreign exchange difference** | **(94,059,559)** | **(247,273,854)** |
| **Cash and cash equivalents as of December 31** | **₩ 259,217,545,462** | **₩ 294,905,675,197** |

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 by 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, 2018 and 2017, 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 (Seosan City), Choongchungnam-do.

**Information about subsidiaries**

The Company’s subsidiaries as of December 31, 2018 and 2017 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 at and for the years ended December 31, 2018 and 2017, which has been included in the consolidated financial statements, is as follows (Korean won in thousands):

| | 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 |

| | 2017 | | | | | |
|---|---|---|---|---|---|---|
| Subsidiary | Assets | Liabilities | Equity | Revenue | Profit for the year | Total comprehensive income |
| Dongguan Hanwha Total Engineering Plastic Co., Ltd. | ₩ 22,551,575 | ₩ 4,007,223 | ₩ 18,544,353 | ₩ 37,861,221 | ₩ 742,841 | ₩ (320,408) |
| Hanwha Total Petrochemical Trading (Shanghai) Co., Ltd. | 2,688,835 | 421,133 | 2,267,702 | 4,912,570 | 189,718 | 63,123 |

There were no changes in the scope of consolidation for the years ended December 31, 2018 and 2017.

## 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, 2018 and 2017. Control is achieved when the Group is exposed, or has rights, to variable returns from its involvement with the investee and has the ability to affect those returns through its power over the investee. Specifically, the Group controls an investee if and only if the Group has:

- Power over the investee (i.e. existing rights that give it the current ability to direct the relevant activities of the investee)
- Exposure, or rights, to variable returns from its involvement with the investee, 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 equity holders of the parent of the Group and to the non-controlling interests, even if this results in the non-controlling interests having a deficit balance. When necessary, adjustments are made to the financial statements of subsidiaries to bring their accounting policies into line with the Group's accounting policies. All intra-group assets and liabilities, equity, income, expenses and cash flows relating to transactions between members of the Group are eliminated in full on consolidation.

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

- Derecognizes the 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.

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

**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.

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.

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

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.

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
- Financial assets at fair value through profit or loss

***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.

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

***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 elected 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.

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.

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

**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, including contract assets | 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 and contract assets, 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.

**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.

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

**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 the consolidated statement of comprehensive income.

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***
This is the category most relevant to the Group. 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. The EIR amortization is included as finance costs in the consolidated statement of comprehensive income.

**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 the consolidated statement of comprehensive income.

**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.

**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
- Hedges of a net investment in a foreign operation

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

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 the consolidated statement of comprehensive income. 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 the consolidated statement of comprehensive income.

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 and loss.

***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 the consolidated statement of comprehensive income. 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 forward currency contracts as hedges of its exposure to foreign currency risk in forecast transactions and firm commitments, as well as forward commodity contracts for its exposure to volatility in the commodity prices. The ineffective portion relating to foreign currency contracts is recognized as other expense and the ineffective portion relating to commodity contracts is recognized in other income or expenses.

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

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.

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.

***Hedges of a net investment***
Hedges of a net investment in a foreign operation, including a hedge of a monetary item that is accounted for as part of the net investment, are accounted for in a way similar to cash flow hedges. Gains or losses on the hedging instrument relating to the effective portion of the hedge are recognized as OCI while any gains or losses relating to the ineffective portion are recognized in the consolidated statement of comprehensive income. On disposal of the foreign operation, the cumulative value of any such gains or losses recorded in equity is transferred to the consolidated statement of comprehensive income.

### Revenue from contracts with customers

(a) Goods sold
For contracts for goods sold to customers, the Group generally expects revenue recognized when the control to the goods have 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 controls 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.

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

**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.

**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, catalysts, tools and furniture | 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.

**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.

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

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 the consolidated statement of comprehensive income when the asset is derecognized.

**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

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 14.

### Foreign currency translation

The Group's consolidated financial statements are presented in Korean won. 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 net profit for the year 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 financial statements 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.

In the process of applying the Group's accounting policies, management has made the following judgments, which have the most significant effect on the amounts recognized in the consolidated financial statements.

**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.

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

**Amended standards**

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

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

The amendments to KIFRS 1102 *Share-based Payment* that address three main areas: the effects of vesting conditions on the measurement of a cash-settled share-based payment transaction; the classification of a share-based payment transaction with net settlement features for withholding tax obligations; and accounting where a modification to the terms and conditions of a share-based payment transaction changes its classification from cash settled to equity settled. Therefore, these amendments do not have significant impact on the Group's consolidated financial statements.

**Amendments to KIFRS 2122 *Foreign Currency Transactions and Advance Consideration***

The Interpretation clarifies that, in determining the spot exchange rate to use on initial recognition of the related asset, expense or income (or part of it) on the derecognition of a non-monetary asset or non-monetary liability relating to advance consideration, the date of the transaction is the date on which an entity initially recognizes the non-monetary asset or non-monetary liability arising from the advance consideration. If there are multiple payments or receipts in advance, then the entity must determine the transaction date for each payment or receipt of advance consideration. The amendments has no effect on the Group's consolidated financial statements.

**KIFRS 1109 *Financial Instruments***

The Group adopted the KIFRS 1109 *Financial Instruments* for the first time for the financial year beginning on January 1, 2018. In accordance with the KIFRS 1109, the comparative financial statements were not restated and the difference between the carrying amount per the prior period and the carrying amount per the initial application date was recognized in retained earnings on January 1, 2018. In summary, the expected impact of KIFRS 1109 adoption on the classification of the Group's financial assets (excluding derivatives) as of December 31, 2017 is as follows (Korean won in thousands):

| Accounts | Classification according to KIFRS 1039 | Classification according to KIFRS 1109 | Amounts according to the KIFRS 1039 | Amounts according to the KIFRS 1109 |
|---|---|---|---|---|
| Trade receivables | Loans and receivables | Amortized costs | ₩ 1,013,445,820 | ₩ 1,013,445,820 |
| Other receivables | Loans and receivables | Amortized costs | 65,150,711 | 65,150,711 |
| Accrued income | Loans and receivables | Amortized costs | 89,974 | 89,974 |
| Guarantee deposits | Loans and receivables | Amortized costs | 52,014 | 52,014 |
| Available-for-sale financial assets (equity securities) | Available-for-sale financial assets | OCI- fair value | 9,849,586 | 9,849,586 |
| Available-for-sale financial assets (debt securities) | Available-for-sale financial assets | Amortized costs | 522,230 | 522,230 |
| Long-term loans | Loans and receivables | Amortized costs | 532,396 | 532,396 |
| Refundable deposits | Loans and receivables | Amortized costs | 3,155,043 | 3,155,043 |
| Long-term financial instruments | Loans and receivables | Amortized costs | 16,000 | 16,000 |

**KIFRS 1115 *Revenue from Contracts with Customers***

The Group adopted the amendments to KIFRS 1115 *Revenue from Contracts with Customers.* In accordance with the transitional provisions of KIFRS 1115, comparative financial statements presented were not restated and the cumulative effect of initial application was applied retrospectively and recognized in retained earnings (or equity) on January 1, 2018. Upon first adoption of KIFRS 1115, the Group's sales for the year ended December 31, 2018 decreased by ₩ 1,297,720 thousand, cost of goods sold increased by ₩68,848,474 thousand, and selling and administrative expenses decreased by ₩70,146,194 thousand.

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

**Standards issued but not yet effective**

Standards issued but not yet effective up to the date of issuance of the Group's consolidated financial statements are listed below. The Group intends to adopt these standards when they become effective.

**KIFRS 1116 *Leases***

KIFRS 1116 was issued in January 2016 and it replaces KIFRS 1017 *Leases*, KIFRS 2104 *Determining whether an Arrangement contains a Lease*, KIFRS 2015 *Operating Leases-Incentives* and KIFRS 2027 *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*. KIFRS 1116 sets out the principles for the recognition, measurement, presentation and disclosure of leases and requires lessees to account for all leases under a single on-balance sheet model similar to the accounting for finance leases under KIFRS 1017. The standard includes two recognition exemptions for lessees – leases of 'low-value' assets (e.g., personal computers) and short-term leases (i.e., leases with a lease term of 12 months or less). At the commencement date of a lease, a lessee will recognize a liability to make lease payments (i.e., the lease liability) and an asset representing the right to use the underlying asset during the lease term (i.e., the right-of-use asset). Lessees will be required to separately recognize the interest expense on the lease liability and the depreciation expense on the right-of-use asset.

Lessees will be also required to remeasure the lease liability upon the occurrence of certain events (e.g., a change in the lease term, a change in future lease payments resulting from a change in an index or rate used to determine those payments). The lessee will generally recognize the amount of the remeasurement of the lease liability as an adjustment to the right-of-use asset.

