1. General

Doosan Corporation (the "Company") was incorporated on December 18, 1933, under the name of Sohwa-Kirin Beer, Ltd. to manufacture and sell beer. The Company has changed its name to Dongyang Beer, Ltd. in February 1948 and again to OB Beer, Ltd. in February 1996 and finally to Doosan Corporation on September 1, 1998.

Since June 1973, the Company's shares have been listed in the Korea Exchange. After several capital issues, the Company's share capital as of December 31, 2018 is ₩134,846 million, including ₩26,984 million of preferred shares.

The Company's ordinary shares as of December 31, 2018 are owned as follows:

	Number of ordinary shares owned	Ownership percentage (%)
Related parties	9,315,435	51.08
Treasury stocks	3,306,169	18.13
Others	5,616,498	30.79
	18,238,102	100.00

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

2. Summary of significant accounting policies

2.1 Basis of preparation

The Company prepares statutory financial statements in Korean in accordance with KIFRS enacted by *the Act on External Audit of Stock Companies*. The Company's financial statements are separate financial statements prepared in accordance with KIFRS 1027 *Separate Financial Statements*, in which the controlling company, investors of associates or participants of joint control company have stated investment assets at cost method or financial statements accounted in accordance with KIFRS 1109 *Financial Instruments*. The accompanying separate financial statements have been translated into English from Korean financial statements. In the event of any differences in interpreting the financial statements or the independent auditor's report thereon, Korean version, which is used for regulatory reporting purposes, shall prevail.

Significant accounting policies applied in the preparation of the separate financial statements are described below. Significant accounting policies applied in the preparation of the separate financial statements for the year ended December 31, 2018 are the same as those adopted in the preparation of the separate financial statements for the year ended December 31, 2017, except for the effects related to the adoption of the standards or interpretations described below.

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

2.2 Changes of accounting policies and disclosure

2.2.1 New and amended standards and interpretations

The Company applied KIFRS 1115 *Revenue from Contracts with Customers* and KIFRS 1109 *Financial Instruments* for the first time. The nature and effect of the changes as a result of adoption of these new accounting standards are described below.

Several other amendments and interpretations apply for the first time in 2018, but do not have an impact on the separate financial statements of the Company. The Company has not early adopted any standards, interpretations or amendments that have been issued but are not yet effective.

KIFRS 1115 *Revenue from Contracts with Customers*

KIFRS 1115 supersedes KIFRS 1011 *Construction Contracts*, KIFRS 1018 *Revenue* and related Interpretations and it applies, with limited exceptions, to all revenue arising from contracts with its customers. KIFRS 1115 establishes a five-step model to account for revenue arising from contracts with customers and requires that revenue be recognized at an amount that reflects the consideration to which an entity expects to be entitled in exchange for transferring goods or services to a customer.

KIFRS 1115 requires an entity to exercise judgement, taking into consideration all of the relevant facts and circumstances when applying each step of the model to contracts with their customers. The standard also specifies the accounting for the incremental costs of obtaining a contract and the costs directly related to fulfilling a contract. In addition, the standard requires extensive disclosures.

The Company adopted KIFRS 1115 using cumulative catch-up method of adoption with the date of initial application of January 1, 2018. Under this method, the new standard can be applied either to all contracts at the date of initial application or only to contracts that are not completed at this date. The Company elected to apply the new standard only to contracts that were not completed as of January 1, 2018.

The cumulative effect of initial adoption of KIFRS 1115 is adjusted for the opening balance of retained earnings at the date of initial adoption. Therefore, the comparative information was not restated and continues to be reported under KIFRS 1011, KIFRS 1018 and the related Interpretation. Significant changes and the resulting amount impact are as follows.

[Impact on the separate statements of financial position as of December 31, 2018]

(Korean won in millions)

	Adjustments	Amount before adopting KIFRS 1115	Adjustments	Amount reported
Assets				
Trade and other receivables		₩ 560,024	₩ -	₩ 560,024
Inventories	(a)	473,361	(12,536)	460,825
Other assets		3,713,375	-	3,713,375
Total assets		4,746,760	(12,536)	4,734,224
Liabilities				
Trade and other payables	(a)	742,419	(12,536)	729,884
Other liabilities		1,698,832	-	1,698,832
Total liabilities		2,441,251	(12,536)	2,428,715
Equity				
Total equity		₩ 2,305,508	₩ -	₩ 2,305,508

2.2.1 New and amended standards and interpretations (cont'd)

[Impact on the separate statements of comprehensive income as of December 31, 2018]

(Korean won in millions)

	Adjustments	Amount before adopting KIFRS 1115	Adjustments	Amount reported
Operating revenue	(a)	₩ 3,117,713	₩ (198,312)	₩ 2,919,401
Operating cost	(a)	2,864,350	(198,312)	2,666,038
Finance expenses		(54,356)	-	(54,356)
Other non-operating expenses		(16,321)	-	(16,321)
Income tax expenses		24,073	-	24,073
Profit for the year		158,613	-	158,613
Other comprehensive income		(10,368)	-	(10,368)
Total comprehensive income for the year		₩ 148,245	₩ -	₩ 148,245

The nature of these adjustments is described below.

(a) Principal versus agent consideration

For the specific product sales transaction recognized as revenue in gross amount under the previous standard, the Company determined itself as an agent in the adoption of KIFRS 1115 and recognized revenue in net amount deducting cost of sales. Accordingly, sales and costs of sales was decreased by the same amount during the year ended December 31, 2018, and inventories and trade payables were decreased as of December 31, 2018.

KIFRS 1109 *Financial Instruments*

KIFRS 1109 *Financial Instruments* replaces KIFRS 1039 *Financial Instruments: Recognition and Measurement* for annual periods beginning on or after January 1, 2018, bringing together all three aspects of the accounting for financial instruments: classification and measurement; impairment; and hedge accounting. With the exception of hedge accounting to be applied prospectively by the Company, the Company has adjusted the cumulative effect of initial adoption of KIFRS 1109 from its equity at the beginning of January 1, 2018 with the date of initial adoption of KIFRS 1109. The nature and effect of the major changes in accounting policies in accordance with the adoption of KIFRS 1109 are as follows.

2.2.1 New and amended standards and interpretations (cont'd)

[Impact on the separate statements of financial position as of January 1, 2018]

(Korean won in millions)

	Adjustments	Classification according to KIFRS 1039	Classification according to KIFRS 1109	Book value according to KIFRS 1039	Book value according to KIFRS 1109
Financial assets:					
Cash and cash equivalents	(a)	Loans and receivables	Financial assets at amortized cost	₩ 56,560	₩ 56,560
Short-term and long-term financial instruments	(a),(b)	Loans and receivables	Financial assets at amortized cost	69	69
Short-term and long-term investment securities	(a)	Available-for-sale financial assets	Financial assets (designated) at fair value through OCI		87,213
	(a),(b)		Financial assets at fair value through profit or loss	91,130	3,917
Trade and other receivables	(a),(b)	Loans and receivables	Financial assets at amortized cost	490,637	490,637
Derivative assets	(a),(c)	Derivatives designated as hedging instruments	Derivatives designated as hedging instruments	1,345	1,345
	(a)	Financial assets at fair value through profit or loss	Financial assets at fair value through profit or loss	1,902	1,902
Deposits	(a),(b)	Loans and receivables	Financial assets at amortized cost	40,700	40,700
				682,343	682,343
Financial liabilities:					
Trade and other payables	(a)	Financial liabilities at amortized cost	Financial liabilities at amortized cost	522,677	522,677
Borrowings and bonds	(a)	Financial liabilities at amortized cost	Financial liabilities at amortized cost	953,429	953,429
Derivative liabilities	(a),(c)	Financial liabilities at fair value through profit or loss	Financial liabilities at fair value through profit or loss	1	1
				₩ 1,476,107	₩ 1,476,107

2.2.1 New and amended standards and interpretations (cont'd)

(a) Classification and measurement

Other than certain trade receivables, the transaction costs of financial assets that are not measured at fair value through profit or loss are included in the fair value at initial recognition under KIFRS 1109.

Under KIFRS 1109, debt instruments are subsequently measured at fair value through profit or loss, amortized cost, or fair value through OCI. The classification is based on two criteria: the Company's business model for managing the assets; and whether the instruments' contractual cash flows represent 'solely payments of principal and interest' on the principal amount outstanding.

The followings are the changes in the classification of the Company's debt instruments:

- *Trade receivables and Other receivables,* and *Other non-current financial assets* (i.e., *Loan to an associate and Loan to a director*) are held to collect contractual cash flows and give rise to cash flows representing solely payments of principal and interest. These are now classified and measured as *Debt instruments at amortized cost.*

- Debt instruments that are classified and measured as *Debt instruments at fair value through OCI*. The Company expects not only to hold the assets to collect contractual cash flows, but also to sell a significant amount on a relatively frequent basis. The Company's quoted debt instruments passed the SPPI test.

Other financial assets are classified and subsequently measured as follows.

- Equity investments in non-listed companies previously classified as *Available-for-sale financial assets* are now classified and measured as *Equity instruments designated at fair value through OCI*. The Company elected to classify irrevocably its non-listed equity investments under this category as it intends to hold these investments for the foreseeable future. There were no impairment losses recognized in profit or loss for these investments in prior periods.

- Listed equity investments previously classified as *Available-for-sale financial assets* are now classified and measured as *Financial assets at fair value through profit or loss. Derivatives* and *financial assets measured at fair value through profit or loss* that consists of a listed equity instrument that does not have an irrevocable choice of classifying it as *Equity instruments designated at fair value through OCI* at initial recognition. This category contains debt instruments that didn't pass the SPPI test or that are not part of a business model whose objective is to hold the assets to collect contractual cash flows or a business model for collecting and selling contractual cash flows or whose objective is to collect contractual cash flows.

The assessment of the Company's business model was made as of the date of initial application, January 1, 2018, and then applied retrospectively to those financial assets that were not derecognized before January 1, 2018. The assessment of whether contractual cash flows on debt instruments are solely comprised of principal and interest was made based on the facts and circumstances as of the initial recognition of the assets.

The accounting for the Company's financial liabilities is largely consistent with the accounting under KIFRS 1039. Similar to the requirements of KIFRS 1039, KIFRS 1109 requires contingent consideration to be accounted for as a financial instrument in which changes in fair value are measured at fair value recognized in the statements of comprehensive income.

Under KIFRS 1109, an embedded derivative is no longer separated from the host contract. Instead, financial assets are classified on the basis of contractual definitions and the Company's business model.

The accounting for financial liabilities and derivatives embedded in non-financial equity contracts has not changed from the requirements of KIFRS 1039.

2.2.1 New and amended standards and interpretations (cont'd)

(b) Impairment

The adoption of KIFRS 1109 has fundamentally changed the company's accounting for impairment losses for financial assets by replacing KIFRS 1039's incurred loss approach with a forward-looking expected credit loss (ECL) approach.

KIFRS 1109 requires the Company to recognize an allowance for ECLs for other 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 Company expects to receive, discounted at an approximation of the original effective interest rate.

For trade and other receivables and contract assets, the Company applies a simplified approach in calculating ECLs. Therefore, the Company does not track changes in credit risk, but instead recognizes a loss allowance based on lifetime ECLs at each reporting date. The Company 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.

For debt instruments at fair value through OCI, ECLs are provided for credit losses that result from default events that are possible within the next 12-months (a 12-month ECL). A 12-month ECL is expected credit losses that result from default events that are possible within 12 months after the reporting date.

(c) Hedge accounting

KIFRS 1109 applies mechanics of hedge accounting (fair value hedge accounting, cash flow hedge, foreign entities net investment hedge) specified in the current KIFRS 1039. However, the Company changed from the complex and rule-based hedge accounting requirements of KIFRS 1039 to the principle-based approach which focuses on the risk management activities.

Requirements for application of hedge accounting are relaxed by enlarging items designated as hedges and hedging instruments, evaluating the high risk avoidance effects, and eliminating the quantitative criteria (80 ~ 125%).

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

The amendments clarify that an entity that is a venture capital organization, or other qualifying entity, may elect, at initial recognition on an investment-by-investment basis, to measure its investments in associates and joint ventures at fair value through profit or loss. If an entity, that is not itself an investment entity, has an interest in an associate or joint venture that is an investment entity, the entity may, when applying the equity method, elect to retain the fair value measurement applied by that investment entity associate or joint venture to the investment entity associate's or joint venture's interests in subsidiaries. This election is made separately for each investment entity associate or joint venture, at the later of the date on which: (a) the investment entity associate or joint venture is initially recognized; (b) the associate or joint venture becomes an investment entity; and (c) the investment entity associate or joint venture first becomes a parent. The amendments has no effect on the Company's separate financial statements.

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. On adoption, an entity is required to apply the amendments without restating prior periods, but retrospective application is permitted if elected for all three amendments and other criteria are met. The Company's accounting policy for cash-settled share-based payments is consistent with the approach clarified in the amendments. In addition, the Company has no share-based payment transaction with net settlement features for withholding tax obligations and had not made any modifications to the terms and conditions of its share-based payment transaction. Therefore, these amendments do not have any impact on the Company's separate financial statements.

2.2.1 New and amended standards and interpretations (cont'd)

Amendments to KIFRS 1040 *Investment Properties* — Transfers of Investment Properties
The amendments clarify when an entity should transfer properties, including properties under construction or development into, or out of investment properties. The amendments state that a change in use occurs when the properties meets, or ceases to meet, the definition of investment properties and there is evidence of the change in use. A mere change in management's intentions for the use of a properties does not provide evidence of a change in use. The amendments have no effect on the Company's separate 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 have no effect on the Company's separate financial statements.

Amendments to KIFRS 1101 *First-time Adoption of International Financial Reporting Standards* - Deletion of short-term exemptions for first-time adopters
Short-term exemptions in paragraphs E3–E7 of KIFRS 1101 were deleted because they have now served their intended purpose. This amendment is not applicable to the Company.

2.2.2 Standards issued but not yet effective

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

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

KIFRS 1116 is effective for annual periods beginning on or after January 1, 2019, with earlier application permitted. A lessee can choose to apply the standard using either the full retrospective approach or the modified retrospective approach. The standard's transition provisions allow several practical expedients. The Company is specifically analyzing the detailed effect of the adoption of this standard on its separate financial statements and plans to apply the amended standard on the specified effective date.

2.2.3 Standards issued but not yet effective (cont'd)

Amendments to KIFRS 1109: *Prepayment Features with Negative Compensation*
Under KIFRS 1109, a debt instrument can be measured at amortized cost or at fair value through other comprehensive income, provided that the contractual cash flows are 'solely payments of principal and interest on the principal amount outstanding' (the SPPI criterion) and the instrument is held within the appropriate business model for that classification. The amendments to KIFRS 1109 clarify that a financial asset passes the SPPI criterion regardless of the event or circumstance that causes the early termination of the contract and irrespective of which party pays or receives reasonable compensation for the early termination of the contract.

The amendments should be applied retrospectively and are effective from January 1, 2019, with earlier application permitted. These amendments have no impact on the separate financial statements of the Company.

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. These amendments will apply only to any future plan amendments, curtailments, or settlements of the Company.

Amendments to KIFRS 1028: *Long-term interests in associates and joint ventures*
The amendments clarify that an entity applies KIFRS 1109 to long-term interests in an associate or joint venture to which the equity method is not applied but that, in substance, form part of the net investment in the associate or joint venture (long-term interests). This clarification is relevant because it implies that the expected credit loss model in KIFRS 1109 applies to such long-term interests. The amendments also clarified that, in applying KIFRS 1109, an entity does not take account of any losses of the associate or joint venture, or any impairment losses on the net investment, recognized as adjustments to the net investment in the associate or joint venture that arise from applying KIFRS 1028 Investments in Associates and Joint Ventures. The amendments should be applied retrospectively and are effective from January 1, 2019, with early application permitted. The amendments will not have an impact on its separate financial statements.

KIFRS Interpretation 2123 *Uncertainty over Income Tax Treatment*

The Interpretation addresses the accounting for income taxes when tax treatments involve uncertainty that affects the application of KIFRS 1012 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

2.2.2 Standards issued but not yet effective (cont'd)

The Company 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 Company will apply the interpretation from its effective date. Since the Company operates in a complex multinational tax environment, applying the Interpretation may affect its separate financial statements. In addition, the Company may need to establish processes and procedures to obtain information that is necessary to apply the Interpretation on a timely basis.

Annual Improvements 2015-2017 Cycle (issued in December 2017)
These improvements include:

KIFRS 1103 *Business Combinations*
The amendments clarify that, when an entity obtains control of a business that is a joint operation, it applies the requirements for a business combination achieved in stages, including remeasuring previously held interests in the assets and liabilities of the joint operation at fair value. In doing so, the acquirer remeasures its entire previously held interest in the joint operation. An entity applies those amendments to business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after January 1, 2019, with early application permitted. These amendments will apply on future business combinations of the Company.

KIFRS 1111 *Joint Arrangements*
A party that participates in, but does not have joint control of, a joint operation might obtain joint control of the joint operation in which the activity of the joint operation constitutes a business as defined in KIFRS 1103. The amendments clarify that the previously held interests in that joint operation are not remeasured. An entity applies those amendments to transactions in which it obtains joint control on or after the beginning of the first annual reporting period beginning on or after January 1, 2019, with early application permitted. These amendments are currently not applicable to the Company but may apply to future transactions.

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 Company's current practice is in line with these amendments, the Company does not expect any effect on its separate 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 Company's current practice is in line with these amendments, the Company does not expect any effect on its separate financial statements.

2.3 Investments in subsidiaries, joint ventures and associates

The Company has elected to use book value under previous generally accepted accounting principles as deemed cost for subsidiaries, joint ventures and associates at the date of transition to KIFRS. After the date of transition, subsidiaries, joint ventures and associates are measured at cost.

The Company determines whether an impairment loss is recognized in respect of investments in associates, joint ventures and associates in accordance with KIFRS 1039 *Financial Instruments: Recognition and Measurement*. If there is an indication of impairment, the total carrying amount of the subsidiaries, joint ventures and associates (including goodwill) is compared to the recoverable amount (the greater of fair value less cost to sell and value in use) in accordance with KIFRS 1036 *Asset Impairment*. The recognized impairment loss is not allocated to any assets (including goodwill) that are part of the carrying amount of the associates, joint ventures and associates. The reversal of impairment loss is recognized in accordance with KIFRS 1036 as the recoverable amount of the investment assets increases subsequently.

2.4 Operating segments

The Company's operating segments are disclosed in a manner consistent with the business segment reporting provided to the chief operating decision-maker, and the information is disclosed in Note 24 in accordance with KIFRS 1108 *Operating Segments*.

2.5 Goodwill

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

For the purpose of impairment testing, goodwill is allocated to each of the cash-generating units (CGUs) (or groups of CGUs) that is expected to benefit from the synergies of the combination.

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

On disposal of the relevant CGU, the attributable amount of goodwill is included in the determination of the profit or loss on disposal.

2.6 Non-current assets held for sale

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

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

2.7 Revenue from contracts with customers

2.7.1 Identifying performance obligations

The Company's major businesses include manufacturing of copperplate, hydraulic equipment, forklift truck, and fuel cell and service such as IT system development/operating.

2.7.2 Variable consideration

If the consideration in a contract includes a variable amount, the Company estimates the amount of consideration to which it will be entitled in exchange for transferring the goods to the customer. The variable consideration is estimated at contract inception and constrained until it is highly probable that a significant revenue reversal in the amount of cumulative revenue recognized will not occur when the associated uncertainty with the variable consideration is subsequently resolved.

2.7.3 Allocation of the transaction price

The Company allocates the transaction price on the basis of the stand-alone selling price to the various performance obligations identified in a single contract. The Company uses the 'adjusted market assessment approach' to estimate the stand-alone selling price of each performance obligation and, in exceptional transactions, the 'expected cost plus a margin approach' to predict expected costs and add appropriate profit margins.

2.8 Lease

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

2.8.1 The Company as lessor

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

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

2.8.2 The Company as lessee

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

Lease payments are apportioned between finance expenses and reduction of the lease obligation, so as to achieve a constant rate of interest on the remaining balance of the liability. Finance expenses are recognized immediately in profit or loss, unless they are directly attributable to qualifying assets, in which case they are capitalized in accordance with the Company's general policy on borrowing costs (see Note 2.10). Contingent rentals are recognized as expenses in the periods in which they are incurred.

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

2.9 Foreign currencies

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

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

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

- Exchange differences on foreign currency borrowings relating to assets under construction for future productive use, which are included in the cost of those assets when they are regarded as an adjustment to interest costs on those foreign currency borrowings
- Exchange differences on transactions entered into in order to hedge certain foreign currency risks (see Note 2.23 below for hedging accounting policies)
- Exchange differences on monetary items forming part of the net investment in the foreign operation.

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 the Company initially recognizes the non-monetary asset or non-monetary liability arising from the advance consideration. If there are multiple payments or receipts in advance, the Company determines the transaction date for each payment or receipt of advance consideration.

2.10 Borrowing costs

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

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

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

2.11 Retirement benefit costs and termination benefits

The Company operates a defined benefit pension plan. The cost of providing benefits is determined using the projected unit credit method, with actuarial valuations being carried out at the end of each reporting period. Remeasurement, comprising actuarial gains and losses, the effect of the changes to the asset ceiling (if applicable) and the return on plan assets are reflected immediately in the separate statements of financial position with a charge or credit recognized in other comprehensive income in the period in which they occur. Remeasurement recognized in other comprehensive income is reflected immediately in retained earnings and will not be reclassified to profit or loss. Past service cost is recognized in profit or loss in the period of a plan amendment. Net interest is calculated by applying the discount rate at the beginning of the period to the net defined benefit liability or asset.

Defined benefit costs are composed of service cost (including current service cost, past service cost, as well as gains and losses on curtailments and settlements), net interest expense (income) and remeasurement.

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

The retirement benefit liabilities recognized in the separate statements of financial position represents the actual deficit or surplus in the Company's defined benefit plans. Any surplus resulting from this calculation is limited to the present value of any economic benefits available in the form of refunds from the plans or reductions in future contributions to the plans.

2.11 Retirement benefit costs and termination benefits (cont'd)

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

Contributions to defined contribution retirement benefit plans are recognized as an expense when employees have rendered service entitling them to the contributions.

2.12 Share-based payment transactions of the Company

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

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

2.13 Taxation

Income tax expenses represent the sum of the tax currently payable and deferred tax.

2.13.1 Current tax

The tax currently payable is based on taxable profit for the year. Taxable profit differs from profit as reported in the separate statements of profit or loss and comprehensive income because of items of income or expense that are taxable or deductible in other years and items that are never taxable or deductible. The Company's liability for current tax is calculated using tax rates that have been enacted or substantively enacted by the end of the reporting period.

2.13.2 Deferred tax

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

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

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset realized, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Company expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

2.13.3 Current and deferred taxes for the year

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

2.14 Government grants

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

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

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

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

2.15 Property, plant and equipment

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

Subsequent costs are recognized in carrying amount of an asset or as a separate asset if it is probable that future economic benefits associated with the assets will flow to the Company and the cost of an asset can be measured reliably. Routine maintenance and repairs are expensed as incurred.

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

	Estimated useful lives (in years)
Buildings	5–50
Structures	2–30
Machinery	2–15
Other property, plant and equipment	2–10

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

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

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

2.16 Investment properties

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

Subsequent costs are recognized in carrying amount of an asset or as a separate asset if it is probable that future economic benefits associated with the assets will flow into the Company and the cost of an asset can be measured reliably. Routine maintenance and repairs are expensed as incurred.

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

2.17 Intangible assets

2.17.1 Intangible assets acquired separately

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

2.17.2 Internally generated intangible assets

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

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

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

2.17.3 Intangible assets acquired in a business combination

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

2.17.4 Derecognition of intangible assets

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

2.17.5 Amortization of intangible assets

Intangible assets other than memberships with indefinite useful lives are amortized using the straight-line method with acquiring cost, except for residual value, with the amortization beginning when the asset is available for use. The estimated useful lives of the assets are as follows:

	Estimated useful lives (in years)
Development costs	5–10
Industrial rights	5
Other intangible assets	4–15

2.18 Impairment of tangible and intangible assets other than goodwill

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

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

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

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

2.19 Inventories

Inventories are stated at the lower of cost and net realizable value. Cost of inventories, except for those in transit, are measured under the weighted-average cost formula and consists of the purchase price, cost of conversion and other costs incurred in bringing the inventories to their present location and condition. Net realizable value represents the estimated selling price for inventories, less all estimated costs of completion and costs necessary to make the sale.

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

2.20 Provisions

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

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

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, a receivable is recognized as an asset if it is virtually certain that reimbursement will be received and the amount of the receivable can be measured reliably.

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

2.21 Financial instruments

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity.

2.21.1 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 Company’s business model for managing them.

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 Company’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 Company commits to purchase or sell the asset.

2.21.1 Financial assets (cont'd)

[Subsequent measurement]

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

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

Financial assets at amortized cost (debt instruments)
The Company measures financial assets at amortized cost if both of the following conditions are met:

- The financial asset is held within a business model with the objective to hold financial assets in order to collect contractual cash flows, and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding

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

Financial assets at fair value through OCI (debt instruments)
The Company 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 statements of profit or loss 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 Company 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.

Gains and losses on these financial assets are never recycled to profit or loss. Dividends are recognized as other income in the statements of profit or loss when the right of payment has been established, except when the Company 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 Company can elect to classify irrevocably its non-listed equity investments under this category.

2.21.1 Financial assets (cont'd)

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 statements of financial position at fair value with net changes in fair value recognized in profit or loss.

This category contains derivatives and listed equity instruments that do not make an irrevocable choice to account for changes in fair value in other comprehensive income. Dividends on listed equity instruments are recognized in profit or loss at the time the rights are established.

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

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

[Derecognition]

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

- The rights to receive cash flows from the asset have expired, or
- The Company 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 Company has transferred substantially all the risks and rewards of the asset, or (b) the Company has neither transferred nor retained substantially all the risks and rewards of the asset, but has transferred control of the asset

When the Company 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 Company continues to recognize the transferred asset to the extent of its continuing involvement. In that case, the Company 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 Company 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 Company could be required to repay.

2.21.1 Financial assets (cont'd)

[Impairment of financial assets]

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

2.21.2 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.

[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 Company that are not designated as hedging instruments in hedge relationships as defined by KIFRS 1109. Separated embedded derivatives are also classified as held for trading unless they are designated as effective hedging instruments.

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

Financial liabilities designated upon initial recognition at fair value through profit or loss are designated at the initial date of recognition, and only if the criteria in KIFRS 1109 are satisfied.

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

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

This category generally applies to interest-bearing loans and borrowings.

2.21.2 Financial liabilities (cont'd)

[Derecognition]

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

2.21.3 Offsetting of financial instruments

Financial assets and financial liabilities are offset and the net amount is reported in the separate statements of financial position if there is a currently enforceable legal right to offset the recognized amounts and there is an intention to settle on a net basis, to realize the assets and settle the liabilities simultaneously.

2.21.4 Financial guarantee liabilities

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

Financial guarantee liabilities are initially measured at their fair values and, if not designated as financial liabilities at fair value through profit or loss, or unless the transfer of a financial asset does not meet the derecognition criteria or the continuing involvement approach is applied are subsequently measured at the higher of:

- The amount of loss allowances determined in accordance with KIFRS 1109 *5.5,* and
- The amount initially recognized, less cumulative amortization recognized in accordance with the KIFRS 1115

2.22 Equity instruments

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

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

2.23 Derivative financial instruments and hedge accounting

The Company 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

At the inception of a hedge relationship, the Company formally designates and documents the hedge relationship to which the Company 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 Company 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 Company 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 Company actually hedges and the quantity of the hedging instrument that the Company 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 statements of profit or loss. The change in the fair value of the hedged item attributable to the risk hedged is recorded as part of the carrying value of the hedged item and is also recognized in the statements of profit or loss.

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

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

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

2.23 Derivative financial instruments and hedge accounting (cont'd)

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

The Company 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 forward contracts is recognized as finance income or finance expenses.

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 year. 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 in a foreign operation
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 statements of profit or loss. On disposal of the foreign operation, the cumulative value of any such gains or losses recorded in equity is transferred to the statements of profit or loss.

2.24 Fair value

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

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

2.25 Approval of separate financial statements

The separate financial statements of the Company were approved by the Board of Directors on March 11, 2019 and will be finalized at the annual general meeting of shareholders on March 29, 2019.

3. Significant accounting judgements and key sources of estimation uncertainties

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

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

3.1 Revenue recognition

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

3.2 Impairment of goodwill

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

3.3 Defined benefit liabilities

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

3.4 Provisions

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

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

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

3.6 Deferred tax

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

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

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

3.8 Fair value

When the fair values of financial instruments recorded in the separate statements of financial position cannot be measured based on quoted prices in active markets, their fair value is measured using valuation techniques including the discounted cash flow (DCF) model. The inputs to these models are taken from observable markets where possible, but where this is not feasible, a degree of judgement is required in establishing fair values. Judgements include considerations of inputs such as liquidity risk, credit risk and volatility. Changes in assumptions relating to these factors could affect the reported fair value of financial instruments.

4. Financial risk management

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

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

4.1 Market risk

4.1.1 Foreign currency risk

The Company's exposure to the risk of changes in foreign exchange rates relates primarily to the Company's operating activities (when revenue or expense is denominated in a foreign currency). The Company's basis for foreign currency risk management is to reduce income/loss volatility. Foreign currency risk is managed by the Company's policy on foreign currencies and foreign currency management for speculative purpose is strictly prohibited.