Lessor accounting under KIFRS 1116 is not significantly changed from today's accounting under KIFRS 1017. Lessors will continue to classify all leases using the same classification principle as in KIFRS 1017 and distinguish between two types of leases: operating and finance leases.

KIFRS 1116 is effective for annual periods beginning on or after January 1, 2019 and requires lessees and lessors to make more extensive disclosures than under KIFRS 1017.

As a practical expedient, a lessee may elect, by class of the underlying asset, not to separate non-lease components from lease components, and instead account for each lease component and any associated non-lease components as a single component. The Group is analyzing the impact on the consolidated financial statements, but it is difficult in practice to provide a reasonable estimate of the financial impact until the Group completes this analysis. The amendments have no significant effect on the Group's consolidated financial statements.

**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 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
- Determine 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 also clarify that an entity first determines any past service cost, or a gain or loss on settlement, without considering the effect of the asset ceiling. This amount is recognized in profit or loss. An entity then determines the effect of the asset ceiling after the plan amendment, curtailment or settlement. Any change in that effect, excluding amounts included in the net interest, is recognized in other comprehensive income. The amendments apply to plan amendments, curtailments, or settlements occurring on or after the beginning of the first annual reporting period that begins on or after January 1, 2019, with early application permitted.

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

**IFRIC Interpretation 23 *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 and 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 has to determine whether to consider each uncertain tax treatment separately or together with one or more other uncertain tax treatments. The approach that better predicts the resolution of the uncertainty should be followed. The interpretation is effective for annual reporting periods beginning on or after January 1, 2019, but certain transition reliefs are available. The Group will apply the interpretation from its effective date. The amendments have no significant effect on the Group's consolidated financial statements.

**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 the entity originally recognized those past transactions or events. An entity applies those amendments for annual reporting periods beginning on or after January 1, 2019, with early application is permitted. When an 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, the Group does not expect any effect on its consolidated financial statements.

**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. An entity applies those 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, the Group does not expect any effect on its consolidated financial statements.

## 3. Financial instruments

Financial assets as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | | | |
|---|---|---|---|---|---|
| | Financial assets measured at FVTPL | Financial assets measured at amortized cost | Financial assets measured at FVOCI | Hedged financial assets | Total |
| Current assets: | | | | | |
| Cash and cash equivalents | ₩ - | ₩ 259,217,545 | ₩ - | ₩ - | ₩ 259,217,545 |
| Trade and other accounts receivable: | | | | | |
| Trade accounts and notes 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 |

| | 2017 | | | | |
|---|---|---|---|---|---|
| | Loans and receivables | Financial assets at fair value through profit or loss | Available-for-sale financial assets | Hedged financial assets | Total |
| Current assets: | | | | | |
| Cash and cash equivalents | ₩ 294,905,675 | ₩ - | ₩ - | ₩ - | ₩ 294,905,675 |
| Trade and other accounts receivable: | | | | | |
| Trade accounts and notes receivable | 1,013,445,820 | - | - | - | 1,013,445,820 |
| Other accounts receivable | 65,150,711 | 1,725,313 | - | 5,031,486 | 71,907,510 |
| Accrued income | 89,974 | - | - | - | 89,974 |
| Guarantee deposits | 52,014 | - | - | - | 52,014 |
| | 1,373,644,194 | 1,725,313 | - | 5,031,486 | 1,380,400,993 |
| Non-current assets: | | | | | |
| Available-for-sale financial assets | - | - | 10,371,816 | - | 10,371,816 |
| Long-term loans | 532,396 | - | - | - | 532,396 |
| Long-term accounts receivable: | | | | | |
| Refundable deposits | 3,155,043 | - | - | - | 3,155,043 |
| Other non-current assets: | | | | | |
| Long-term financial instruments | 16,000 | - | - | - | 16,000 |
| | 3,703,439 | - | 10,371,816 | - | 14,075,255 |
| | ₩ 1,377,347,633 | ₩ 1,725,313 | ₩ 10,371,816 | ₩ 5,031,486 | ₩ 1,394,476,245 |

## 3. Financial instruments (cont'd)

Financial liabilities as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | | |
|---|---|---|---|---|
| | Financial liabilities measured at FVTPL | Hedged financial liabilities | Other financial liabilities | 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 received | - | - | 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 |

| | 2017 | | | |
|---|---|---|---|---|
| | Financial liabilities at fair value through profit or loss | Hedged financial liabilities | Other financial liabilities | Total |
| Current liabilities: | | | | |
| Trade and other accounts payable: | | | | |
| Trade accounts payable | ₩ - | ₩ - | ₩ 743,820,571 | ₩ 743,820,571 |
| Other accounts payable | 603,209 | 3,342,949 | 164,000,384 | ₩ 167,946,542 |
| Accrued expenses | - | - | 106,000,589 | 106,000,589 |
| Deposits received | - | - | 99,300 | 99,300 |
| Short-term borrowings | - | - | 104,024,770 | 104,024,770 |
| Current portion of bonds payable and long-term borrowings | - | - | 479,745,396 | 479,745,396 |
| | 603,209 | 3,342,949 | 1,597,691,010 | 1,601,637,168 |
| Non-current liabilities: | | | | |
| Bonds payable | - | - | 738,846,432 | 738,846,432 |
| Long-term borrowings | - | - | 404,828,283 | 404,828,283 |
| Long-term accounts payable | - | - | 1,097,041 | 1,097,041 |
| | - | - | 1,144,771,756 | 1,144,771,756 |
| | ₩ 603,209 | ₩ 3,342,949 | ₩ 2,742,462,766 | ₩ 2,746,408,924 |

## 3. Financial instruments (cont'd)

Gains or losses by financial instrument for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Financial assets | | | | Financial liabilities | | | |
| | Financial assets measured at FVTPL | Financial assets measured at amortized cost | Financial assets measured at FVOCI | Hedged financial assets | Financial liabilities measured at FVTPL | Hedged financial liabilities | 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 |
| Reversal of allowance for doubtful accounts | - | 16,295 | - | - | - | - | - | 16,295 |

| | 2017 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Financial assets | | | | Financial liabilities | | | |
| | Loans and receivables | Financial assets at fair value through profit or loss | Available-for-sale financial assets | Hedged financial assets | Financial liabilities at fair value through profit or loss | Hedged financial liabilities | Other financial liabilities | Total |
| Interest income | ₩ 4,356,867 | ₩ - | ₩ 8,776 | ₩ - | ₩ - | ₩ - | ₩ - | ₩ 4,365,643 |
| Interest expenses | - | - | - | - | - | - | (48,166,909) | (48,166,909) |
| Gain (loss) on valuation of derivative instruments | - | 1,725,312 | - | 3,269,324 | (603,208) | (3,269,324) | - | 1,122,104 |
| Gain (loss) on settlement of derivative instruments | - | 88,863,233 | - | - | (67,971,259) | - | - | 20,891,974 |
| Reversal of allowance for doubtful accounts | 304,250 | - | - | - | - | - | - | 304,250 |

Above gains or losses are inclusive of all the gains or losses on the financial instruments that are recorded as both selling and administrative expenses and finance income (costs).

## 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):

| | 2018 | | 2017 | |
|---|---|---|---|---|
| | Carrying amount | Fair value | Carrying amount | Fair value |
| Financial assets: | | | | |
| Cash and cash equivalents | ₩ 259,217,545 | ₩ 259,217,545 | ₩ 294,905,675 | ₩ 294,905,675 |
| Trade and other accounts receivable: | | | | |
| Trade accounts and notes receivable | 816,791,857 | 816,791,857 | 1,013,445,820 | 1,013,445,820 |
| Other accounts receivable (derivative assets) | 25,917,373 | 25,917,373 | 6,756,799 | 6,756,799 |
| Other accounts receivable | 112,926,897 | 112,926,897 | 65,150,711 | 65,150,711 |
| Accrued income | 225,524 | 225,524 | 89,974 | 89,974 |
| Guarantee deposits | 18,685 | 18,685 | 52,014 | 52,014 |
| Long-term investment securities | 12,209,887 | 12,209,887 | - | - |
| Available-for-sale financial assets | - | - | 10,371,816 | 10,371,816 |
| Long-term loans | 454,040 | 454,040 | 532,396 | 532,396 |
| Long-term accounts receivable: | | | | |
| Refundable deposits | 3,181,510 | 3,181,510 | 3,155,043 | 3,155,043 |
| Other non-current assets: | | | | |
| Long-term financial instruments | 15,500 | 15,500 | 16,000 | 16,000 |
| | ₩ 1,230,958,818 | ₩ 1,230,958,818 | ₩ 1,394,476,248 | ₩ 1,394,476,248 |