The Company reduces exposure to foreign currency risk by matching the inflow and the outflow of foreign currencies (natural hedge) and manages foreign currency risk for the remaining exposure by using derivatives, such as currency forwards.

The carrying amount of the Company's monetary assets and liabilities denominated in foreign currencies, which represents the maximum exposure to foreign currency risk as of December 31, 2018 and 2017 is as follows (Korean won in millions):

	December 31, 2018					
	USD	EUR	JPY	GBP	Others(*1)	Total
Financial assets in foreign currencies	₩ 214,379	₩ 33,656	₩ 889	₩ 61,885	₩ 32,738	₩ 343,547
Financial liabilities in foreign currencies	(153,800)	(3,911)	(6,364)	(336)	(2,115)	(166,526)
	₩ 60,579	₩ 29,745	₩ (5,475)	₩ 61,549	₩ 30,623	₩ 177,021

	December 31, 2017					
	USD	EUR	JPY	GBP	Others(*1)	Total
Financial assets in foreign currencies	₩ 224,167	₩ 29,666	₩ 887	₩ 32,683	₩ 29,277	₩ 316,680
Financial liabilities in foreign currencies	(166,462)	(1,438)	(2,824)	(573)	(160)	(171,457)
	₩ 57,705	₩ 28,228	₩ (1,937)	₩ 32,110	₩ 29,117	₩ 145,223

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

Net foreign currency translation gain for the years ended December 31, 2018 and 2017 is ₩642 million and ₩1,697 million, respectively.

The table below summarizes the impact of 10% increase/decrease of currency exchange rates on profit before income tax expenses for the year.

	Impact on profit before income tax expenses	
	2018	2017
10% Increase	₩ 17,702	₩ 14,522
10% Decrease	(17,702)	(14,522)

The above-mentioned sensitivity analysis is based on monetary assets and liabilities denominated in foreign currencies other than the Company's functional currency as of December 31, 2018 and 2017.

4.1.2 Interest rate risk

The Company's interest rate risk is related to borrowings and bank deposits with floating interest rates, and related interest income and expense are exposed to interest rate risk. The Company is exposed to interest rate risk mainly due to its borrowings with floating interest rates. The purpose of interest rate risk management is to minimize uncertainty and finance expenses arising from interest rate fluctuation.

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

The carrying amount of the Company's financial assets and liabilities with floating interest rates exposed to interest rate risk as of December 31, 2018 and 2017 is as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Financial assets	₩ 117,119	₩ 54,872
Financial liabilities	(181,574)	(304,284)
	₩ (64,455)	₩ (249,412)

A sensitivity analysis on the Company's profit before income tax expenses assuming a 1% increase and decrease in interest rates for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	Impact on profit before income tax expenses	
	2018	2017
Increase	₩ (645)	₩ (2,494)
Decrease	645	2,494

4.1.3 Price risk

The Company is exposed to equity price risks arising from its listed equity investments. The Company periodically measures the risk as the fair value or future cash flows of equity investments may fluctuate due to the changes in market prices. Important investments in the Company's portfolio are individually managed, and acquisition and disposal are approved by the Board of Directors.

4.2 Credit risk

Credit risk refers to risk of financial losses to the Company when the counterparty defaults on the obligations of the contract. Credit risk arises from financial assets at fair value through OCI and financial assets at fair value through profit or loss which are not equity securities, deposits in financial institution, financial derivatives and guarantee limit, and others. As well as from the Company's normal transactions and investing activities. To manage credit risk, the Company evaluates the creditworthiness of each customer or counterparty considering the financial status, past experience and other factors. The Company establishes credit limit for each customer and counterparty.

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

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

4.2 Credit risk (cont'd)

The carrying amount of the financial assets exposed to credit risk as of December 31, 2018 and 2017 is as follows (Korean won in millions). The carrying amount indicates the maximum exposure to credit risk.

		December 31, 2018
Cash and cash equivalents	₩	114,171
Short-term and long-term financial instruments		10,329
Trade and other receivables		560,023
Deposits		13,822
Short-term and long-term investment securities:		
Financial assets at fair value through profit or loss		7,617
Derivative assets		1,184
	₩	707,146

		December 31, 2017
Loans and receivables:		
Cash and cash equivalents	₩	56,560
Short-term and long-term financial instruments		69
Trade and other receivables		490,637
Deposits		40,700
Available-for-sale financial assets:		
Short-term and long-term investment securities		88,475
Derivative assets		3,247
	₩	679,688

Apart from the above-mentioned financial assets, financial guarantee liabilities of the Company are explained in Note 30.

Details of trade receivables exposed to credit risk, presented using forecast model, as of December 31, 2018 are as follows (Korean won in millions):

	Trade receivables							
	Individually assessed trade receivables (*1)	Trade receivables assessed for impairment on a collective basis(*2)						
		Within due	Less than 3 months	3–6 months	6–12 months	More than 12 months	Subtotal	Total
Book value	₩ 211,016	₩ 169,492	₩ 14,167	₩ 3,901	₩ 32,108	₩ 4,119	₩ 223,787	₩ 434,803
Expected credit loss rate								
Expected credit loss	₩ 19,446	₩	₩	₩	₩ [illegible]	₩ 3,615	₩ 4,000	₩ 23,446

(*1) Trade receivables with indication of impairment that are individually identifiable, such as bankruptcy.

(*2) Trade receivables that are not individually significant and are classified into groups according to their similar characteristics.

4.3 Liquidity risk

Liquidity risk is the risk that the Company will encounter difficulty in meeting its financial liabilities' obligations related to its financing for its operation.

Based on the establishment of a regular funding plan, the Company prepares for the funding balance of its business activities, investment activities and financing activities for the maturity of financial assets and liabilities. The Company manages the liquidity risks that may occur in the future in advance by securing and maintaining required liquidity.

A summary of the Company's non-derivative liabilities' maturity as of December 31, 2018 and 2017 is as follows (Korean won in millions):

	December 31, 2018					
		Nominal cash flows according to contract				
	Book value	Total	Less than 1 year	1–2 years	2–5 years	More than 5 years
Financial liabilities	₩ 2,075,961	₩ 2,083,197	₩ 1,215,289	₩ 315,363	₩ 552,545	₩ -
Interest on financial liabilities	-	114,727	51,311	28,956	34,460	-
	₩ 2,075,961	₩ 2,197,924	₩ 1,266,600	₩ 344,319	₩ 587,005	₩ -

	December 31, 2017					
		Nominal cash flows according to contract				
	Book value	Total	Less than 1 year	1–2 years	2–5 years	More than 5 years
Financial liabilities	₩ 1,475,021	₩ 1,477,257	₩ 995,550	₩ 347,818	₩ 133,889	₩ -
Interest on financial liabilities	-	43,616	30,554	11,888	1,174	-
	₩ 1,475,021	₩ 1,520,873	₩ 1,026,104	₩ 359,706	₩ 135,063	₩ -

The above-mentioned maturity analysis is based on undiscounted cash flow according to the contract, which is different from non-derivative liabilities in the separate statements of financial position. Apart from the above-mentioned non-derivative liabilities, as of December 31, 2018, financial guarantee liabilities of the Company are explained in Note 30.

4.4 Capital risk

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

The Company manages its capital structure through dividend payments to shareholders, returns capital to shareholders and issues new shares and sells its assets for debt reduction. Debt-to-equity ratio calculated as total liabilities divided by equity is used as an index to manage the Company's capital similar to overall industry practice.

Debt-to-equity ratios as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Total liabilities	₩ 2,428,715	₩ 1,750,271
Total equity	2,305,508	2,199,759
Debt-to-equity ratio	105.34%	79.57%

5. Restricted financial assets

Details of restricted financial assets as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017	Description
Long-term financial instruments	₩ 10,329	₩ 69	Bank transaction deposits, deposits provided for business, establishment of the right of pledge and others

6. Short-term and long-term investment securities

Details of short-term and long-term investment securities as of December 31, 2018 and 2017 are as follows (Korean won in millions):

			December 31, 2018
Short-term investment securities	Financial assets at fair value through profit or loss	₩	1,497
Long-term investment securities	Financial assets (designated) at fair value through OCI(*1)		361
	Financial assets at fair value through profit or loss		6,120
			6,481
		₩	7,978

(*1) The bonds of the unsecured bonds with stock warrants was sold in full which is issued by Doosan Heavy Industries & Construction Co., Ltd., a subsidiary, during the current period.

				December 31, 2017
Short-term investment securities	Available-for-sale financial assets	Beneficiary certificates	₩	1,497
Long-term investment securities	Available-for-sale financial assets	Non-marketable equity securities		235
		Beneficiary certificates(*1)		88,051
		Equity investments and others		1,347
				89,633
			₩	91,130

(*1) Including unsecured bond with stock warrants issued by Doosan Heavy Industries & Construction Co., Ltd., a subsidiary, on May 4, 2017 and the Company has recognized stock warrants separately.

Changes in accumulated other comprehensive income of financial assets (designated) at fair value through OCI for the year ended December 31, 2018 are as follows (Korean won in millions):

		Beginning balance	Effect of adoption of new accounting standards	Valuation	Disposal	Changes due to merger	Ending balance
Debt instruments at fair value through OCI	Accumulated other comprehensive income before income tax	₩ -	₩ (2,533)	₩ 355	₩ 2,178	₩ -	₩ -
	Income tax effect	-	613	(86)	(527)	-	-
		-	(1,920)	269	1,651	-	-
Equity instruments designated at fair value through OCI	Accumulated other comprehensive income before income tax	-	-	(35)	-	100	65
	Income tax effect	-	-	9	-	(24)	(15)
		-	-	(26)	-	76	50
		₩ -	₩ (1,920)	₩ 243	₩ 1,651	₩ 76	₩ 50

Changes in accumulated gain (loss) on available-for-sale financial assets for the year ended December 31, 2017 are as follows (Korean won in millions):

	2017			
	Beginning balance	Valuation	Disposal and others	Ending balance
Beneficiary certificates	₩	₩ (2,533)	₩ -	₩ (2,533)
Income tax effect		613	-	613
	₩	₩ (1,920)	₩ -	₩ (1,920)

7. Trade and other receivables

Trade and other receivables as of December 31, 2018 and 2017 consist of the following (Korean won in millions):

	December 31, 2018			December 31, 2017		
	Gross	Provision for impairment	Book value	Gross	Provision for impairment	Book value
Current:						
Trade receivables	₩ 434,622	₩ (23,266)	₩ 411,356	₩ 399,051	₩ (22,093)	₩ 376,958
Non-trade receivables	103,228	(1,635)	101,593	70,395	(1,066)	69,329
Accrued income	80	-	80	197	-	197
Short-term loans	902	(5)	897	38,933	(5)	38,928
Others	88	-	88	-	-	-
	₩ 538,920	₩ (24,906)	₩ 514,014	₩ 508,576	₩ (23,164)	₩ 485,412
Non-current:						
Trade receivables	₩ 181	₩ (181)	₩ -	₩ 181	₩ (181)	₩ -
Non-trade receivables	35	(35)	-	35	(35)	-
Long-term loans	46,010	-	46,010	5,226	-	5,226
	₩ 46,226	₩ (216)	₩ 46,010	₩ 5,442	₩ (216)	₩ 5,226

Changes in allowance for doubtful accounts for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018				
	Beginning balance	Provision for impaired receivables	Write off	Merger	Ending balance
Trade receivables	₩ (22,093)	₩ (744)	₩ 113	₩ (542)	₩ (23,266)
Non-trade receivables	(1,066)	(569)	-	-	(1,635)
Short-term loans	(5)	-	-	-	(5)
Long-term trade receivables	(181)	-	-	-	(181)
Long-term non-trade receivables	(35)	-	-	-	(35)
	₩ (23,380)	₩ (1,313)	₩ 113	₩ (542)	₩ (25,122)

	2017			
	Beginning balance	Provision for impaired receivables	Write off	Ending balance
Trade receivables	₩ (23,182)	₩ (19)	₩ 1,108	₩ (22,093)
Non-trade receivables	(1,054)	(12)	-	(1,066)
Short-term loans	(5)	-	-	(5)
Long-term trade receivables	(181)	-	-	(181)
Long-term non-trade receivables	(35)	-	-	(35)
	₩ (24,457)	₩ (31)	₩ 1,108	₩ (23,380)

Impairment loss (reversal of impairment loss) on impaired trade receivables is included in selling and administrative expenses in the separate statements of profit or loss, and that on receivables other than impaired trade receivables is included in other non-operating expenses (income).

8. Inventories

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

	December 31, 2018			December 31, 2017		
	Acquisition cost	Valuation allowance	Book value	Acquisition cost	Valuation allowance	Book value
Merchandise	₩ 121,383	₩ (2,236)	₩ 119,147	₩ 108,566	₩ (2,131)	₩ 106,435
Finished goods	102,362	(3,753)	98,609	89,226	(1,588)	87,638
Work in process	47,733	(228)	47,505	31,773	(798)	30,975
Raw materials	155,435	(3,939)	151,496	123,595	(4,238)	119,357
Materials in transit	37,252	-	37,252	32,682	-	32,682
Others	6,816	-	6,816	6,013	(153)	5,860
	₩ 470,981	₩ (10,156)	₩ 460,825	₩ 391,855	₩ (8,908)	₩ 382,947

The amount of write-down of inventories is ₩1,248 million and ₩1,610 million for the years ended December 31, 2018 and 2017, respectively.

9. Derivatives

Details of derivative contracts are as follows:

Derivative contracts	Purpose	Description
Currency forward contracts	Cash flow hedge	Adjustment from foreign currency sales to Korean won to avoid cash flow risk arising from foreign currency forecast sales
Interest rate swap	Held for trading	Recognized in gain or loss of gap between floating-interest rate and fixed-interest rate
Stock warrants and others	Held for trading	Recognized gap of fair value as gain or loss

Details of gain (loss) on valuation of derivatives as of December 31, 2018 and 2017 are as follows (Korean won in millions, foreign currency in thousands):

December 31, 2018						
Buy		Sell				
Currency	Amount	Currency	Amount	Assets (liabilities)	Loss	Accumulated other comprehensive income(*1)
Currency forward contracts:						
KRW	112,377	USD	100,000	₩ 1,016	₩ -	₩ 1,016
KRW	31,287	CNY	194,000	(218)	-	(218)
Interest rate swap:						
KRW 5,000, 3.15%		KRW 5,000, MOR 3M+1.38%		-	(3)	-
Stock warrants and others(*2)				167	(1,735)	-
				₩ 965	₩ (1,738)	₩ 798

(*1) The amounts are gain (loss) on valuation of derivatives designated as cash flow hedges before income tax effect.

(*2) Valuation of stock warrants issued by Doosan Heavy Industries & Construction Co., Ltd. (see Note 6).

9. Derivatives (cont'd)

December 31, 2017						
Buy		Sell				
Currency	Amount	Currency	Amount	Assets (liabilities)	Gain (loss)	Accumulated other comprehensive income(*1)
Currency forward contracts:						
KRW	15,935	USD	14,000	₩ 952	₩ -	₩ 952
KRW	6,172	CNY	4,000	393	-	393
Interest rate swap:						
KRW 5,000, 3.15%		KRW 5,000, MOR 3M+1.38%		(1)	(1)	-
KRW 30,000, 3.63%		KRW 30,000, MOR 3M+1.80%		-	(16)	-
Stock warrants and others(*2)				1,902	(1,826)	-
				₩ 3,246	₩ (1,843)	₩ 1,345

(*1) The amounts are gain (loss) on valuation of derivatives designated as cash flow hedges before income tax effect.

(*2) Valuation of stock warrants issued by Doosan Heavy Industries & Construction Co., Ltd. (see Note 6).

10. Financial instruments by category

Categories of financial instruments as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018					
	Financial assets at fair value through profit or loss	Financial assets (designated) at fair value through OCI	Derivatives designated as hedging instruments	Financial assets at amortized cost	Book value	Fair value
Cash and cash equivalents	₩ -	₩ -	₩ -	₩ 114,171	₩ 114,171	₩ 114,171
Short-term and long-term financial instruments	9,000	-	-	1,329	10,329	10,329
Short-term and long-term investment securities	7,617	361	-	-	7,978	7,978
Trade and other receivables	-	-	-	560,023	560,023	560,023
Derivative assets	168	-	1,016	-	1,184	1,184
Deposits	-	-	-	13,822	13,822	13,822
	₩ 16,785	₩ 361	₩ 1,016	₩ 689,345	₩ 707,507	₩ 707,507

	December 31, 2018					
	Financial liabilities at fair value through profit or loss	Derivatives designated as hedging instruments	Financial guarantee contract	Financial liabilities at amortized cost	Book value	Fair value
Trade and other payables	₩ -	₩ -	₩ 1,555	₩ 728,329	₩ 729,884	₩ 729,884
Borrowings, bonds	-	-	-	1,347,632	1,347,632	1,347,632
Derivative liabilities	-	218	-	-	218	218
	₩ -	₩ 218	₩ 1,555	₩ 2,075,961	₩ 2,077,734	₩ 2,077,734

10. Financial instruments by category (cont'd)

	December 31, 2017					
	Financial assets at FVTPL	Loans and receivables	Available-for-sale financial assets	Derivatives designated as hedging instruments	Book value	Fair value
Cash and cash equivalents	₩ -	₩ 56,560	₩ -	₩ -	₩ 56,560	₩ 56,560
Short-term and long-term financial instruments	-	69	-	-	69	69
Short-term and long-term investment securities	-	-	91,130	-	91,130	91,130
Trade and other receivables	-	490,637	-	-	490,637	490,637
Derivative assets	1,902	-	-	1,345	3,247	3,247
Deposits	-	40,700	-	-	40,700	40,700
	₩ 1,902	₩ 587,966	₩ 91,130	₩ 1,345	₩ 682,343	₩ 682,343

	December 31, 2017					
	Financial liabilities at FVTPL	Financial liabilities at amortized cost	Derivatives designated as hedging instruments	Financial guarantee contract	Book value	Fair value
Trade and other payables	₩ -	₩ 521,592	₩ -	₩ 1,084	₩ 522,676	₩ 522,676
Borrowings, bonds	-	953,429	-	-	953,429	953,429
Derivative liabilities	1	-	-	-	1	1
	₩ 1	₩ 1,475,021	₩ -	₩ 1,084	₩ 1,476,106	₩ 1,476,106

Fair value measurements of financial instruments by fair value hierarchy levels as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
Financial assets at fair value :				
Financial assets at fair value through profit or loss	₩ -	₩ 9,000	₩ 7,785	₩ 16,785
Financial assets (designated) at fair value through OCI	126	-	235	361
Derivative assets designated as hedging instruments	-	1,016	-	1,016
	126	10,016	8,020	18,162
Financial liabilities (designated) at fair value :				
Financial liabilities at fair value through profit or loss	-	-	-	-
Derivative liabilities designated as hedging instruments	-	(218)	-	(218)
	-	(218)	-	(218)
	₩ 126	₩ 9,798	₩ 8,020	₩ 17,944

	December 31, 2017			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Financial assets at fair value through profit or loss	₩ -	₩ -	₩ 1,902	₩ 1,902
Derivative assets designated as hedging instruments	-	1,345	-	1,345
Available-for-sale financial assets	-	86,978	-	86,978
	-	88,323	1,902	90,225
Financial liabilities:				
Financial liabilities at fair value through profit or loss	-	(1)	-	(1)
Derivative liabilities designated as hedging instruments	-	-	-	-
	-	(1)	-	(1)
	₩ -	₩ 88,322	₩ 1,902	₩ 90,224

The above table does not include information for those financial instruments, which are not measured at fair value because the carrying amount approximates fair value.

10. Financial instruments by category (cont'd)

The Company uses the following hierarchy for determining and disclosing the fair value of financial instruments by valuation technique. The level of hierarchy of fair value is as follows:

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

The fair value of financial instruments traded in active markets is based on quoted market prices at the dates of the separate statements of financial position. These instruments are included in Level 1. Instruments included in Level 1 comprise primarily listed equity investments classified as financial assets at fair value.

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

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

Comprehensive income (loss) by categories of financial instruments for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018						
	Profit or loss						Other comprehensive income(*1)
	Interest	Dividends	Financial guarantee	Impairment (reversal)	Disposal	Foreign exchange	
Financial assets:							
Financial assets at amortized cost	₩ 2,671	₩ -	₩ -	₩ 1,313	₩ (5,732)	₩ 28,008	₩ -
Financial assets at fair value through profit or loss	-	-	-	-	(4)	-	-
Financial assets (designated) at fair value through OCI	3,088	5	-	-	(5,060)	-	2,498
	₩ 5,759	₩ 5	₩ -	₩ 1,313	₩ (10,796)	₩ 28,008	₩ 2,498
Financial liabilities:							
Financial liabilities at amortized cost	₩ (56,633)	₩ -	₩ -	₩ -	₩ (294)	₩ 17,573	₩ -
Financial guarantee contract	-	-	1,691	-	-	-	-
	₩ (56,633)	₩ -	₩ 1,691	₩ -	₩ (294)	₩ 17,573	-

(*1) Other comprehensive income is before income tax effect.

10. Financial instruments by category (cont'd)

	2017													
	Profit or loss												Other comprehensive loss(*1)	
	Interest		Dividend		Financial guarantee		Impairment		Disposal		Foreign exchange			
Financial assets:														
Loans and receivables	₩	4,998	₩	-	₩	-	₩	(1,392)	₩	(5,161)	₩	63,361	₩	-
Available-for-sale financial assets		1,656		24		-		-		-		-		(2,533)
	₩	6,654	₩	24	₩	-	₩	(1,392)	₩	(5,161)	₩	63,361	₩	(2,533)
Financial liabilities:														
Financial liabilities at amortized cost	₩	(42,336)	₩	-	₩	-	₩	-	₩	-	₩	22,143	₩	-
Financial guarantee contract		-		-		1,272		-		-		-		-
	₩	(42,336)	₩	-	₩	1,272	₩	-	₩	-	₩	22,143		-

(*1) Other comprehensive loss is before income tax effect.

Apart from the above financial instruments, comprehensive income (loss) by derivatives for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018						2017					
	Profit or loss				Other comprehensive loss(*1)		Profit or loss				Other comprehensive income(*1)	
	Valuation		Disposal				Valuation		Disposal			
Derivatives not designated as hedging instruments	₩	(1,738)	₩	-	₩	-	₩	(1,843)	₩	137	₩	-
Derivatives designated as hedging instruments		-		123		(547)		-		-		4,885
	₩	(1,738)	₩	123	₩	(547)	₩	(1,843)	₩	137	₩	4,885

(*1) Other comprehensive income (loss) is before income tax effect.

Financial assets and liabilities subject to an enforceable master-netting arrangement or similar agreement as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018						December 31, 2017					
	Gross recognized financial instruments		Gross financial instruments set off		Net amounts presented in the statements of financial position		Gross recognized financial instruments		Gross financial instruments set off		Net amounts presented in the statements of financial position	
Financial assets:												
Trade receivables	₩	22,815	₩	(7,647)	₩	15,168	₩	11,691	₩	(6,246)	₩	5,445
Other receivables		161		(104)		57		261		(64)		196
	₩	22,976	₩	(7,751)	₩	15,225	₩	11,951	₩	(6,310)	₩	5,641
Financial liabilities:												
Trade payables	₩	85,037	₩	(7,751)	₩	77,286	₩	74,087	₩	(6,310)	₩	67,777

11. Investments in subsidiaries, joint ventures and associates

Details of investments in subsidiaries, joint ventures and associates as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	Location	Ownership interests (%)	December 31, 2018	December 31, 2017
Subsidiaries:				
Doosan Heavy Industries & Construction Co., Ltd. ("DHC")(*10)	Korea	33.79	₩ 1,232,946	₩ 1,232,946
Oricom Inc. ("Oricom")	Korea	63.41	23,168	23,168
Dootamall Co., Ltd.(*3)	Korea	100.00	-	231,550
Doosanbears Inc.(*9)	Korea	100.00	15,559	11,138
DIP Holdings Co., Ltd. ("DIP")(*1)	Korea	100.00	-	164,169
DLI Corporation	Korea	100.00	8,000	8,000
Doosan Information and Communications America LLC	USA	100.00	4,889	4,889
Doosan Information and Communications China Co., Ltd.	China	100.00	3,230	3,230
Doosan Information and Communications Europe Ltd	UK	100.00	4,870	4,870
Doosan Mottrol (Jiangyin) Co., Ltd.	China	100.00	21,601	21,601
Doosan Electro-Materials (Changshu) Co., Ltd.	China	100.00	45,964	45,964
Doosan Electro-Materials America, LLC	USA	100.00	1,101	1,101
Doosan Electro-Materials Luxembourg Sarl	Luxembourg	100.00	28,111	28,111
Doosan Industrial Vehicle Europe Kft.(*7)	Hungary	100.00	10,696	-
Doosan Industrial Vehicle Europe N.A.	Belgium	100.00	16,934	16,934
Doosan Industrial Vehicle U.K. Ltd.	UK	100.00	1,909	1,909
Doosan Logistics Europe GmbH	Germany	100.00	1,909	1,909
Doosan Industrial Vehicle America Corp.	USA	100.00	27,016	27,016
Doosan Industrial Vehicle Yantai Co., Ltd.	China	100.00	10,617	10,617
Doosan Fuel Cell America, Inc.	USA	100.00	61,402	61,402
Doosan Energy Solutions America, Inc.	USA	100.00	1,680	1,680
Doosan Cuvex Co., Ltd(*10)	Korea	29.19	32,636	32,636
DBC Co., Ltd(*6, 10)	Korea	18.70	19,822	49,181
DRA Inc.(*2, 4)	Korea	100.00	54,000	2,000
Doosan Mobility Innovation Inc.(*2, 5, 8)	Korea	100.00	30,600	2,200
Doosan Mecatec Co., Ltd.(*2)	Korea	100.00	197,853	-
Neoplux Co., Ltd.(*2)	Korea	96.77	49,047	-
			1,905,560	1,988,221
Associates:				
Prestolite Asia Ltd.	Korea	28.36	468	468
Daesan Green Energy Co. Ltd.(*7, 11)	Korea	10.00	5,100	-
			5,568	468
Joint venture:				
Sichuan Kelun-Doosan Biotechnology Company Limited	China	50.00	2,526	2,526
			₩ 1,913,654	₩ 1,991,215

(*1) The Company merged it in March 1, 2018

(*2) It increased as it merged DIP Holdings Co., Ltd, which owns the investment share.

(*3) The Company merged it in June 1, 2018

(*4) It increased share capital of ₩23,000 million during the current period.

(*5) It increased share capital of ₩16,900 million during the current period.

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

(*6) It decreased share capital of ₩29,359 million during the current period.

(*7) The Company newly acquired shares during the current period.

(*8) During the current period, DAE Co., Ltd. changed its name to Doosan Mobility Innovation Inc.

(*9) It increased share capital of ₩4,421 million during the current period.

(*10) Ownership interests in the subsidiary's (potential) voting rights for the purpose of assessing the control over the subsidiary was less than 50%, but it was deemed to have substantial control.

(*11) Although the ownership percentage is less than 20%, the Company can exercise voting rights in the Board of Directors of the investee company and it is classified as an associate.

Announced market prices of investments in subsidiaries, joint ventures and associates as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018		December 31, 2017	
	Book value	Fair value	Book value	Fair value
Subsidiaries:				
DHC	₩ 1,232,946	₩ 427,594	₩ 1,232,946	₩ 674,570
Oricom	23,168	37,258	23,168	36,966

The Company determines whether impairment loss is recognized in respect of joint ventures and associates in accordance with KIFRS 1036 *Impairment of Assets.* The Company determined whether there is any indication of impairment of investment securities as of December 31, 2018. As a result, the Company performed an impairment test by comparing the carrying amount of the investment in DHC, a subsidiary, with the recoverable amount (the greater of the fair value less costs and value in use).

The carrying amount of investments in DHC before impairment test was ₩1,232,946 million as of December 31, 2018.

The recoverable amount of Investments in DHC is determined based on value in use. The discount rate and the permanent growth rate used in calculating value in use as of December 31, 2018 are as follows:

	December 31, 2018
Discount rate	8.98%~12.39%
Permanent growth rate	1.00%~1.50%

Estimates for value in use calculation are as follows.

The Company uses cash flow projections based on financial budgets approved by the directors covering five-year periods for a value in use calculation. The financial budgets are determined based on historical result and expectation of market growth. Cash flows beyond that five-year periods have been extrapolated using the expected growth rate, continuing the fifth year cash flow. The growth rate does not exceed long-term average growth rate of market, and the discount rates used reflect relevant risks specific to the CGUs.

The result of recoverable amount of the Company calculated based on value in use calculation was not to cause the aggregate carrying amount to exceed amount of the investment shares. Therefore, no impairment loss is recognized based on the impairment test for the year ended December 31, 2018.

A reasonably possible change in a key assumption would cause the change of recoverable amount. Therefore, management continuously observes related sales and industrial trend subsequently.

12. Property, plant and equipment

Changes in property, plant and equipment for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018					
	Land	Buildings and Structures	Machinery	Others	Construction in progress	Total
Beginning balance	₩ 213,089	₩ 84,426	₩ 107,026	₩ 66,200	₩ 24,050	₩ 494,791
Acquisition/capital expenditure	663	1,245	12,167	22,045	25,257	61,377
Reclassification	13,584	7,826	18,272	230	(25,939)	13,973
Disposal	(47)	(31)	(1,052)	(4,809)	-	(5,939)
Increase due to merger(*1)	197,626	102,878	956	19,904	1,435	322,799
Depreciation	(43)	(10,011)	(21,046)	(27,022)	-	(58,122)
Impairment	-	(14)	(340)	-	(2,465)	(2,819)
Acquisition of government grants	-	-	(592)	-	-	(592)
Ending balance	₩ 424,872	₩ 186,319	₩ 115,391	₩ 76,548	₩ 22,338	₩ 825,468
Acquisition cost	₩ 376,837	₩ 249,106	₩ 375,067	₩ 228,230	₩ 23,386	₩ 1,252,626
Accumulated depreciation (accumulated impairment losses are included)	-	(62,787)	(258,591)	(151,681)	(1,048)	(474,107)
Government grants	-	-	(1,085)	(1)	-	(1,086)
Accumulated revaluation surplus	48,035	-	-	-	-	48,035

(*1) Increase due to the merger with Dootamall Co., Ltd. during the current period.