| | 2018 | | 2017 | |
|---|---|---|---|---|
| | Carrying amount | Fair value | Carrying amount | Fair value |
| Financial liabilities: | | | | |
| Trade and other accounts payable: | | | | |
| Trade accounts payable | ₩ 433,682,621 | ₩ 433,682,621 | ₩ 743,820,571 | ₩ 743,820,571 |
| Other accounts payable (derivative liability) | 3,600,740 | 3,600,740 | 3,946,158 | 3,946,158 |
| Other accounts payable | 129,720,974 | 129,720,974 | 164,000,384 | 164,000,384 |
| Accrued expenses | 109,246,788 | 109,246,788 | 106,000,589 | 106,000,589 |
| Deposits received | 99,300 | 99,300 | 99,300 | 99,300 |
| Short-term borrowings | 122,334,402 | 122,334,402 | 104,024,770 | 104,024,770 |
| Current portion of bonds payable and long-term borrowings | 544,849,221 | 544,849,221 | 479,745,396 | 479,745,396 |
| Bonds payable | 937,293,715 | 937,293,715 | 738,846,432 | 738,846,432 |
| Long-term borrowings | 640,000,000 | 640,000,000 | 404,828,283 | 404,828,283 |
| Long-term accounts payable | 382,413 | 382,413 | 1,097,041 | 1,097,041 |
| | ₩ 2,921,210,174 | ₩ 2,921,210,174 | ₩ 2,746,408,924 | ₩ 2,746,408,924 |

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

The levels of fair value measurements of financial instruments as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 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 and notes 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 received | - | - | 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 |

**3. Financial instruments (cont'd)**

| | 2017 | | | |
|---|---|---|---|---|
| | Level 1 | Level 2 | Level 3 | Total |
| Assets and liabilities measured at fair value: | | | | |
| Derivative assets (other accounts receivable) | ₩ - | ₩ 6,756,799 | ₩ - | ₩ 6,756,799 |
| Derivative liabilities (other accounts payable) | - | 3,946,158 | - | 3,946,158 |
| Assets and liabilities for which fair values are disclosed: | | | | |
| Cash and cash equivalents | 26,484 | 294,879,191 | - | 294,905,675 |
| Trade accounts and notes receivable | - | - | 1,013,445,820 | 1,013,445,820 |
| Other accounts receivable | - | - | 65,150,711 | 65,150,711 |
| Accrued income | - | - | 89,974 | 89,974 |
| Guarantee deposits | - | - | 52,014 | 52,014 |
| Long-term loans | - | - | 532,396 | 532,396 |
| Refundable deposits | - | - | 3,155,043 | 3,155,043 |
| Long-term financial instruments | - | 16,000 | - | 16,000 |
| Trade accounts payable | - | - | 743,820,571 | 743,820,571 |
| Other accounts payable | - | - | 164,000,384 | 164,000,384 |
| Accrued expenses | - | - | 106,000,589 | 106,000,589 |
| Deposits received | - | - | 99,300 | 99,300 |
| Short-term borrowings | - | 104,024,770 | - | 104,024,770 |
| Current portion of bonds payable and long-term borrowings | - | 479,745,396 | - | 479,745,396 |
| Bonds payable | - | 738,846,432 | - | 738,846,432 |
| Long-term borrowings | - | 404,828,283 | - | 404,828,283 |
| Long-term accounts payable | - | - | 1,097,041 | 1,097,041 |

For the years ended December 31, 2018 and 2017, there have been no transfers between level 1 and level 2 fair value measurements. Derivatives assets and liabilities the Group holds are over-the-counter derivatives and included in level 2 as the lowest level input, significant to the fair value measurement, is directly or indirectly observable.

Restricted deposits as of December 31, 2018 and 2017 consist of the following (Korean won in thousands):

| | 2018 | 2017 | Description |
|---|---|---|---|
| Long-term financial instruments | ₩ 15,500 | ₩ 16,000 | Deposits for maintenance of checking accounts |

## 4. Trade and other accounts receivable, net

Trade and other accounts receivable as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | |
|---|---|---|---|
| | Gross value | Allowance for doubtful accounts | Net value |
| Trade accounts and notes 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 |

| | 2017 | | |
|---|---|---|---|
| | Gross value | Allowance for doubtful accounts | Net value |
| Trade accounts and notes receivable | ₩ 1,014,501,354 | ₩ (1,055,534) | ₩ 1,013,445,820 |
| Other receivables (*) | 75,736,937 | - | 75,736,937 |
| | ₩ 1,090,238,291 | ₩ (1,055,534) | ₩ 1,089,182,757 |

(*) 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 ranges from 1% to 5% of the balances of trade receivables, differentiated by credit rating excluding Hanwha Group, Total Group, state-owned companies, and major conglomerates (Samsung, Hyundai Motors, SK, LG, Lotte, etc.). 20% ~ 100% of the balances of trade receivables are provided as an allowance considering 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.

Reversal of allowance for doubtful accounts included in selling and administrative expenses amounted to ₩16,295 thousand and ₩304,250 thousand for the years ended December 31, 2018 and 2017, respectively.

The aging analysis of trade and other accounts receivable as of December 31, 2018 and 2017 is as follows (Korean won in thousands):

| | 2018 | | | | | |
|---|---|---|---|---|---|---|
| | Neither past due nor impaired | Past due but not impaired | | | Impaired | Total |
| | | Within 90 days | 91 – 180 days | Over 180 days | | |
| Trade accounts and notes receivable | ₩ 798,869,795 | ₩ 17,493,607 | ₩ 58,623 | ₩ 369,832 | ₩ 1,039,239 | ₩ 817,831,096 |
| Other receivables | 142,724,029 | - | - | - | - | 142,724,029 |
| | ₩ 941,593,824 | ₩ 17,493,607 | ₩ 58,623 | ₩ 369,832 | ₩ 1,039,239 | ₩ 960,555,125 |

| | 2017 | | | | | |
|---|---|---|---|---|---|---|
| | Neither past due nor impaired | Past due but not impaired | | | Impaired | Total |
| | | Within 90 days | 91 – 180 days | Over 180 days | | |
| Trade accounts and notes receivable | ₩ 1,009,239,682 | ₩ 3,613,238 | ₩ 37,972 | ₩ 554,928 | ₩ 1,055,534 | ₩ 1,014,501,354 |
| Other receivables | 75,727,028 | 9,909 | - | - | - | 75,736,937 |
| | ₩ 1,084,966,710 | ₩ 3,623,147 | ₩ 37,972 | ₩ 554,928 | ₩ 1,055,534 | ₩ 1,090,238,291 |

The Group discounted accounts receivable pursuant to export bill discount agreements entered into with various financial institutions in 2018 and 2017. As the Group has retained the risks and rewards relating to transferred accounts receivable, the Group continues to recognize the discounted accounts receivable in its consolidated statements of financial position and recognizes short-term borrowings for the consideration received (See Note 9).

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

Discounted accounts receivable as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Book value: | | |
| Discounted accounts receivable | ₩ 44,912,075 | ₩ 36,425,472 |
| Related short-term borrowings | 44,912,075 | 36,425,472 |

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

## 5. Inventories

Inventories as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | |
|---|---|---|---|
| | Gross value | Valuation allowance | Net 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 |

| | 2017 | | |
|---|---|---|---|
| | Gross value | Valuation allowance | Net value |
| Finished goods | ₩ 203,471,854 | ₩ (177,617) | ₩ 203,294,237 |
| Semi-finished goods | 101,963,495 | (1,028,693) | 100,934,802 |
| Raw materials | 190,774,191 | - | 190,774,191 |
| Sub-materials | 10,855,657 | - | 10,855,657 |
| Supplies | 84,595,424 | - | 84,595,424 |
| By-products | 67,622,585 | - | 67,622,585 |
| Materials-in-transit | 588,969,374 | - | 588,969,374 |
| | ₩ 1,248,252,580 | ₩ (1,206,310) | ₩ 1,247,046,270 |

Loss on valuation of inventories included in cost of goods sold amounted to ₩49,825,165 thousand and ₩1,206,310 thousand for the years ended December 31, 2018 and 2017, respectively.

## 6. Long-term investments securities

Long-term investments securities of the Group as of December 31, 2018 and 2017 are as following (Korean won in thousands):

| | 2018 | | 2017 |
|---|---|---|---|
| | Acquisition cost | Book value | Book value |
| Financial assets measured at FVOCI: | | | |
| Non-listed equity investments (*) | ₩ 9,849,588 | ₩ 11,973,087 | ₩ 9,849,588 |
| Financial assets measured at amortized cost: | | | |
| National bonds (*) | 236,800 | 236,800 | 522,230 |
| | ₩ 10,086,388 | ₩ 12,209,887 | ₩ 10,371,816 |

(*) Classified as available-for-sale financial assets as of December 31, 2017.