	2017					
	Land	Buildings and Structures	Machinery	Others	Construction in progress	Total
Beginning balance	₩ 220,441	₩ 87,775	₩ 105,311	₩ 59,094	₩ 45,008	₩ 517,629
Acquisition/capital expenditure	318	2,609	11,336	27,898	29,800	71,961
Reclassification	-	520	9,596	4,585	(16,821)	(2,120)
Disposal	(21,415)	(908)	(261)	(2,602)	(33,937)	(59,123)
Investment in kind	-	-	-	(113)	-	(113)
Depreciation	(43)	(5,570)	(18,956)	(22,662)	-	(47,231)
Net increase due to revaluation	16,193	-	-	-	-	16,193
Impairment	(2,405)	-	-	-	-	(2,405)
Ending balance	₩ 213,089	₩ 84,426	₩ 107,026	₩ 66,200	₩ 24,050	₩ 494,791
Acquisition cost	₩ 169,599	₩ 137,237	₩ 348,701	₩ 196,850	₩ 24,050	₩ 876,437
Accumulated depreciation (accumulated impairment losses are included)	-	(52,811)	(240,950)	(130,635)	-	(424,396)
Government grants	-	-	(725)	(15)	-	(740)
Accumulated revaluation surplus	43,490	-	-	-	-	43,490

The Company recognized the land subsequently measured at revaluation amount, if the land were stated at cost, the land would amount to ₩376,837 million and ₩169,599 million as of December 31, 2018 and 2017, respectively.

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

Meanwhile, the Company's land and buildings are partially pledged as collateral for loans from KDB and others (see Note 31).

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

The Company recognizes subsequent measurement of the land as revaluation, and the revaluation amount is the fair value of the revaluation date. As of December 31, 2018, the fair value of land assets was determined from the appraisal that was undertaken by independently qualified valuators, the First Appraisal & Consulting Co., Ltd ("FACC") and Mirae & Saehan Appraisal Co., Ltd., on October 31, 2017.

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

Fair value measurements of land assets by fair value hierarchy level as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018			December 31, 2017		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Land	₩ -	₩ -	₩ 424,872	₩ -	₩ -	₩ 213,089

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

Valuation technique	Significant inputs that are not based on observable market data (unobservable inputs)	Explanation of input parameters
Official Assessed Reference Land Price ("OARLP"): OARLP of similar parcels nearby the subject land and reflating corrections necessary for differences between the subject and the comparable	Fluctuation rate of land price and others	Fair value increases (decreases), if rate of land price increases (decreases).
	Parcel conditions and others	Fair value increases (decreases), if correction of parcel conditions and others increases (decreases).
	Land conditions affecting the sales price and others	Fair value increases (decreases), if correction of land conditions affecting the sales price increases (decreases).

The fair value of the land as of December 31, 2018 is not significantly different from the revalued amount as of December 31, 2017.

Machinery and other property, plant and equipment acquired through finance lease agreements as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Acquisition cost	₩ 26,908	₩ 33,006
Accumulated depreciation	(16,107)	(17,986)
Book value	₩ 10,801	₩ 15,020

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

Minimum lease payments and present value of finance lease liabilities as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018				December 31, 2017			
	Minimum lease payments		Present value		Minimum lease payments		Present value	
Within 1 year	₩	5,614	₩	5,253	₩	7,633	₩	7,104
1 year–5 years		7,456		7,195		10,532		10,117
		13,070	₩	12,448		18,165	₩	17,221
Adjustment for present value		(622)				(944)		
Present value of finance lease liabilities	₩	12,448			₩	17,221		

Classification of depreciation for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018		2017	
Cost of sales	₩	41,311	₩	37,266
Selling and administrative expenses		15,268		8,776
Research and development cost and others		1,543		1,189
	₩	58,122	₩	47,231

13. Intangible assets

Changes in intangible assets for the years ended December 31, 2018 and 2017 consist of the following (Korean won in millions):

	2018									
	Goodwill		Industrial rights		Development costs		Other intangible assets		Total	
Beginning balance	₩	131,943	₩	1,924	₩	15,590	₩	37,185	₩	186,642
Acquisition/capital expenditure		-		844		13,180		791		14,815
Reclassification		-		-		3,340		1,669		5,009
Disposal		-		(80)		-		(876)		(956)
Increase due to merger(*1)		-		99		-		1,363		1,462
Amortization		-		(522)		(2,224)		(7,441)		(10,187)
Impairment		-		-		(371)		-		(371)
Acquisition of government grants		-		-		(2,211)		-		(2,211)
Ending balance	₩	131,943	₩	2,265	₩	27,304	₩	32,691	₩	194,203
Acquisition costs	₩	131,943	₩	5,544	₩	66,253	₩	100,811	₩	304,551
Accumulated amortization (accumulated impairment losses are included)		-		(3,279)		(31,528)		(68,120)		(102,927)
Government grants		-		-		(7,421)		-		(7,421)

(*1) Increase due to the merger with Dootamall Co., Ltd. during the current period.

13. Intangible assets (cont'd)

	2017				
	Goodwill	Industrial rights	Development costs	Other intangible assets	Total
Beginning balance	₩ 138,361	₩ 1,293	₩ 8,126	₩ 46,331	₩ 194,111
Acquisition/capital expenditure	-	1,067	9,741	1,946	12,754
Government grants	-	-	(1,177)	-	(1,177)
Reclassification	-	-	1,276	1,167	2,445
Disposal	-	(26)	-	(1,527)	(1,553)
Investment in kind	(6,418)	-	-	(516)	(6,936)
Amortization	-	(410)	(1,133)	(10,214)	(11,757)
Impairment	-	-	(1,243)	-	(1,243)
Ending balance	₩ 131,943	₩ 1,924	₩ 15,590	₩ 37,187	₩ 186,644
Acquisition costs	₩ 131,943	₩ 4,425	₩ 34,304	₩ 93,766	₩ 264,438
Accumulated amortization (accumulated impairment losses are included)	-	(2,501)	(12,684)	(56,579)	(71,764)
Government grants	-	-	(6,030)	-	(6,030)

The carrying amount of membership with indefinite useful lives in other intangible assets is ₩12,475 million and ₩13,069 million as of December 31, 2018 and 2017, respectively.

Meanwhile, expenditure on research and development, which was recognized as expenses, amounted to ₩32,199 million and ₩30,825 million for the years ended December 31, 2018 and 2017, respectively.

Before impairment test, the carrying amount of goodwill was allocated to CGUs as follows (Korean won in millions):

CGUs	December 31, 2018	December 31, 2017	Description
Mottrol BG	₩ 84,562	₩ 84,562	Manufacturing and sale of hydraulic components
Information and communications BU	2,015	2,015	Operation and development of software
Industrial vehicles BG	15,076	15,076	Manufacturing and sale of forklifts
Fuel Cell BG	30,290	30,290	Manufacturing and sale of fuel cell
	₩ 131,943	₩ 131,943	

The recoverable amount of CGU is determined based on value in use. The discount rate and the permanent growth rate used in calculating value in use as of December 31, 2018 are as follows:

	Mottrol BG	Information and communications BU	Industrial vehicles BG	Fuel Cell BG
Discount rate	10.98%	11.07%	9.30%	11.48%
Permanent growth rate	1.00%	1.00%	1.00%	1.00%

Estimates for value in use calculation are as follows.

The Company uses cash flow projections based on financial budgets approved by the directors covering five-year periods for a value in use calculation. The financial budgets are determined based on historical result and expectation of market growth. Cash flows beyond that five-year periods have been extrapolated using the expected growth rate, continuing the fifth year cash flow. Permanent growth rate does not exceed long-term average growth rate of market, and the discount rates used reflect relevant risks specific to the CGUs.

The result of recoverable amount of the Company calculated based on value in use calculation was not to cause the aggregate carrying amount to exceed the aggregate recoverable amount of the CGUs. Therefore, no impairment loss is recognized based on the impairment test for the year ended December 31, 2018.

The recoverable amount may change according to changes in key assumptions. Accordingly, the Company's management regularly observes relevant turnovers and industrial trends. Meanwhile, if discount rate changes by 50 basis points, no additional impairment losses will be incurred.

13. Intangible assets (cont'd)

Classification of amortization for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018		2017	
Cost of sales	₩	1,783	₩	2,612
Selling and administrative expenses		8,268		8,978
Research and development cost and others		136		167
	₩	10,187	₩	11,757

14. Investment properties

Changes in investment properties for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018				2017		
	Land	Buildings	Construction In Progress	Total	Land	Buildings	Total
Beginning balance	₩ 151,780	₩ 1,128	₩ -	₩ 152,908	₩ 135,947	₩ 1,232	₩ 137,179
Acquisition	-	132	1,335	1,467			-
Disposal	-	(1,273)	-	(1,273)	(515)		(515)
Reclassification	(13,584)	(5,131)	-	(18,715)			-
Increase due to merger(*1)	291,374	114,428	485	406,287			-
Revaluation(*2)	5,360	(3,801)	-	1,559	16,348	(104)	16,244
Ending balance	₩ 434,930	₩ 105,483	₩ 1,820	₩ 542,233	₩ 151,780	₩ 1,128	₩ 152,908

(*1) Increase due to the merger with Dootamall Co., Ltd. during the current period.

(*2) Gain or loss on the valuation of investment properties is included in other non-operating income and expenses in the separate statements of profit or loss.

The Company's land and buildings included in the above investment properties are pledged as collateral for borrowings from Woori Bank and others (see Note 31).

Details of fair value model that the Company applies for measurement of investment properties are as follows:

The Company recognizes subsequent measurement of investment properties using fair value, As of December 31, 2018, the fair value of investment properties was determined from the appraisal that was undertaken by independently qualified valuators, the First Appraisal & Consulting Co., Ltd ("FACC") and Mirae & Saehan Appraisal Co., Ltd., on November 30, 2018.

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

14. Investment properties (cont'd)

Fair value measurements of investment properties by fair value hierarchy level as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018			December 31, 2017		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Land	₩ -	₩ -	₩ 434,930	₩ -	₩ -	₩ 151,780
Buildings	-	-	105,483	-	-	1,128
Construction In progress	-	-	1,820	-	-	-
	₩ -	₩ -	₩ 542,233	₩ -	₩ -	₩ 152,908

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

Valuation techniques	Significant inputs that are not based on observable market data (unobservable inputs)	Correlation between unobservable inputs and fair value arguments
Official Assessed Reference Land Price ("OARLP"):	Fluctuation rate of land price and others	Fair value increases (decreases), if rate of land price increases (decreases).
OARLP of similar parcels nearby the subject land and reflating corrections necessary for differences between the subject and the comparable	Parcel conditions and others	Fair value increases (decreases), if correction of parcel conditions and others increases (decreases).
	Land conditions affecting the sales price and others	Fair value increases (decreases), if correction of land conditions affecting the sales price increases (decreases).
Estimated cost price approach: Fair value is based on depreciation and replacement costs considered with structure, building materials, construction condition, building equipment, end use, present condition and management condition	Replacement cost	Fair value decreases (increases), if replacement cost increases (decreases).

15. Bonds and borrowings

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

	Annual interest rate (%)(*1)	December 31, 2018	December 31, 2017
The 283-2nd	4.16	₩ 80,000	₩ 80,000
The 284	4.22	-	80,000
The 285	3.95	-	60,000
The 286	4.13	-	75,000
The 287	3.70	-	30,000
The 288	3.70	-	30,000
The 289	4.20	120,000	120,000
The 290	4.85	100,000	100,000
The 291	4.77	100,000	-
The 292-1st	2.64	30,000	-
The 292-2nd	4.20	120,000	-
The 293	4.36	50,000	-
The 294	4.79	99,000	-
The 295-1st	4.22	30,000	-
The 295-2nd	4.64	20,000	-
		749,000	575,000
Discount on bonds payable		(2,068)	(1,251)
		746,932	573,749
Reclassification of current portion of long-term bonds:		(299,663)	(274,620)
Principal amount of bonds		300,000	275,000
Discount on bonds payable		(337)	(380)
		₩ 447,269	₩ 299,129

(*1) Nominal interest rate

Short-term borrowings as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	Creditor	Annual interest rate (%)	December 31, 2018	December 31, 2017
Usance and D/A, D/P	KEB Hana Bank and others	3.21~3.59	₩ 1,645	₩ 2,436
General borrowings	Kwangju Bank and others	3.18~4.00	103,000	133,000
			₩ 104,645	₩ 135,436

Financial liabilities related to transferred trade receivables, which did not meet the derecognition criteria, amounted to ₩1,645 million and ₩2,436 million as of December 31, 2018 and 2017, respectively. The trade receivables were pledged as collateral for these liabilities (see Note 30).

Long-term borrowings as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	Annual interest rate (%)	December 31, 2018	December 31, 2017
Borrowings in Korean won:			
KDB	3.81~3.90	₩ 90,000	₩ 60,000
Woori Bank	-	-	20,000
Shinhan Bank	3.09~3.33	40,000	80,000
Kookmin Bank	-	-	5,000
China Bank	3.83~4.10	30,000	30,000
Nonghyup Bank	3.83~3.90	55,000	-
KEB Hana Bank	3.90	30,000	-
The Export-Import Bank of Korea	3.08	90,000	-

15. Bonds and borrowings (cont'd)

	Annual interest rate (%)	December 31, 2018	December 31, 2017
NongHyup Life Insurance Co.,Ltd and others	3.90	125,000	-
Borrowings in foreign currency:			
The Export-Import Bank of Korea	3.59~4.56	38,574	49,284
		498,574	49,284
Present value discounts	`	(2,518)	(40)
		496,056	244,244
Reclassification of current portion of long-term borrowings		(82,858)	(177,321)
		₩ 413,198	₩ 66,923

16. Net defined benefit liabilities

The Company operates a defined benefit plan for employees, and the actuarial valuation of plan assets and the defined benefit liabilities is performed by a reputable actuary using the projected unit credit method.