## 7. Property, plant and equipment, net

The acquisition costs and net book value of property, plant and equipment as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 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 |

| | 2017 | | |
|---|---|---|---|
| | Cost | Accumulated depreciation | Book value |
| Land | ₩ 277,187,470 | ₩ - | ₩ 277,187,470 |
| Buildings | 224,422,688 | (50,878,727) | 173,543,961 |
| Structures | 959,191,156 | (304,263,625) | 654,927,531 |
| Machinery and equipment | 4,373,655,485 | (2,022,003,216) | 2,351,652,269 |
| Vehicles | 13,597,142 | (11,886,725) | 1,710,417 |
| Others | 260,155,145 | (140,945,359) | 119,209,786 |
| Construction-in-progress | 325,787,040 | - | 325,787,040 |
| | ₩ 6,433,996,126 | ₩ (2,529,977,652) | ₩ 3,904,018,474 |

Changes in the net book value of property, plant and equipment for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 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 |

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

| | 2017 | | | | | |
|---|---|---|---|---|---|---|
| | Jan. 1 | Acquisitions | Disposals | Transfers (*) | Depreciation | Dec. 31 |
| Land | ₩ 277,143,918 | ₩ - | ₩ - | ₩ 43,552 | ₩ - | ₩ 277,187,470 |
| Buildings | 175,454,321 | 129,454 | (9,759) | 4,278,216 | (6,308,271) | 173,543,961 |
| Structures | 686,269,915 | 87,963 | (6,130) | 5,366,394 | (36,790,611) | 654,927,531 |
| Machinery and equipment | 2,476,197,377 | 54,629 | (6,616,671) | 147,889,727 | (265,872,793) | 2,351,652,269 |
| Vehicles | 3,206,811 | 13,860 | (24,547) | 27,800 | (1,513,507) | 1,710,417 |
| Others | 111,087,665 | 4,534,280 | (1,175,463) | 47,827,772 | (43,064,468) | 119,209,786 |
| Construction-in-progress | 152,082,512 | 387,113,624 | - | (213,409,096) | - | 325,787,040 |
| | ₩ 3,881,442,519 | ₩ 391,933,810 | ₩ (7,832,570) | ₩ (7,975,635) | ₩ (353,549,650) | ₩ 3,904,018,474 |

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

**Capitalization of borrowing costs**
Borrowing costs capitalized as part of property, plant and equipment amounted to ₩10,608,883 thousand and ₩4,178,132 thousand for the years ended December 31, 2018 and 2017, respectively. Capitalization interest rate is 2.90% and 2.98% for the years ended December 31, 2018 and 2017, respectively.

## 8. Intangible assets, net

Changes in the net book value of intangible assets for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 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 |

| | 2017 | | | | | |
|---|---|---|---|---|---|---|
| | Jan. 1 | Acquisitions | Disposals | Transfers (*) | Amortization | Dec. 31 |
| Patents | ₩ 1,393,357 | ₩ - | ₩ (31,727) | ₩ 221,860 | ₩ (204,693) | ₩ 1,378,797 |
| Software | 35,047,415 | - | (64,713) | 4,943,442 | (13,507,425) | 26,418,719 |
| Facility use right | 18,497,296 | - | - | - | (639,677) | 17,857,619 |
| Land use right | 1,229,953 | - | - | (67,567) | (28,703) | 1,133,683 |
| Memberships | 10,630,521 | - | (820,000) | 2,525,513 | - | 12,336,034 |
| | ₩ 66,798,542 | ₩ - | ₩ (916,440) | ₩ 7,623,248 | ₩ (14,380,498) | ₩ 59,124,852 |

(*) 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 impairment test of memberships with indefinite lives and recognized no impairment loss in 2018 and 2017. Net realizable value of a membership is measured at the higher of value in use and fair value less costs to sell, or at value in use, in case fair value less costs to sell is not a reliable measurement.

## 9. Borrowings and bonds payable

Short-term borrowings as of December 31, 2018 and 2017 consist of the following (Korean won in thousands):

| | Financial institution | 2018 annual interest rate (%) | 2018 | 2017 |
|---|---|---|---|---|
| Bank overdrafts | Shinhan Bank | 3.52 | ₩ 77,422,327 | ₩ 67,599,298 |
| Discounted accounts receivable (*) | Woori Bank and others | 2.10~4.00 | 44,912,075 | 36,425,472 |
| | | | ₩ 122,334,402 | ₩ 104,024,770 |

(*) The Group entered into factoring contracts with financial institutions such as Woori Bank, Shinhan Bank and KEB Hana Bank and recognized the discounted accounts receivable as short-term borrowings for the consideration received in its consolidated statements of financial position (See Note 4).

Details of long-term bonds denominated in Korean won as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| Series | Issuance date | Maturity date | 2018 annual interest rate (%) | 2018 | 2017 |
|---|---|---|---|---|---|
| 11-2nd public placement bonds | 2012.01.13 | 2019.01.13 | 4.30 | ₩ 130,000,000 | ₩ 130,000,000 |
| 14-2nd public placement bonds | 2013.02.27 | 2018.02.27 | - | - | 100,000,000 |
| 15-2nd public placement bonds | 2013.04.19 | 2018.04.19 | - | - | 100,000,000 |
| 16-2nd public placement bonds | 2013.11.13 | 2018.11.13 | - | - | 100,000,000 |
| 17-2nd public placement bonds | 2014.02.26 | 2019.02.26 | 3.47 | 170,000,000 | 170,000,000 |
| 18-2nd public placement bonds | 2014.08.08 | 2019.08.08 | 3.07 | 200,000,000 | 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 | - |
| 20-2nd public placement bonds | 2018.03.02 | 2023.03.02 | 3.01 | 190,000,000 | - |
| 21-1st public placement bonds | 2018.10.22 | 2021.10.22 | 2.32 | 160,000,000 | - |
| 21-2nd public placement bonds | 2018.10.22 | 2023.10.20 | 2.52 | 140,000,000 | - |
| 21-3rd public placement bonds | 2018.10.22 | 2025.10.22 | 2.65 | 100,000,000 | - |
| | | | | 1,440,000,000 | 1,040,000,000 |
| Less: discount on bonds | | | | (2,823,672) | (1,260,260) |
| Less: current portion | | | | (499,882,613) | (299,893,308) |
| | | | | ₩ 937,293,715 | ₩ 738,846,432 |

Long-term borrowings as of December 31, 2018 and 2017 consist of the following (Korean won in thousands):

| | Financial institution | 2017 annual interest rate (%) | 2018 | 2017 |
|---|---|---|---|---|
| Funds for facilities | Mizuho Bank | 2.56 | ₩ 100,000,000 | ₩ - |
| Funds for facilities | BTMU | 3-month CD + additional rate | 45,000,000 | 45,000,000 |
| Funds for facilities | BTMU | 2.19 | 60,000,000 | 60,000,000 |
| Funds for facilities | Credit Agricole | 3-month CD + additional rate | 100,000,000 | 100,000,000 |
| Funds for facilities | Credit Agricole | 3-month CD + additional rate | 50,000,000 | - |
| Operating loan | BNP Paribas | - | - | 100,000,000 |
| Commercial paper | Shinhan Bank | - | - | 80,000,000 |
| 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 | - |
| Commercial paper | Shinhan Bank | 3-month CD + additional rate | 80,000,000 | - |
| | | | 685,000,000 | 585,000,000 |
| Less: discount on bonds | | | (33,392) | (319,629) |
| Less: current portion | | | (44,966,608) | (179,852,088) |
| | | | ₩ 640,000,000 | ₩ 404,828,283 |

## 10. Other current liabilities

Other current liabilities as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Advance receipts | ₩ 4,388,283 | ₩ 6,205,440 |
| Withholdings | 10,238,917 | 10,957,736 |
| | ₩ 14,627,200 | ₩ 17,163,176 |

## 11. Employee benefit liability, net

The components of employee benefit liability as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Present value of defined benefit obligation | ₩ 168,477,465 | ₩ 152,168,528 |
| Fair value of plan assets | (160,377,919) | (148,799,658) |
| | ₩ 8,099,546 | ₩ 3,368,870 |

Related expenses the employee benefit liability for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Defined benefit plans: | | |
| Current service cost | ₩ 14,626,696 | ₩ 14,368,838 |
| Interest cost | 6,012,020 | 5,257,278 |
| Expected return on plan assets | (5,710,805) | (4,661,153) |
| | 14,927,911 | 14,964,963 |
| Defined contribution plans: | | |
| Retirement pension allowance | 341,609 | 410,972 |
| | ₩ 15,269,520 | ₩ 15,375,935 |

Of the above amounts, ₩ 10,550,045 thousand and ₩10,558,198 thousand are recognized in cost of goods sold for 2018 and 2017, respectively, while ₩4,719,475 thousand and ₩4,817,737 thousand are recognized in selling and administrative expenses (including research and development) for 2018 and 2017, respectively.