Details of net defined benefit liabilities as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Present value of defined benefit liabilities	₩ 190,741	₩ 162,928
Fair value of plan assets	(150,381)	(128,535)
Net defined benefit liabilities	₩ 40,360	₩ 34,393

Pension costs recognized in profit and loss for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018	2017
Current service costs	₩ 20,209	₩ 20,948
Net interest costs	1,378	1,360
	₩ 21,587	₩ 22,308

Classification of the pension costs recognized in the separate statements of profit or loss for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018	2017
Cost of sales	₩ 12,142	₩ 12,414
Selling and administrative expenses	9,177	9,569
Others	268	325
	₩ 21,587	₩ 22,308

16. Net defined benefit liabilities (cont'd)

Changes in net defined benefit liabilities for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018					
	Defined benefit liabilities		Plan assets		Net defined benefit liabilities	
Beginning balance	₩	162,928	₩	(128,535)	₩	34,393
Profit or loss:						
Current service cost		20,209		-		20,209
Interest cost (income)		4,818		(3,440)		1,378
		25,027		(3,440)		21,587
Remeasurements:						
Actuarial loss from change in demographic assumptions		229		-		229
Actuarial loss from change in financial assumptions		4,858		-		4,858
Others		8,744		1,799		10,543
		13,831		1,799		15,630
Transfer in		2,402		(1,022)		1,380
Transfer out		(586)		420		(166)
Changes due to investment in kind		2,384		(1,570)		814
Contributions by employer directly to plan assets		-		(24,723)		(24,723)
Benefit payments		(15,245)		6,690		(8,555)
Ending balance	₩	190,741	₩	(150,381)	₩	40,360

	2017					
	Defined benefit liabilities		Plan assets		Net defined benefit liabilities	
Beginning balance	₩	160,432	₩	(122,898)	₩	37,534
Profit or loss:						
Current service cost		20,948		-		20,948
Interest cost (income)		4,215		(2,855)		1,360
		25,163		(2,855)		22,308
Remeasurements:						
Actuarial loss from change in demographic assumptions		363		-		363
Actuarial gain from change in financial assumptions		(2,933)		-		(2,933)
Others		1,271		1,530		2,801
		(1,299)		1,530		231
Transfer in		976		(629)		347
Transfer out		(2,077)		976		(1,101)
Changes due to investment in kind		(9,482)		6,920		(2,562)
Contributions by employer directly to plan assets		-		(17,074)		(17,074)
Benefit payments		(10,785)		5,495		(5,290)
Ending balance	₩	162,928	₩	(128,535)	₩	34,393

16. Net defined benefit liabilities (cont'd)

Assumptions used for actuarial valuation as of December 31, 2018 and 2017 are as follows:

	December 31, 2018	December 31, 2017
Discount rate (%)	2.85	3.04
Salary growth rate (%):		
Employee	3.0~5.0	2.8~4.4
Executive	2.1	2.4

Details of plan assets as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Debt securities	₩ 2,323	₩ 2,008
Saving deposits and others	148,058	126,527
	₩ 150,381	₩ 128,535

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

The sensitivity analysis for the significant actuarial assumptions as of December 31, 2018 and 2017 is as follows (Korean won in millions):

			Amount	Ratio
December 31, 2018	Discount rate	1% increase	₩ (12,379)	(-) 6.49%
		1% decrease	14,115	7.40%
	Salary growth rate	1% increase	13,371	7.01%
		1% decrease	(11,979)	(-) 6.28%
December 31, 2017	Discount rate	1% increase	(10,248)	(-) 6.29%
		1% decrease	11,666	7.16%
	Salary growth rate	1% increase	11,046	6.78%
		1% decrease	(9,922)	(-) 6.09%

The weighted average maturity of the defined benefit liabilities as of December 31, 2018 is 7.1 years. The Company expects to contribute ₩41,581 million for the defined benefit plans in 2019.

17. Provisions

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

	2018					
	Beginning balance	Increase (decrease)	Used	Ending balance	Current	Non-current
Provision for product warranties	₩ 4,930	₩ 2,392	₩ (711)	₩ 6,611	₩ 6,611	₩ -
Provision for restoration	1,650	60	(743)	967	-	967
Other provisions	37	-	-	37	37	-
	₩ 6,617	₩ 2,452	₩ (1,454)	₩ 7,615	₩ 6,648	₩ 967

	2017					
	Beginning balance	Increase (decrease)	Used	Ending balance	Current	Non-current
Provision for product warranties	₩ 4,230	₩ 700	₩ -	₩ 4,930	₩ 4,930	₩ -
Provision for restoration	849	801	-	1,650	-	1,650
Other provisions	37	-	-	37	37	-
	₩ 5,116	₩ 1,501	₩ -	₩ 6,617	₩ 4,967	₩ 1,650

The Company recognizes the expected expenses due to quality assurance, exchange refund, defect repair, and subsequent post-service as provisions based on the warranty period and past experience rate.

18. Share capital and share premium

Changes in share capital and share premium for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions, except for share data):

	Number of shares		Share capital			
	Ordinary shares	Preferred shares	Ordinary shares	Preferred shares	Total	Share premium
Balance at January 1, 2017	20,206,888	5,396,759	₩ 107,854	₩ 26,984	₩ 134,838	₩ 355,736
Exercise of stock options	800	-	4	-	4	65
Retirement of shares	(1,010,385)	-	-	-	-	-
Exercise of stock options	700	-	4	-	4	115
Balance at December 31, 2017	19,198,003	5,396,759	₩ 107,862	₩ 26,984	₩ 134,846	₩ 355,916
Balance at January 1, 2018	19,198,003	5,396,759	₩ 107,862	₩ 26,984	₩ 134,846	₩ 355,916
Capital share issue costs	-	-	-	-	-	(1)
Retirement of shares	(959,901)	-	-	-	-	-
Balance at December 31, 2018	18,238,102	5,396,759	₩ 107,862	₩ 26,984	₩ 134,846	₩ 355,915

18. Share capital and share premium (cont'd)

The Company's number of shares authorized is 400,000,000 shares with a par value of ₩5,000 per share. The amount of share capital is not the same as total par value of shares issued due to retirement of shares.

The number of shares with the limited voting rights under commercial law are 3,306,169 shares and 4,266,070 shares as of December 31, 2018 and 2017, respectively. Preferred shares do not have voting rights.

19. Capital surplus

Details of capital surplus as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Share premium	₩ 355,915	₩ 355,916
Revaluation reserves	277,542	277,542
Other capital surplus	100,712	46,757
	₩ 734,169	₩ 680,215

20. Other equity items

Other capital items as of December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Treasury stocks	₩ (203,567)	₩ (261,976)
Loss on disposal of treasury stocks	(16,738)	(16,738)
Stock options	4,066	10,431
Loss from capital reduction	(127,318)	(127,318)
	₩ (343,557)	₩ (395,601)

20.1 Treasury stocks

The Company acquired registered ordinary shares and non-voting preferred shares, and recognized them as other capital item for the stabilization of share price. Changes in treasury stocks for the years ended December 31, 2018 and 2017 are as follows (in millions of Korean won, except for share data):

	Number of treasury stocks			Book value of treasury stocks		
	Ordinary shares	Preferred shares	Total	Ordinary shares	Preferred shares	Total
Balance at January 1, 2017	5,276,455	673,054	5,949,509	₩ 308,404	₩ 15,052	₩ 323,456
Disposal (retirement of shares)	(1,010,385)	-	(1,010,385)	(61,481)	-	(61,481)
Balance at December 31, 2017	4,266,070	673,054	4,939,124	246,923	15,052	261,975
Balance at January 1, 2018	4,266,070	673,054	4,939,124	246,923	15,052	261,975
Disposal (retirement of shares)	(959,901)	-	(959,901)	(58,408)	-	(58,408)
Balance at December 31, 2018	3,306,169	673,054	3,979,223	₩ 188,515	₩ 15,052	₩ 203,567

20.2 Share-based payment

The Company granted stock options to its directors several times in the past. Stock options are settled based on the Board of Directors' decision by issuance of new shares, treasury stocks or cash settlement. Vesting condition offers two-year service after the resolution at the shareholders' meeting. The number of granted options as of December 31, 2018 is as follows (Korean won, except for share data):

	Date of grant	Number of granted options	Exercisable period	Exercisable price	Expected fair value at the date of grant
9th	2008.3.21	-	2011.3.21 - 2018.3.20	₩ 165,100	₩ 68,846
10th	2009.3.27	1,850	2012.3.27 - 2019.3.26	106,500	53,382
12th	2010.3.26	5,800	2013.3.26 - 2020.3.26	116,500	56,460
13th	2011.3.25	4,000	2014.3.25 - 2021.3.25	137,500	68,045
14th	2012.3.30	8,500	2015.3.30 - 2022.3.30	156,200	63,647
15th	2013.3.29	28,800	2016.3.29 - 2023.3.28	128,100	43,353
16th	2014.3.28	39,900	2017.3.28 - 2024.3.27	134,300	39,558

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

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

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

Changes in stock options for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions, except for share data):

	2018					
	Number of ordinary shares to be issued			Valuation amount		
	Beginning	Forfeited	Ending	Beginning	Forfeited	Ending
9th	11,900	(11,900)	-	₩ 819	₩ (819)	₩ -
10th	1,850	-	1,850	99	-	99
12th	39,310	(33,510)	5,800	2,219	(1,892)	327
13th	15,500	(11,500)	4,000	1,055	(783)	272
14th	23,300	(14,800)	8,500	1,483	(942)	541
15th	50,400	(21,600)	28,800	2,185	(936)	1,249
16th	65,000	(25,100)	39,900	2,571	(993)	1,578
	207,260	(118,410)	88,850	₩ 10,431	₩ (6,365)	₩ 4,066

20.2 Share-based payment (cont'd)

	2017							
	Number of ordinary shares to be issued				Valuation amount			
	Beginning	Exercised	Forfeited	Ending	Beginning	Exercised	Forfeited	Ending
8th	800	(800)	-	-	₩ 23	₩ (23)	₩ -	₩ -
9th	11,900	-	-	11,900	819	-	-	819
10th	2,250	(200)	(200)	1,850	120	(11)	(11)	99
12th	40,810	(500)	(1,000)	39,310	2,304	(28)	(56)	2,219
13th	16,300	-	(800)	15,500	1,109	-	(54)	1,055
14th	25,000	-	(1,700)	23,300	1,591	-	(108)	1,483
15th	53,000	-	(2,600)	50,400	2,298	-	(113)	2,185
16th	101,900	-	(36,900)	65,000	4,031	-	(1,460)	2,571
	251,960	(1,500)	(43,200)	207,260	₩ 12,295	₩ (62)	₩ (1,802)	₩ 10,431

The weighted-average remaining contractual period (from December 31, 2018 to maturity) of stock options is 4.2 years.

21. Accumulated other comprehensive income

Accumulated other comprehensive income as of December 31, 2018 and 2017 is as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Gain on valuation of derivatives designated as cash flow hedges	₩ 605	₩ 1,019
Gain on valuation of financial assets (designated) at fair value through OCI	50	-
Land revaluation surplus	136,359	49,446
Loss on valuation of available-for-sale financial assets	-	(1,920)
	₩ 137,014	₩ 48,546

22. Retained earnings

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

	December 31, 2018	December 31, 2017
Legal reserves	₩ 67,423	₩ 62,906
Discretionary reserves	10,000	26,666
Unappropriated retained earnings	1,565,614	1,642,180
	₩ 1,643,037	₩ 1,731,752

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

Changes in retained earnings for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	December 31, 2018	December 31, 2017
Beginning balance	₩ 1,731,753	₩ 1,688,734
Profit for the year	158,613	205,100
Actuarial loss on retained earnings	(11,848)	(175)
Dividends payments	(177,090)	(100,426)
Retirement of shares	(58,408)	(61,480)
Reclassification of land revaluation surplus due to land disposal	17	-
Ending balance	₩ 1,643,037	₩ 1,731,753

22. Retained earnings (cont'd)

Separate statements of appropriation of retained earnings for the years ended December 31, 2018 and 2017 are as follows (Korean won):

		2018		2017
Unappropriated retained earnings:				
Unappropriated retained earnings carried over from the prior year	₩	1,553,896,816,596	₩	1,498,735,803,305
Profit for the year		158,613,281,158		205,100,275,058
Remeasurements of defined benefit plan		(11,847,558,268)		(174,792,586)
Retirement of treasury stocks		(58,408,585,701)		(61,480,484,781)
Interim dividends		(76,656,988,200)		-
Reclassification of land revaluation surplus due to land disposal		17,434,000		-
		1,565,614,399,585		1,642,180,800,996
Transfers retained earnings:				
Reversal of research and development reserves		10,000,000,000		16,666,000,000
		10,000,000,000		16,666,000,000
Appropriation of retained earnings:				
Earned profit reserves		-		4,516,717,500
Dividends		25,741,842,500		100,433,266,900
		25,741,842,500		104,949,984,400
Unappropriated retained earnings to be carried forward	₩	1,549,872,557,085	₩	1,553,896,816,596

Details of dividends for the years ended December 31, 2018 are as follows (Korean won, except for share data and dividend amount):

	2018					
	Preferred shares (old)		Preferred shares (new)		Ordinary shares	
Par value per share	₩	5,000	₩	5,000	₩	5,000
The 1st quarter:						
Number of shares issued		4,411,074		985,685		19,198,003
Number of treasury stocks		620,812		52,242		4,266,070
Shares eligible for dividends		3,790,262		933,443		14,931,933
Rate of dividend per par value		26%		26%		26%
Dividend per share	₩	1,300	₩	1,300	₩	1,300
Dividend amount (Korean won in million)	₩	4,927	₩	1,213	₩	19,412
The 2nd quarter:						
Number of shares issued		4,411,074		985,685		19,198,003
Number of treasury stocks		620,812		52,242		4,266,070
Shares eligible for dividends		3,790,262		933,443		14,931,933
Rate of dividend per par value		26%		26%		26%
Dividend per share	₩	1,300	₩	1,300	₩	1,300
Dividend amount (Korean won in million)	₩	4,927	₩	1,213	₩	19,412
The 3rd quarter:						
Number of shares issued		4,411,074		985,685		19,198,003
Number of treasury stocks		620,812		52,242		4,266,070
Shares eligible for dividends		3,790,262		933,443		14,931,933
Rate of dividend per par value		26%		26%		26%
Dividend per share	₩	1,300	₩	1,300	₩	1,300
Dividend amount (Korean won in million)	₩	4,927	₩	1,213	₩	19,412
Year end (planned):						
Number of shares issued		4,411,074		985,685		18,238,102
Number of treasury stocks		620,812		52,242		3,306,169
Shares eligible for dividends		3,790,262		933,443		14,931,933
Rate of dividend per par value		27%		26%		26%
Dividend per share	₩	1,350	₩	1,300	₩	1,300
Dividend amount (planned) (Korean won in million)	₩	5,117	₩	1,213	₩	19,412

22. Retained earnings (cont'd)

Details of dividends paid by the Company for the year ended December 31, 2018 are as follows (Korean won in millions, except for share data):