Changes in the present value of the defined benefit obligation for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| As of January 1 | ₩ 152,168,528 | ₩ 138,515,984 |
| Current service cost | 14,626,696 | 14,368,838 |
| Interest cost | 6,012,020 | 5,257,278 |
| Benefits paid | (13,219,687) | (3,620,320) |
| Re-measurement loss (gain) in OCI: | | |
| Actuarial loss arising from changes in demographic assumptions | 141,371 | - |
| Actuarial loss (gain) arising from changes in financial assumptions | 7,747,912 | (3,426,288) |
| Experience adjustments | 955,672 | 1,020,501 |
| Others (transferred from related parties) | 44,953 | 52,535 |
| As of December 31 | ₩ 168,477,465 | ₩ 152,168,528 |

## 11. Employee benefit liability, net (cont'd)

Changes in the fair value of plan assets for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | | 2018 | | 2017 |
|---|---|---|---|---|
| As of January 1 | ₩ | 148,799,658 | ₩ | 127,048,351 |
| Contribution by employer | | 20,500,000 | | 23,000,000 |
| Expected returns | | 5,710,805 | | 4,661,153 |
| Benefits paid | | (11,466,058) | | (3,209,442) |
| Re-measurement gain (loss) in OCI | | (3,232,047) | | (2,611,029) |
| Others (transferred from (to) related parties) | | 65,561 | | (89,375) |
| As of December 31 | ₩ | 160,377,919 | ₩ | 148,799,658 |

Plan assets as of December 31, 2018 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, 2018 and 2017 is as follows:

| | 2018 | 2017 |
|---|---|---|
| Discount rate (%) | 3.61 | 4.11 |
| Future salary increase rate (%) | 4.96 | 4.97 |

A quantitative sensitivity analysis for significant assumptions as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | | |
|---|---|---|---|---|
| | | Increase by 1% point | | Decrease by 1% point |
| Impact on the defined benefit obligation due to changes in discount rates | ₩ | (14,032,285) | ₩ | 16,477,855 |
| Impact on the defined benefit obligation due to changes in future salary increase rates | | 16,505,914 | | (14,307,817) |

| | 2017 | | | |
|---|---|---|---|---|
| | | Increase by 1% point | | Decrease by 1% point |
| Impact on the defined benefit obligation due to changes in discount rates | ₩ | (11,989,147) | ₩ | 13,978,122 |
| Impact on the defined benefit obligation due to changes in future salary increase rates | | 14,067,258 | | (12,274,614) |

## 12. 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 as of December 31, 2018 and 2017 are presented as follows (Korean won in thousands and US dollar, except for contract exchange rate):

2018

| Financial institution | Maturity date | Contract exchange rate | Contract amount | Fair value Assets | Fair value Liabilities |
|---|---|---|---|---|---|
| Mizuho Bank | 2019.01.04~15 | 1117.59 ~1123.77 | USD 108,000,000 | ₩ 228,069 | ₩ 85,176 |
| KDB | 2019.01.08~16 | 1117.4 ~ 1128.05 | USD 62,000,000 | 320,519 | 6,233 |
| Shinhan Bank | 2019.01.02~10 | 1117.65 ~1124.9 | USD 107,000,000 | 400,709 | 18,798 |
| ICBC | 2019.01.07~14 | 1117.51~1127.6 | USD 70,000,000 | 331,686 | 4,714 |
| KEB Hana Bank | 2019.01.17 | 1117.7 | USD 33,000,000 | 8,861 | - |
| | | | | ₩ 1,289,844 | ₩ 114,921 |

2017

| Financial institution | Maturity date | Contract exchange rate | Contract amount | Fair value Assets | Fair value Liabilities |
|---|---|---|---|---|---|
| KDB Bank | 2018.01.09 | 1,070.90~1,073.95 | USD 44,000,000 | ₩ 84,057 | ₩ - |
| ICBC | 2018.01.08 | 1,073.95 | USD 30,000,000 | 80,786 | - |
| Credit Agricole | 2018.01.04 | 1,078.35 | USD 23,000,000 | 188,853 | - |
| KEB Hana Bank | 2018.01.02~31 | 1,068.90~1,079.95 | USD 121,000,000 | 491,182 | 3,250 |
| Woori Bank | 2018.01.05~31 | 1,067.65~1,074.45 | USD 83,000,000 | 155,120 | - |
| Woori Bank | 2018.01.31 | 163.59~163.98 | CNY 25,000,000 | 10,284 | - |
| | | | | ₩ 1,010,282 | ₩ 3,250 |

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, 2018, the Group entered into 7 commodity swaps for 794,000 barrels and 322,500 tons. In relation to the contracts, ₩24,219,774 thousand and ₩2,082,292 thousand are recognized as gain and loss on valuation of derivative financial instruments for the year ended December 31, 2018, respectively, while the corresponding amounts are recorded as other accounts receivable and other accounts payable as of December 31, 2018, respectively.

Details of the swap contracts entered into to hedge the risk of volatility in interest rates on borrowings as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| 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) |
| BTMU Bank | 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 | 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) |

| Financial institution | Contract date | Maturity | Contract amount | Received – variable interest rate | Paid – swap interest rate | 2017 Valuation gain (loss) | 2017 Receivables (payables) |
|---|---|---|---|---|---|---|---|
| Shinhan Bank | 2015.8.27 | 2018.8.27 | 80,000,000 | 3-month CD | 1.71% | ₩ 243,471 | ₩ 24,767 |
| | 2016.6.27 | 2019.6.27 | 100,000,000 | 3-month CD | 1.35% | 356,582 | 821,786 |
| | 2016.9.27 | 2019.6.27 | 100,000,000 | 3-month CD | 1.30% | 290,287 | 832,747 |
| BTMU Bank | 2016.3.31 | 2019.3.29 | 45,000,000 | 3-month CD | 1.74% | 277,369 | 73,165 |
| BNP Paribas Bank | 2015.12.17 | 2018.12.17 | 100,000,000 | 3-month CD | 1.80% | 560,079 | 9,698 |
| Credit Agricole | 2017.12.14 | 2020.12.14 | 100,000,000 | 3-month CD | 2.08% | (73,625) | (73,625) |
| | | | ₩525,000,000 | | | ₩ 1,654,163 | ₩ 1,688,538 |

## 13. 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, 2018 is as follows (Unit: ton):

| | 2018 | 2019 | 2020 |
|---|---|---|---|
| Allocated emission allowance | 4,391,327 | 4,391,327 | 4,391,327 |
| Estimated greenhouse gas emissions | 4,427,148 | 4,473,251 | 4,928,000 |

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 |

Changes in emission liabilities for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| January 1 | ₩ 5,130,264 | ₩ 10,913,841 |
| Changes in estimation | (5,130,264) | (8,807,293) |
| Decrease (emission allowances submitted) | - | (2,106,548) |
| Increase (cost of emissions recognized) | 553,397 | 5,130,264 |
| December 31 | ₩ 553,397 | ₩ 5,130,264 |

Changes in emission allowances for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | | | | |
|---|---|---|---|---|---|---|
| | 2018 | | 2019 | | 2020 | |
| | Quantity | Book value | Quantity | Book value | Quantity | Book value |
| January 1 | 13,685 | ₩ - | 4,427,148 | ₩ - | 8,796,339 | ₩ - |
| Free allocation | 4,391,327 | - | 4,391,327 | - | 4,391,327 | - |
| Borrowed | 22,136 | - | (22,136) | - | - | - |
| Purchase | - | - | - | - | - | - |
| Delivery to the government | - | - | - | - | - | - |
| December 31 | 4,427,148 | ₩ - | 8,796,339 | ₩ - | 13,187,666 | ₩ - |

| | 2017 | | | | | |
|---|---|---|---|---|---|---|
| | 2015 | | 2016 | | 2017 | |
| | Quantity | Book value | Quantity | Book value | Quantity | Book value |
| January 1 | - | ₩ - | - | ₩ - | - | ₩ - |
| Free allocation | 4,267,529 | - | 4,336,065 | - | 4,368,688 | - |
| Borrowed | - | - | 32,742 | - | (32,742) | - |
| Purchase | - | - | 70,000 | 1,437,436 | - | - |
| Delivery to the government | (4,267,529) | - | (4,438,807) | (1,437,436) | (4,322,261) | - |
| December 31 | - | ₩ - | - | ₩ - | 13,685 | ₩ - |

## 14. Commitments and contingencies

The following table presents the available lines of credit from financial institutions as of December 31, 2018 and 2017 (Korean won in thousands and US dollar):

| | 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 |

| | 2017 | | |
|---|---|---|---|
| | 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 | 414,000,000 | 170,000,000 |
| Line of credit for export and import financing | Woori Bank and others | 3,000,000 | 1,007,600,000 |
| Line of credit for export bill discounts | Woori Bank and others | - | 51,000,000 |
| | | ₩ 431,800,000 | US$ 1,228,600,000 |

The Company has provided a blank promissory note to Korea National Oil Corp. as collateral in connection with petroleum import duty as of December 31, 2018.