	Preferred shares (old)	Preferred shares (new)	Ordinary shares	Total
Annual dividends for prior year:				
Shares eligible for dividends	3,790,262	933,443	14,931,933	
Dividend per share (Korean won)	₩ 5,150	₩ 5,100	₩ 5,100	
	₩ 19,520	₩ 4,761	₩ 76,153	₩ 100,434
Interim dividends for the current year:				
Shares eligible for dividends	3,790,262	933,443	14,931,933	
Dividend per share (Korean won)	₩ 3,900	₩ 3,900	₩ 3,900	
	₩ 14,782	₩ 3,640	₩ 58,234	₩ 76,656
	₩ 34,302	₩ 8,401	₩ 134,387	₩ 177,090

23. Revenues

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

23.1 Disaggregation revenue

	2018
Revenues from contracts with customers:	
Finished goods	₩ 1,769,293
Merchandise	831,884
Others	204,985
	2,806,162
Others:	
Dividend	97,252
Rental	15,986
	113,238
	₩ 2,919,401

23.2 Disaggregation revenues from contracts with customers

	2018
Type of Business:	
Electro-Materials BG	₩ 587,574
Industrial vehicles BG	738,217
Mottrol BG	536,297
Information and communications BU	119,816
Others	824,258
	2,806,162
Timing of revenue recognition:	
Transfer at a point in time	2,600,816
Transfer over time	205,346
	₩ 2,806,162

23.2 Disaggregation revenues from contracts with customers (cont'd)

		2017
Sales of goods:		
Finished goods	₩	1,614,445
Merchandise		677,740
		2,292,185
Others:		
Dividend		94,260
Others		238,384
		332,644
	₩	2,624,829

24. Breakdown of expenses by nature

Breakdown of expenses by nature for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

		2018		2017
Changes in inventories	₩	(77,878)	₩	(168,045)
Purchases of raw materials and merchandise		1,593,804		1,526,737
Employee benefits expenses		366,819		362,678
Depreciation and amortization		68,309		58,988
Others		714,984		567,714
	₩	2,666,038	₩	2,348,072

25. Selling and administrative expenses

Selling and administrative expenses for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

		2018		2017
Salaries	₩	116,860	₩	112,607
Pension costs		9,607		9,181
Employee benefits		23,058		24,422
Travel expenses		9,681		9,054
Utility expenses		2,048		2,466
Sales commission		23,171		17,536
Taxes and dues		9,393		3,915
Rental expenses		14,007		20,928
Depreciation		15,268		8,776
Advertising expenses		12,381		8,959
Packaging expenses		5,991		4,492
Research and development		31,062		30,825
Training expenses		4,802		4,728
Freight expenses		9,428		10,027
Commission expenses		168,498		104,197
Maintenance of office		6,326		5,420
Service contract expenses		21,968		20,098
Samples expenses		2,568		1,999
Bad debt expenses		744		19
Amortization		8,268		8,978
Others		7,806		6,674
	₩	502,935	₩	415,301

26. Finance income and expenses

Finance income and expenses for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018	2017
Finance income:		
Interest income	₩ 5,759	₩ 6,654
Dividend income	5	24
Gain on foreign currency transaction	15,820	21,626
Gain on foreign currency translation	6,527	12,660
Gain on derivative transactions	145	175
Financial guarantee income	1,691	1,272
	29,947	42,411
Finance expenses:		
Interest expense	56,633	42,336
Loss on foreign currency transactions	17,349	28,150
Loss on foreign currency translations	5,885	10,963
Loss on derivative transactions	23	38
Loss on valuation of derivatives	1,738	1,843
Financial guarantee expense	832	376
Loss on repayment of bonds	294	126
Other financial expenses	1,550	565
	84,304	84,397
	₩ (54,357)	₩ (41,986)

27. Other non-operating income and expenses

Other non-operating income and expenses for the years ended December 31, 2018 and 2017 are as follows (Korean won in millions):

	2018	2017
Other non-operating income:		
Gain on disposal of investments in associates	₩ -	₩ 18,079
Gain on disposal of property, plant and equipment	380	374
Gain on disposal of intangible assets	233	792
Gain on disposal of investment properties	-	333
Gain on valuation of investment properties	5,360	16,348
Gain on transfer of business	3,766	7,805
Reversal of impairment loss of property, plant and equipment	-	157
Miscellaneous income	5,535	4,031
	15,274	47,919
Other non-operating expenses:		
Loss on disposal of trade receivables	5,732	5,161
Loss on disposal of investments in subsidiaries	-	362
Loss on disposal of property, plant and equipment	924	3,090
Impairment loss of property, plant and equipment	2,819	2,562
Loss on disposal of intangible assets	108	45
Impairment loss of intangible assets	371	1,243
Loss on disposal of investment properties	1,273	-
Loss on valuation of investment properties	3,801	104
Loss on disposal of long-term financial assets	5,064	-
Impairment loss of non-current assets held for sale	-	183
Donations	5,551	7,088
(Reversal of) other bad debt expenses	570	(488)
Miscellaneous loss	5,382	10,601
	31,595	29,951
	₩ (16,321)	₩ 17,968

28. Income tax expenses

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

	2018	2017
Current income tax on profit for the year	₩ 25,930	₩ 52,337
Deferred tax:		
Origination and reversal of temporary differences	(5,167)	(1,815)
Charged or credited directly to equity	3,310	(2,884)
Income tax expenses	₩ 24,073	₩ 47,638

28. Income tax expenses (cont'd)

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

	2018				
	Beginning balance	Changes: Profit or loss	Changes: Equity	Changes: Merger	Ending balance
Accrued revenues	₩ (8)	₩ 28	₩ -	₩ (25)	₩ (5)
Write-down of inventories	2,156	302	-	-	2,458
Investment securities	426	667	(605)	455	943
Property, plant and equipment	(22,428)	(857)	-	(65,014)	(88,299)
Investment properties	(16,454)	(731)	-	(28,443)	(45,628)
Accrued expenses	15,375	(1,627)	-	154	13,902
Defined benefit liabilities	8,004	(2,226)	3,782	206	9,766
Reserve for research and human resource	(2,420)	2,420	-	-	-
Others	4,904	3,882	132	1,977	10,895
	₩ (10,445)	₩ 1,858	₩ 3,309	₩ (90,690)	₩ (95,968)

	2017			
	Beginning balance	Changes: Profit or loss	Changes: Equity	Ending balance
Accrued revenues	₩ (6)	₩ (2)	₩ -	₩ (8)
Write-down of inventories	1,766	390	-	2,156
Investment in securities	872	(1,059)	613	426
Property, plant and equipment	(21,434)	1,376	(2,370)	(22,428)
Investment properties	(12,924)	(3,530)	-	(16,454)
Accrued expenses	12,559	2,816	-	15,375
Defined benefit liabilities	6,817	1,131	56	8,004
Reserve for research and human resource	(6,453)	4,033	-	(2,420)
Others	6,543	(456)	(1,183)	4,904
	₩ (12,260)	₩ 4,699	₩ (2,884)	₩ (10,445)

Temporary differences, net loss and tax credit carryforwards, which have not been recognized as deferred income tax assets and expired or unused as of December 31, 2018 and 2017 are nil.

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

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

	2018	2017	Remarks
Investments in subsidiaries	₩ (933,098)	₩ (937,749)	Able to control the reversal of the temporary difference

28. Income tax expenses (cont'd)

The aggregate deferred tax relating to items that are charged or credited directly to equity for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018			2017		
	Before tax	Income tax effect	After tax	Before tax	Income tax effect	After tax
Gain (loss) on valuation of financial assets (designated) at fair value through OCI	₩ 65	₩ (15)	₩ 50	₩ -	₩ -	₩ -
Gain (loss) on valuation of available-for-sale financial assets	-	-	-	(2,533)	613	(1,920)
Gain (loss) on valuation of derivatives	798	(193)	605	1,345	(325)	1,020
Land revaluation surplus	152,139	(15,780)	136,359	65,233	(15,786)	49,447
Remeasurements of net defined benefit liabilities	(33,937)	8,213	(25,724)	(18,307)	4,430	(13,877)
	₩ 119,065	₩ (7,775)	₩ 111,290	₩ 45,738	₩ (11,068)	₩ 34,670

A reconciliation of income tax expenses and accounting profit before income tax expenses for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018	2017
Profit before income tax expenses	₩ 182,686	₩ 252,739
Tax at domestic tax rates applicable to profit	43,748	60,701
Adjustments:		
Non-temporary difference	(43,690)	(13,526)
Temporary difference not recognized as deferred income tax	27,460	3,098
Tax credits	(3,837)	(4,862)
Additional income tax and tax paid (refunded) for prior periods	221	620
Others	171	1,607
Income tax expenses	₩ 24,073	₩ 47,638
Average effective tax rate (Income tax expenses/Profit before income tax expenses)	13.18%	18.85%

29. Earnings per share

29.1 Basic earnings per share

Basic earnings per share for the years ended December 31, 2018 and 2017 are as follows (Korean won, except for share data):

	2018	2017
Basic earnings per ordinary share	₩ 8,060	₩ 10,426
Basic earnings per old-type preferred share(*1)	8,110	10,475

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

29.1 Basic earnings per share (cont'd)

Profit for the year attributable to the ordinary equity holders of the Company is as follows:

	2018	2017
Profit for the year	₩ 158,613,281,158	₩ 205,100,275,058
(-)Profit attributable to new-type preferred shares	(7,523,518,561)	(9,731,178,218)
(-)Profit attributable to old-type preferred shares	(30,738,894,808)	(39,703,136,338)
Profit for the year attributable to the ordinary equity holders of the Company	₩ 120,350,867,789	₩ 155,665,960,502

The weighted-average number of ordinary shares and old-type preferred shares outstanding used in basic earnings per share calculation for the years ended December 31, 2018 and 2017 is as follows:

	2018		2017	
	Ordinary shares	Old-type preferred shares	Ordinary shares	Old-type preferred shares
Beginning outstanding shares	14,931,933	3,790,262	14,930,433	3,790,262
Exercise of stock options	-	-	638	-
Weighted-average number of shares outstanding	14,931,933	3,790,262	14,931,071	3,790,262

29.2 Diluted earnings per share

Diluted earnings per share for the years ended December 31, 2018 and 2017 are as follows:

	2018	2017
Diluted earnings per ordinary share	₩ 8,060	₩ 10,425
Diluted earnings per old-type preferred share	8,110	10,475

Diluted profit for the year attributable to the ordinary equity holders of the Company for the years ended December 31, 2018 and 2017 is as follows:

	2018	2017
Profit for the year attributable to the ordinary equity holders of the Company	₩ 120,350,867,789	₩ 155,665,960,502
Share-based expense (after income tax)	-	-
Diluted profit for the year attributable to the ordinary equity holders of the Company	₩ 120,350,867,789	₩ 155,665,960,502

Diluted weighted-average number of ordinary shares outstanding for the years ended December 31, 2018 and 2017 is as follows:

	2018	2017
Weighted-average number of ordinary shares outstanding	14,931,933	14,931,071
Exercise of stock options	142	371
Diluted weighted-average number of ordinary shares outstanding	14,932,075	14,931,442

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

29.3 Conditions for preferred shares dividends

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

(*1) Cash dividends available to ordinary shares plus 1%

(*2) The Company should distribute 2% of par value of preferred shares annually. In case the Company distributes more than 2% of par value for ordinary shares, preferred shares are participated in dividend for the exceeded dividend.

30. Contingencies and commitments

30.1 Notes, bills and checks offered in security

As of December 31, 2018, the Company provided 2 blank checks and 1 general check (₩300 million) as collateral against financial institutions for guarantees to fulfill a contract and payment guarantees of the Company.

30.2 Credit lines for borrowings

Credit lines for borrowings of the Company as of December 31, 2018 are as follows (Korean won in millions and foreign currency in thousands):

	Financial institutions	Ceiling	
Credit lines for operating borrowings and others	Korea Exim Bank and others	KRW	968,400
Credit lines for facility borrowings and others	Korea Exim Bank and others	USD	34,500
		KRW	113,065
L/C guarantees of payment and others	KDB and others	USD	101,452
		KRW	1,081,465
		USD	135,952

30.3 Transferred trade receivables

Outstanding trade receivables sold with recourse by the Company are in the amount of ₩1,645 million and ₩2,436 million as of December 31, 2018 and 2017, respectively. Because the Company retains some level of risks and rewards relating to trade receivables, the Company has recognized its carrying amount of it and cash receipt from transfer as short-term borrowings, in separate statements of financial position (see Note 15).

30.4 Litigation in progress

The Company is involved in lawsuits as a defendant with claims exposure of ₩17,918 million as of December 31, 2018. The ultimate outcome of the lawsuit cannot presently be determined.

30.5 Technical contract

The Company has technical license agreements with Nabtesco, Horstman and others for the year ended December 31, 2018, and the Company paid ₩924 million as license fee.

30.6 Guarantees of payment

Guarantees of payment provided by the Company as of December 31, 2018 are as follows (Korean won in millions and foreign currency in thousands):

Provided to	Amount		Description
Subsidiaries:			
Doosan Mottrol (Jiangyin) Co., Ltd.	USD	7,000	An on-site guarantee of payment
	CNY	95,000	An on-site guarantee of payment
Doosan Electro Materials (Changshu) Co., Ltd	USD	39,000	An on-site guarantee of payment
Doosan Electro-Materials Luxembourg Sarl	USD	11,000	An on-site guarantee of payment
Circuit Foil Luxembourg Sarl	EUR	24,200	An on-site guarantee of payment
Doosan Energy Solution Kft.	EUR	10,000	An on-site guarantee of payment
	HUF	995,121	An on-site guarantee of payment
Doosan Industrial Vehicle U.K	GBP	22,400	An on-site guarantee of payment
Doosan Industrial Vehicle Yantai Co., Ltd.	USD	10,000	An on-site guarantee of payment
Doosan Fuel Cell America, Inc.	USD	152,221	An on-site guarantee of payment
	KRW	2,285	An on-site guarantee of payment
Doosan Energy Solutions America, Inc.	USD	61,092	An on-site guarantee of payment
Doosan Mecatec Co., Ltd.	USD	50,900	Performance guarantee
	KRW	30,000	Performance guarantee
Korea Duty Free Shops Association	KRW	740	Performance guarantee
	USD	331,213	
	CNY	95,000	
	GBP	22,400	
	EUR	34,200	
	HUF	995,121	
	KRW	33,025	

Guarantees of payment provided by third parties to the Company as of December 31, 2018 are as follows (Korean won in millions and foreign currency in thousands):

Provided to	Amount		Description
Seoul Guarantee Insurance	KRW	178,220	Performance guarantee
Korea Defense Industry Association	KRW	63,867	Performance guarantee
Machinery Financial Cooperative	KRW	28,334	Performance guarantee
Korea Software Financial Cooperative(*1)	KRW	2,269	Performance guarantee
KDB	USD	23,132	Performance guarantee
Woori Bank and others	USD	25,420	L/C guarantee of payment
	KRW	272,690	
	USD	48,552	

(*1) Equity shares are provided as collateral.