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 recognized ₩36.6 billion and ₩28.8 billion in total to Hanwha Corporation and Total SA in 2018 and 2017 as the related fees, respectively.

As of December 31, 2018, three lawsuits are filed against the Group and the total value of the litigation is estimated to be about ₩2.2 billion.

Summary of major contracts as at December 31, 2018 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 (*1) | Hanwha General Chemical Co., Ltd. | Utility supply | December 18, 2000 | December 31, 2024 | Republic of Korea |
| Contracted service contract (*2) | 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 | July 6, 2019 | Republic of Korea |
| Jet A-1 / Gasoil sales contract (*3) | 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 (*3) | 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 (*4) | Industrial Technology Services Co., Ltd. | Maintenance section | October 1, 2017 | September 30, 2019 | Republic of Korea |
| Hydrogen supply contract (*5) | HANWHA ENERGY CORPORATION | Hydrogen gas supply contract | May 17, 2018 | May 16, 2028 | Republic of Korea |
| EPC Contract for PP4 Project construction (*6) | HANWHA E&C | PP4 construction contract | December 26, 2018 | February 28, 2021 | Republic of Korea |

## 14. Commitments and contingencies (cont'd)

(*1) As Samsung General Chemicals Co., Ltd. merged with Samsung Petrochemical Co., Ltd. on June 1, 2004, the company changed its name from Samsung Petrochemical Co., Ltd. to Samsung General Chemicals Co., Ltd. On April 30, 2003, and pursuant to the resolution reached at the shareholders meeting on April 30, 2015, the company subsequently changed its name to Hanwha General Chemical Co., Ltd.
(*2) The contract period is based on the operating hours of the factory. Under the assumption that the plant operates normally, the hours were calculated assuming the contract expiration on December 31, 2030, but it may expire later if the factory is not operated due to other factors. Even if the service hours are left, the contract will be expired unconditionally on December 31, 2031.
(*3) Terms of the contract have been finalized and reached, but as the supply of the product under the contract has not yet begun, expiration date of the contract is uncertain at this time.
(*4) The contract (contractor: Industrial Technology Services Co., Ltd.) was renewed effective October 1, 2017 with changes to term and pricing conditions from the initial contract.
(*5) As a hydrogen supply contract for a hydrogen fuel cell power plant to be built at our plant site, the expected initial hydrogen supply will be in October 2019 (expected date for commissioning), and the full supply will be on June 30, 2020 (expected date for normal operation).
(*6) As a PP4 factory EPC contract to be constructed at our factory site, the period of work is from the contract date, including the mechanical completion date (November 15, 2020), to February 28, 2021.

## 15. 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, 2018 and 2017, the number of ordinary shares issued and fully paid 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 Korea Commercial Code.

Other components of equity of the Group as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Net gain (loss) on valuation of interest rate swaps | ₩ (732,889) | ₩ 1,242,764 |
| Net gain on valuation of financial instruments measured at FVOCI | 1,562,895 | - |
| Exchange differences on translation of foreign operations | (1,223,450) | (1,084,594) |
| | ₩ (393,444) | ₩ 158,170 |

Retained earnings as of December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Appropriated: | | |
| Legal reserve (*1) | ₩ 47,913,290 | ₩ 47,913,290 |
| Reserve for research and human resources development (*2) | - | 6,000,000 |
| Unappropriated | 2,759,553,513 | 2,706,778,619 |
| | ₩ 2,807,466,803 | ₩ 2,760,691,909 |

(*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, 2018 and 2017.
(*2) In accordance with the Korean Tax Incentives Limitation Law, the Group is able to deduct an amount provided as a reserve for research and human resources development from taxable income through appropriations of retained earnings. The reserve is added back to taxable income over three years after a two year grace period then can be appropriated as dividend.

## 16. Income and expenses

Details of selling and administrative expenses for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Salaries | ₩ 95,519,020 | ₩ 90,868,484 |
| Provision for severance and retirement benefits | 3,421,069 | 3,382,001 |
| Employee welfare benefits | 23,727,557 | 21,302,848 |
| Printing | 1,054,621 | 968,272 |
| Travel | 3,231,837 | 3,328,167 |
| Communications | 556,801 | 732,049 |
| Training | 2,454,752 | 2,271,080 |
| Supplies | 943,342 | 939,964 |
| Repairs | 4,806,303 | 2,184,584 |
| Entertainment | 2,758,998 | 2,304,629 |
| Meeting | 519,905 | 506,268 |
| Vehicle maintenance | 616,562 | 729,305 |
| Transportation | 4,638,601 | 75,449,929 |
| Taxes and dues | 3,815,419 | 3,769,490 |
| Insurance | 1,887,531 | 1,528,373 |
| Commissions and fees | 49,037,522 | 42,193,757 |
| Rents | 10,138,712 | 10,469,827 |
| Market research | 2,518,863 | 2,311,386 |
| Research and development | 28,142,594 | 26,397,684 |
| Depreciation | 7,509,003 | 6,848,959 |
| Amortization of intangible assets | 10,083,407 | 9,287,470 |
| Advertising | 3,455,137 | 3,247,657 |
| Samples | 484,723 | 466,331 |
| Promotion | 55,541 | 30,380 |
| Events | 1,284,076 | 1,618,475 |
| Packaging | 15,828,996 | 16,581,556 |
| Electronic data processing | 15,755,748 | 13,949,781 |
| Others | 1,049,450 | 1,027,870 |
| Reversal of bad debt expenses | (16,295) | (304,250) |
| | ₩ 295,279,795 | ₩ 344,392,326 |

Details of finance income for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Interest income | ₩ 3,973,095 | ₩ 4,365,643 |
| Gain on foreign currency transactions | 120,625,183 | 123,759,066 |
| Gain on foreign currency translation | 2,639,297 | 6,559,802 |
| Gain on settlement of derivative instruments | 135,992,962 | 88,863,233 |
| Gain on valuation of derivative instruments | 25,509,618 | 4,994,636 |
| | ₩ 288,740,155 | ₩ 228,542,380 |

## 16. Income and expenses (cont'd)

Details of finance costs for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Interest expenses | ₩ 47,416,132 | ₩ 48,166,909 |
| Loss on foreign currency transactions | 132,020,494 | 153,313,021 |
| Loss on foreign currency translation | 3,431,243 | 10,520,627 |
| Loss on settlement of derivative instruments | 92,462,238 | 67,971,259 |
| Loss on valuation of derivative instruments | 2,197,213 | 3,872,532 |
| | ₩ 277,527,320 | ₩ 283,844,348 |

Details of other income for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Gain on disposal of property, plant and equipment | ₩ 168,655 | ₩ 2,766,461 |
| Dividends income | 264,925 | 305,683 |
| Rental income | 250,015 | 66,300 |
| Others | 32,814,952 | 16,003,828 |
| | ₩ 33,498,547 | ₩ 19,142,272 |

Details of other expenses for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Loss on disposal of property, plant and equipment | ₩ 6,313,142 | ₩ 6,728,134 |
| Loss on disposal of intangible assets | 10,462 | 96,441 |
| Loss on disposal of trade accounts receivable | 5,111,724 | 3,874,037 |
| Donations | 7,078,944 | 5,789,480 |
| Others | 4,857,290 | 10,975,660 |
| | ₩ 23,371,562 | ₩ 27,463,752 |

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, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Changes in finished goods and semi-finished goods | ₩ (89,230,991) | ₩ (40,650,292) |
| Use of raw materials and others | 5,911,369,914 | 4,698,381,230 |
| Salaries and other benefits | 274,109,428 | 263,052,207 |
| Depreciation | 355,690,071 | 353,549,650 |
| Amortization of intangible assets | 14,756,798 | 14,380,498 |
| Transportation | 76,066,654 | 77,724,615 |
| Advertising | 3,473,967 | 3,271,648 |
| Rents | 10,995,546 | 11,138,923 |
| Others | 3,589,448,043 | 2,780,446,934 |
| | ₩ 10,146,679,430 | ₩ 8,161,295,413 |

Details of salaries and other benefit expenses for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Salaries | ₩ 206,788,604 | ₩ 203,770,631 |
| Provision for severance and retirement benefits | 15,269,520 | 15,375,936 |
| Employee welfare benefits | 52,051,304 | 43,905,640 |
| | ₩ 274,109,428 | ₩ 263,052,207 |

## 17. Income taxes

The major components of income tax expense for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Current income taxes | ₩ 276,207,249 | ₩ 344,973,524 |
| Additional income taxes (refund of) for prior period | (27,961,629) | 163,316 |
| Deferred income taxes | 8,184,388 | 3,940,177 |
| Income tax expense charged directly to equity | 3,336,383 | 615,539 |
| | ₩ 259,766,391 | ₩ 349,692,556 |

Details of income tax expense charged directly to equity for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Gain (loss) on valuation of interest rate swaps | ₩ 708,657 | ₩ (437,455) |
| Re-measurement gain | 3,188,329 | 1,052,994 |
| Gain (loss) on valuation of financial instruments measured at FVOCI | (560,603) | - |
| | ₩ 3,336,383 | ₩ 615,539 |

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, 2018 and 2017 is as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Profit before tax | ₩ 1,084,044,959 | ₩ 1,452,567,795 |
| Tax at the statutory income tax rate (*) | 287,750,364 | 351,059,406 |
| Reconciling items: | | |
| Non-deductible expenses and non-taxable income for tax purposes | 376,955 | (2,625,891) |
| Tax credit | (1,341,102) | (462,573) |
| Additional income taxes (refund of) for prior periods | (27,961,629) | 163,316 |
| Others | 941,803 | 1,558,298 |
| Income tax expense at the effective income tax (2018: 23.96%, 2017: 24.07%) | ₩ 259,766,391 | ₩ 349,692,556 |

(*) 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.

## 17. Income taxes (cont'd)

Significant changes in deferred tax assets (liabilities) for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | | | |
|---|---|---|---|---|
| | Jan. 1 | Recognized directly in profit or loss | Recognized directly in equity | Dec. 31 |
| Employee benefit liability | ₩ - | ₩ (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) |
| Gain (loss) 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 (loss) on valuation of long-term investment securities | - | - | (560,603) | (560,603) |
| | ₩ 11,121,009 | ₩ (11,520,771) | ₩ 3,336,383 | ₩ 2,936,621 |

| | 2017 | | | |
|---|---|---|---|---|
| | Jan. 1 | Recognized directly in profit or loss | Recognized directly in equity | Dec. 31 |
| Employee benefit liability | ₩ 67,504 | ₩ (1,120,498) | ₩ 1,052,994 | ₩ - |
| Depreciation | 11,173,521 | (4,935,799) | - | 6,237,722 |
| Accrued income | (84,698) | 60,945 | - | (23,753) |
| Capitalized interest costs | (3,122,745) | 180,870 | - | (2,941,875) |
| Gain (loss) on valuation of derivative instruments | (8,318) | - | (437,455) | (445,773) |
| Unrealized financing income | (161,680) | 77,298 | - | (84,382) |
| Gain (loss) on foreign currency translation | (356) | (32) | - | (388) |
| Reserve for research and human resources development | (1,452,000) | 1,452,000 | - | - |
| Accrued expenses | 8,407,958 | (28,500) | - | 8,379,458 |
| Accrued contribution | 242,000 | (242,000) | - | - |
| | ₩ 15,061,186 | ₩ (4,555,716) | ₩ 615,539 | ₩ 11,121,009 |

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.

## 18. Earnings per share

The Group's basic and diluted earnings per share amounts for the years ended December 31, 2018 and 2017 are computed as follows (Korean won):

| | | 2018 | | 2017 |
|---|---|---|---|---|
| Net profit for the year attributable to ordinary shares | ₩ | 824,278,568,122 | ₩ | 1,102,875,238,747 |
| Weighted-average number of ordinary shares outstanding | | 19,165,316 shares | | 19,165,316 shares |
| Earnings per share | ₩ | 43,009 | ₩ | 57,545 |

As the Group has no potentially dilutive common stocks, the basic and diluted earnings per share are the same.

## 19. Dividends

Details of dividends declared and paid for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands, except for dividends per share):

| | | 2018 | | 2017 |
|---|---|---|---|---|
| Dividends attributable to ordinary shares: | | | | |
| Interim dividend (2017: ₩14,505 per share) | ₩ | 220,000,000 | ₩ | 278,000,000 |
| Cash dividend (2017: ₩28,625 per share) | | 396,906,000 | | 548,615,000 |
| | ₩ | 616,906,000 | ₩ | 826,615,5000 |

The Company's dividend payout ratios for the years ended December 31, 2018 and 2017 are computed as follows (Korean won in thousands):

| | | 2018 | | 2017 |
|---|---|---|---|---|
| Dividends (A) | ₩ | 616,906,000 | ₩ | 826,615,000 |
| Profit for the year (B) | | 822,541,584 | | 1,102,153,658 |
| Dividend payout ratio (A/B) | | 75.00% | | 75.00% |

## 20. Supplementary cash flow information

Details of non-cash and working capital adjustments to reconcile net profit for the year to net cash flows from operating activities for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

### Non-cash adjustments

| | 2018 | 2017 |
|---|---|---|
| Provision for severance and retirement benefits | ₩ 14,927,911 | ₩ 14,964,963 |
| Depreciation | 355,690,071 | 353,549,650 |
| Amortization of intangible assets | 14,756,798 | 14,380,498 |
| Reversal of allowance for doubtful accounts | (16,295) | (304,250) |
| Gain on foreign currency translation | (2,639,297) | (6,559,802) |
| Loss on foreign currency translation | 3,431,243 | 10,520,627 |
| Gain on disposal of property, plant and equipment | (168,655) | (2,766,461) |
| Loss on disposal of property, plant and equipment | 6,313,142 | 6,728,134 |
| Loss on disposal of intangible assets | 10,462 | 96,441 |
| Finance income (interest income) | (3,973,095) | (4,365,643) |
| Finance cost (interest expenses) | 47,416,132 | 48,166,909 |
| Loss on disposal of trade accounts receivable | 5,111,724 | 3,874,037 |
| Gain on valuation of derivative instruments | (25,509,618) | (4,994,636) |
| Loss on valuation of derivative instruments | 2,197,213 | 3,872,532 |
| Gain on settlement of derivative instruments | (135,992,962) | (88,863,233) |
| Loss on settlement of derivative instruments | 92,462,238 | 67,971,259 |
| Dividends income | (264,925) | (305,683) |
| Income tax expense | 259,766,391 | 349,692,556 |
| | ₩ 633,518,478 | ₩ 765,657,898 |

### Working capital adjustments

| | 2018 | 2017 |
|---|---|---|
| Trade accounts and notes receivable | ₩ 194,120,676 | ₩ (216,455,263) |
| Other accounts receivable | (43,426,759) | 32,260,066 |
| Other current assets | (2,411,888) | 3,364,710 |
| Prepaid expenses | (2,826,046) | 1,621,981 |
| Guarantee deposits | (45,406) | 80,098 |
| Inventories | (163,392,999) | (466,139,483) |
| Long-term prepaid expenses | 13,177,748 | 14,458,724 |
| Trade accounts and notes payable | (313,885,761) | 436,350,148 |
| Other accounts payable | (30,239,379) | (30,294,036) |
| Advance receipts | (1,816,976) | (4,336,138) |
| Withholdings | (715,341) | 1,601,682 |
| Accrued expenses | 1,257,632 | 1,479,398 |
| Deposits received | - | 2,286 |
| Other non-current liabilities | 1,672,768 | (162,093) |
| Employee benefits | (20,608) | - |
| Payment of severance and retirement benefits | (1,753,630) | (268,968) |
| Plan assets | (20,500,000) | (23,000,000) |
| | ₩ (370,805,969) | ₩ (249,436,888) |

## 20. Supplementary cash flow information (cont'd)

Significant non-cash transactions for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 2018 | 2017 |
|---|---|---|
| Transfer of prepaid expenses from long-term to current | ₩ 186,000 | ₩ 385,600 |
| Transfer of construction-in-progress to respective account of property, plant and equipment and intangible assets | 253,925,376 | 213,409,096 |
| Transfer of bonds payable and borrowings from long-term to current | 544,849,221 | 479,745,395 |
| Transfer of accounts payable from long-term to current | 730,601 | 1,363,096 |
| Changes in other accounts payable due to acquisition of property, plant and equipment | (9,911,546) | 31,920,152 |
| Changes in other accounts receivable due to disposal of property, plant and equipment | 2,000,000 | 15,770 |

Changes in liabilities arising from financing activities for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| 2018 | January 1 | Cash flows | 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 |

| 2017 | January 1 | Cash flows | Foreign exchange rate movement | Amortization | transfer | December 31 |
|---|---|---|---|---|---|---|
| Current liabilities | | | | | | |
| Short term borrowings | ₩ 46,369,704 | ₩ 58,251,359 | ₩ (596,293) | ₩ - | ₩ - | ₩ 104,024,770 |
| Current portion of bonds payable and long-term borrowings | 549,836,460 | (550,000,000) | - | 163,541 | 479,745,395 | 479,745,396 |
| | 596,206,164 | (491,748,641) | (596,293) | 163,541 | 479,745,395 | 583,770,166 |
| Non-current liabilities | | | | | | |
| Long term borrowings | 424,394,730 | 160,000,000 | - | 285,640 | (179,852,087) | 404,828,283 |
| Bonds payable | 898,590,680 | 140,000,000 | - | 149,060 | (299,893,308) | 738,846,432 |
| | 1,322,985,410 | 300,000,000 | - | 434,700 | (479,745,395) | 1,143,674,715 |
| | ₩ 1,919,191,574 | ₩ (191,748,641) | ₩ (596,293) | ₩ 598,241 | ₩ - | ₩ 1,727,444,881 |

## 21. 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 ₩1,818,211 thousand (₩2,228,863 thousand in 2017) and ₩124,919 thousand of provision for severance and retirement benefits in 2018 (₩156,000 thousand in 2017).

## 21. Related party disclosures (cont'd)

The related parties of the Company as of December 31, 2018 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 consolidated financial statements of the Group.

Significant transactions for 2018 and 2017 and the related outstanding balances as of December 31, 2018 and 2017 arising from such transactions between the Group and its related parties are as follows (Korean won in thousands):

| | 2018 | | | | |
|---|---|---|---|---|---|
| Related party | Revenues | 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. (*1) | 5,912,942 | 17,171,356 | - | - | 5,630,318 |
| Hanwha Q CELLS & Advanced Materials Corporation (*2) | 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 (*3) | 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 | 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 |

(*1) Gain on insurance of ₩5,855,283 thousand from the insurance proceed of ₩70,985,876 thousand from Hanwha General Insurance Co., Ltd. is included.
(*2) Hanwha Advanced Materials Corporation and Hanwha Q CELLS Korea merged and formed Hanwha Q CELLS & Advanced Materials Corporation in 2018.
(*3) Hanwha Systems and Hanwha S&C Inc. merged in 2018 and Hanwha Systems was the continuing entity.

## 21. Related party disclosures (cont'd)

| | 2017 | | | | |
|---|---|---|---|---|---|
| Related party | Revenues | Purchase of inventories and others | Purchase of non-current assets | Receivables | Payables |
| Joint controlling: | | | | | |
| HGC | ₩ 452,250,155 | ₩ 18,314,673 | ₩ - | ₩ 66,451,735 | ₩ 2,165,850 |
| Total Holdings | - | 2,186,620 | - | - | 90,438 |
| Other related parties: | | | | | |
| Hanwha Corporation | 127,958,765 | 14,256,761 | 6,815,000 | 6,586,926 | 156,704 |
| Hanwha Galleria Co., Ltd | - | 1,828,126 | - | - | 46,376 |
| Hanwha Construction Co., Ltd | - | - | 167,191,086 | - | 15,474,173 |
| NHL Development Co., Ltd | - | 864,768 | - | - | - |
| Hanwha Life Insurance Co., Ltd. | 2,314,524 | 4,709,662 | - | 133,805,861 | - |
| Hanwha General Insurance Co., Ltd. | 54,800 | 16,441,667 | - | - | 5,825,090 |
| H-Solution Corporation | 35,050 | 9,285,138 | 3,504,380 | - | - |
| Hanwha Advanced Materials Corporation | 47,872,535 | - | - | 4,411,228 | - |
| Hanwha Chemical Co, Ltd. | - | 2,919,712 | - | - | 900,844 |
| Hanwha Hotels & Resorts Co., Ltd. | - | 2,911,323 | 5,317,530 | - | 153,520 |
| Hanwha Estate Co., Ltd. | 10,929 | 1,733,397 | 89,154 | 520 | 876,119 |
| Hanwha S&C Co., Ltd | 10,878 | 3,804,072 | 2,773,129 | 3,966 | 2,185,420 |
| Hanwha Q CELLS Japan Co., Ltd. | 7,316,700 | 97,091 | - | 32,555 | 533 |
| Tri Energy Global Pte. Ltd. | 835,843,048 | 527,580,872 | - | 133,407,698 | 85,312,382 |
| Total Marine Fuels Pte. Ltd. | 15,208,797 | - | - | 994,358 | - |
| Total Petrochemicals (Foshan) Ltd. | 1,771,029 | - | - | - | 87,092 |
| Total Petrochemical (Hong Kong) Ltd. | 8,585,661 | - | - | - | - |
| Total Petrochemical and Refining SA | 13,955,438 | 2,378 | - | 632,349 | 112,899 |
| Total SA | - | 12,187,377 | - | - | 6,524 |
| Total Trading Asia Pte. Ltd | 828,069,539 | 163,542,066 | - | 73,115,408 | - |
| TOTSA Total Oil Trading SA | 3,995,761 | 20,602,263 | - | - | 3,747,397 |
| Atlantic Trading And Marketing Inc. | 75,012,196 | - | - | 26,464,174 | - |
| Total Research & Technology Feluy S.A. | - | - | 17,397,776 | - | 17,249,540 |
| Others | 1,307,090 | 1,727,417 | - | 53,407 | 280,048 |
| | ₩ 2,421,572,895 | ₩ 804,995,383 | ₩ 203,088,055 | ₩ 445,960,185 | ₩ 134,670,949 |

**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, 2018 and 2017, 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.

## 22. Segment information

The financial information about geographic areas for the years ended December 31, 2018 and 2017 are as follows (Korean won in thousands):

| | 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 |
| Net 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 |

| | 2017 | | | |
|---|---|---|---|---|
| | Korea | China | Consolidation elimination | Total |
| Sales | ₩ 9,679,399,362 | ₩ 42,773,791 | ₩ - | ₩ 9,722,173,153 |
| Inter-company sales | 25,261,331 | 19,425,167 | (44,686,498) | - |
| Net sales | 9,654,138,031 | 23,348,624 | - | 9,677,486,655 |
| Operating profit | 1,515,049,164 | 1,353,056 | (210,978) | 1,516,191,242 |
| Net profit for the year | 1,102,153,658 | 932,559 | (210,978) | 1,102,875,239 |
| Non-current assets (*) | 4,013,160,105 | 5,835,437 | - | 4,018,995,542 |

(*) Non-current assets consist of property, plant and equipment, intangible assets and long-term prepaid expenses.

## 23. 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 amounts to ₩525,000,000 thousand and ₩585,000,000 thousand as of December 31, 2018 and 2017, 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 cross currency swap contracts, is not material.

## 23. 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, 2018 and 2017 are as follows (US dollar and Korean won in thousands):

| | 2018 | | | 2017 | | |
|---|---|---|---|---|---|---|
| | Currency | Foreign currencies | Korean won | Currency | Foreign currencies | Korean won |
| Financial assets | USD | 581,781 | ₩ 650,488,784 | USD | 668,751 | ₩ 716,499,832 |
| | Others | | 20,492,156 | Others | | 47,561,218 |
| | | | ₩ 670,980,940 | | | ₩ 764,061,050 |
| Financial liabilities | USD | 410,643 | ₩ 459,139,936 | USD | 573,677 | ₩ 614,637,270 |
| | Others | | 9,750,554 | Others | | 32,762,756 |
| | | | ₩ 468,890,490 | | | ₩ 647,400,026 |

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):

| | 2018 | | 2017 | |
|---|---|---|---|---|
| | (+) 10% | (-) 10% | (+) 10% | (-) 10% |
| Increase (decrease) in profit for the year | ₩ (2,700,144) | ₩ 2,700,144 | ₩ 900,006 | ₩ (900,006) |

**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, 2018, trade accounts and notes receivable from the top five customers accounted for 36.5% or ₩298,238,894 thousand of total trade accounts and notes 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.

## 23. 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):

| | 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 |

| | 2017 | | | | |
|---|---|---|---|---|---|
| | Within 3 months | 3 months ~ 1 year | 1 year ~ 5 years | Over 5 years | Total |
| Bonds payable and borrowings | ₩ 204,024,770 | ₩ 380,000,000 | ₩ 1,145,000,000 | ₩ - | ₩ 1,729,024,770 |

29.7% of the Group's financial liabilities will mature in less than one year as of December 31, 2018 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, 2018 and 2017. The Group's debt-to-equity ratios as of December 31, 2018 and 2017 are 81.7% and 79.6%, respectively.

## 24. Approval of financial statements

The consolidated financial statements of the Group for the year ended December 31, 2018 were approved by the Company's Board of Directors on January 29, 2018.