30.7 Ordinary wages

If the salary items that were not included in the ordinary wages, such as the regular bonus, which the Company paid in the past, are included in the ordinary wages, the Company may have to pay additional past wages in the future.

30.8 Agreement with shareholders

For the year ended December 31, 2018, the Company entered into an agreement with the preferred shares investor regarding the issuance of the redeemable convertible preferred shares of the following subsidiaries.

	Doosan Cuvex Co., Ltd.	DLI Corporation
Put option	On October 24, 2019, the investor may make a purchase request to Doosan Cuvex Co., Ltd. or a third party designated by it for the whole or a part of the redeemable convertible preferred shares held by the investor, an amount equal to the amount of the issuance plus a certain amount of accrual.	On June 26, 2020, the investor may make a purchase request to DLI Corporation or a third party designated by it for the whole or a part of the redeemable convertible preferred shares held by the investor, an amount equal to the amount of the issuance plus a certain amount of accrual.
Early put option	The investor may request the Doosan Cuvex Co., Ltd. to make a purchase before a redemption date in the event of a certain reason, and the calculation method of the settled amount is the same as above.	The investor may request the DLI Corporation to make a purchase before a redemption date in the event of a certain reason, and the calculation method of the settled amount is the same as above.
Call option	On October 24, 2019, the investor may sell all or part of the redeemable convertible preferred share to a third party designated by Doosan Cuvex Co., Ltd. or itself in an amount equal to the amount of the issuance plus a certain amount of accrual.	On June 26, 2020, the investor may sell all or part of the redeemable convertible preferred share to a third party designated by DLI Corporation or itself in an amount equal to the amount of the issuance plus a certain amount of accrual.

31. Pledged assets

The Company pledged certain assets as collateral for its financial liabilities as of December 31, 2018, which are as follows (Korean won in millions and foreign currency in thousands):

Institution	Pledged asset	Related accounts	Financial liabilities	Pledged amount
KDB	Jeung-pyeong, Ik-san plant and Chang-won plant and others	Property, plant and equipment and investment properties	KRW 50,000	KRW 217,490
			KRW -	USD 58,398
Woori Bank	Anmyeondo land and others		KRW 33,000	KRW 132,000
Shinhan Bank	Incheon plant		KRW -	KRW 40,000
KDB and others	Doosan Tower		KRW 289,980	KRW 347,976

As of December 31, 2018, the Company has established the real estate beneficiary certificates (maximum pledge amount of ₩20,800 million) of land and buildings (pledged amount of ₩14,413 million) for the loan arrangement of the subsidiary, DLI Corporation with KDB Capital Corporation and others. As of December 31, 2018, the remaining balance of the borrowings is ₩16,000 million.

32. Related party transactions

Relationship with the Company	Related parties
Subsidiaries	Doosan Heavy Industries & Construction Co., Ltd. ("DHC") Doosan Infracore Co., Ltd. ("DI") and subsidiaries Doosan Engineering & Construction Co., Ltd. ("DEC") Doosan Engine Co., Ltd. ("DE") and subsidiaries Oricom Inc Doosanbears Inc. DLI Corporation Doosan Cuvex Co., Ltd. DBC Co., Ltd DRA Inc. Doosan Mobility Innovation Inc Doosan Mecatec Co., Ltd. Neoplux Co., Ltd. Doosan Information and Communications America, LLC Doosan Information and Communications China Co., Ltd. Doosan Information and Communications Europe Ltd. Doosan Mottrol (Jiangyin) Co., Ltd. Doosan (Hong Kong) Ltd. and subsidiaries Doosan Electro-Materials Singapore Pte. Ltd. Doosan (Shanghai) Chemical Materials Co., Ltd. Doosan Electro-Materials (Changshu) Co., Ltd. Doosan Electro-Materials America, LLC Doosan Electro-Materials Luxembourg Sarl and subsidiaries Doosan Corporation Europe Kft. and subsidiaries Doosan Industrial Vehicle Europe N.A. Doosan Industrial Vehicle U.K. Ltd. and subsidiaries Doosan Logistics Europe GmbH Doosan Industrial Vehicle America Corp. and subsidiaries Doosan Industrial Vehicle Yantai Co., Ltd. Doosan Fuel Cell America, Inc. Doosan Energy Solutions America, Inc. and others
Associates	PRESTOLITE ASIA LTD., Daesan Green Energy Co. Ltd(*2)
Joint ventures	Sichuan Kelun-Doosan Biotechnology Company Limited
Other related parties(*1)	Neo Trans Co., Ltd. Yeongang Foundation Dongdaemun Future Foundation Chung-Ang University and others

(*1) It is not included in the scope of related parties of KIFRS 1024 but includes companies belonging to the same large-scale enterprise group under the *Monopoly Regulation and Fair Trade Act.*
(*2) Newly acquired during the current period.

32. Related party transactions (cont'd)

Significant transactions for the years ended December 31, 2018 and 2017, between the Company and related parties are as follows (Korean won in millions):

	2018						
	Related parties	Sales	Other income	Others (Disposal of assets and others)	Purchases	Other expenses	Others (Purchase of assets and others)
Subsidiaries	DHC and its subsidiaries	₩ 64,237	₩ 2,635	₩ -	₩ 4,963	₩ 9,810	₩ 799
	DI and its subsidiaries	140,838	117	900	59,275	2,609	70
	DEC and its subsidiaries	19,228	103	-	9	-	2,034
	DE and its subsidiaries	3,450	-	-	-	1,110	-
	Overseas subsidiaries for industrial vehicles (*1)	281,012	618	-	52,139	624	-
	DIP Holdings Co., Ltd.	-	-	-	-	-	-
	Others	317,887	3,366	245	210,116	19,551	40
		826,652	6,839	1,145	326,502	33,704	2,943
Associates		25,881	-	-	4,474	-	-
Other related parties		3,429	-	-	2,287	3,077	-
		₩ 855,962	₩ 6,839	₩ 1,145	₩ 333,263	₩ 36,781	₩ 2,943

(*1) Doosan Industrial Vehicle UK, Ltd., Doosan Industrial Vehicle America Corp. and Doosan Industrial Vehicle Yantai Co., Ltd. Etc.

	2017						
	Related parties	Sales	Other income	Others (Disposal of assets and others)	Purchases	Other expenses	Others (Purchase of assets and others)
Subsidiaries	DHC and its subsidiaries	₩ 76,863	₩ 3,559	₩ 29,675	₩ 32	₩ 2,865	₩ 5
	DI and its subsidiaries	142,704	512	-	56,184	3,280	-
	DEC and its subsidiaries	13,160	237	-	2,448	58	3,606
	DE and its subsidiaries	10,007	-	-	-	2,615	-
	Overseas subsidiaries for industrial vehicles (*1)	227,157	512	-	35,680	606	-
	DIP Holdings Co., Ltd.	4,612	-	34	13	1	-
	Others	229,571	863	213	223,468	25,458	1,479
		704,074	5,683	29,922	317,825	34,883	5,090
Associates		-	-	-	6,126	-	-
Other related parties		8,896	-	-	-	7,890	1
		₩ 712,970	₩ 5,683	₩ 29,922	₩ 323,951	₩ 42,773	₩ 5,091

(*1) Doosan Industrial Vehicle UK, Ltd., Doosan Industrial Vehicle America Corp. and Doosan Industrial Vehicle Yantai Co., Ltd. Etc.

32. Related party transactions (cont'd)

As of December 31, 2018 and 2017, significant balances related to the transactions between the Company and related parties are as follows (Korean won in millions):

	December 31, 2018				
	Related parties	Trade receivables	Other receivables	Trade payables	Other payables
Subsidiaries	DHC and its subsidiaries	₩ 9,145	₩ 44,925	₩ 105	₩ 2,454
	DI and its subsidiaries	12,149	3,547	4,375	4,514
	DEC and its subsidiaries	16,874	5,590	741	234
	DE and its subsidiaries	-	1,620	-	-
	Overseas subsidiaries for industrial vehicles (*1)	98,803	917	15,063	1,169
	DIP Holdings Co., Ltd.	-	-	-	-
	Others	76,352	75,306	41,843	11,400
		213,323	131,905	62,127	19,771
Associates		-	-	-	969
Other related parties		334	1,426	-	429
		₩ 213,657	₩ 133,331	₩ 62,127	₩ 21,169

(*1) Doosan Industrial Vehicle UK, Ltd., Doosan Industrial Vehicle America Corp. and Doosan Industrial Vehicle Yantai Co., Ltd. Etc.

	December 31, 2017				
	Related parties	Trade receivables	Other receivables	Trade payables	Other payables
Subsidiaries	DHC and its subsidiaries	₩ 13,104	₩ 134,390	₩ 207	₩ 1,045
	DI and its subsidiaries	12,992	3,331	19,879	692
	DEC and its subsidiaries	4,299	4,831	1,381	7
	DE and its subsidiaries	1,771	1,626	-	17
	Overseas subsidiaries for industrial vehicles (*1)	70,039	2,190	12,272	558
	DIP Holdings Co., Ltd.	907	32	-	-
	Others	68,274	86,406	29,765	3,516
		171,386	232,806	63,504	5,835
Associates		-	-	1,465	-
Other related parties		303	1,516	-	868
		₩ 171,689	₩ 234,322	₩ 64,969	₩ 6,703

(*1) Doosan Industrial Vehicle UK, Ltd., Doosan Industrial Vehicle America Corp. and Doosan Industrial Vehicle Yantai Co., Ltd. Etc.

32. Related party transactions (cont'd)

Fund and equity transactions for the years ended December 31, 2018 and 2017 between the Company and related parties are as follows (Korean won in millions):

2018

		Borrowing		Contribution		Dividend		Loan	
	Related parties	Borrowings	Repayment	Received	Provided	Income	Paid	Loans	Repay ment
Subsidiaries									
	DIP Holdings Co., Ltd.	₩ -	₩ -	₩ -	₩ -	₩ 65,000	₩ -	₩ -	₩ -
	Dootamall Co., Ltd.	-	-	-	-	13,000	-	-	-
	Others	-	-	-	55,017	17,707	-	-	-
		-	-	-	55,017	95,707	-	-	-
Associates		-	-	-	5,100	1,545	-	-	-
Others		-	-	-	-	-	16,287	-	-
		₩ -	₩ -	₩ -	₩ 60,117	₩ 97,252	₩ 16,287	₩ -	₩ -

2017

		Borrowing		Contribution		Dividend		Loan	
	Related parties	Borrowings	Repayment	Received	Provided	Income	Paid	Loans	Repay ment
Subsidiaries									
	DHC(*1)	₩ -	₩ -	₩ -	₩ 92,043	₩ 24,170	₩ -	₩ -	₩ -
	DBC Co., Ltd.	-	-	-	49,181	-	-	-	-
	Doosan Cuvex Co., Ltd.	-	-	-	14,815	-	-	-	-
	Doosan Electro-Materials Luxembourg Sarl	14,107	14,107	-	-	-	-	-	-
	Doosan Fuel Cell America, Inc.	-	-	-	-	-	-	-	6,989
	DIP Holdings Co., Ltd.	-	-	-	-	60,000	-	-	-
	Others	-	-	-	12,100	8,758	-	-	-
		14,107	14,107	-	168,139	92,928	-	-	6,989
Associates		-	-	-	-	47	-	-	-
Joint ventures		-	-	-	-	1,285	-	-	-
Others		-	-	-	-	-	9,245	-	-
		₩ 14,107	₩ 14,107	₩ -	₩ 168,139	₩ 94,260	₩ 9,245	₩ -	₩ 6,989

(*1) The Company acquired bonds with stock warrants issued by DHC (see Note 6).

32. Related party transactions (cont'd)

The Company provided guarantees of payment and others to related parties as of December 31, 2018 (see Note 30).

The Company defines key management personnel as registered officer and non-registered officer (including outside director) who have the authority and responsibility for planning, operation and control and are in charge of business or division unit. Compensation to key management personnel of the Company for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

	2018	2017
Employee benefits	₩ 34,808	₩ 33,417
Pension costs	2,391	2,148
	₩ 37,199	₩ 35,565

33. Cash generated from (used in) operations

The adjustments and changes in cash generated from operating activities in the separate statements of cash flows for the years ended December 31, 2018 and 2017 is as follows (Korean won in millions):

		2018		2017
Adjustments for:				
Interest expense	₩	56,633	₩	42,336
Income tax expenses		24,073		47,638
Loss on foreign currency translation		5,885		10,963
Loss on valuation of derivatives		1,738		1,843
Loss on derivative transactions		23		-
Loss on disposal of trade receivables		5,732		5,161
Loss on disposal of long-term financial assets		5,064		-
Loss on disposal of investments in subsidiaries, joint ventures and associates		-		362
Loss on repayment of bonds		294		126
Depreciation		58,122		47,231
Amortization		10,187		11,757
Loss on disposal of property, plant and equipment		924		3,090
Impairment loss on property, plant and equipment		2,819		2,562
Loss on disposal of intangible assets		108		45
Impairment loss on intangible assets		371		1,243
Loss on disposal of investment properties		1,273		-
Loss on valuation of investment properties		3,801		105
Pension costs		21,587		22,308
Bad debt expenses		744		19
(Reversal of) other bad debt expenses		570		(488)
Increase (decrease) in provisions		1,681		700
Write-down of inventories (cost of sales)		1,247		1,611
Impairment loss on non-current assets held for sale		-		183
Interest income		(5,759)		(6,654)
Dividend income		(97,257)		(94,284)
Gain on foreign currency translation		(6,527)		(12,660)
Gain on disposal of investments in subsidiaries, joint ventures and associates		-		(18,079)
Gain on disposal of property, plant and equipment		(380)		(374)
Reversal of impairment loss on property, plant and equipment		-		(157)
Gain on disposal of intangible assets		(233)		(792)
Gain on disposal of investment properties		-		(333)
Gain on valuation of investment properties		(5,360)		(16,348)
Financial guarantee income		(1,691)		(1,272)
Gain on transfer of business		(3,766)		(7,805)
	₩	81,903	₩	40,037

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

		2018		2017
Changes in operating assets and liabilities:				
Increase in trade receivables	₩	(38,612)	₩	(113,090)
Decrease (increase) in other receivables		(32,589)		68
Increase in inventories		(78,968)		(170,112)
Decrease (increase) in derivative assets		(20)		134
Increase in other current assets		(29,916)		(13,660)
Decrease (increase) in long-term other receivables		184		(344)
Decrease in other non-current assets		246		1,067
Increase in trade payables		57,571		103,417
Increase in other payables		11,888		57,209
Increase in other current liabilities		1,735		61,248
Increase (decrease) in long-term other payables		(1,909)		2,352
Retirement benefits paid		(8,555)		(5,290)
Defined benefit liabilities transferred from (to) affiliated companies		1,213		(754)
Increase in plan assets		(24,723)		(17,074)
	₩	(142,455)	₩	(94,829)

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

		2018		2017
Reclassification of investments in subsidiaries to treasury stocks	₩	-	₩	26,625
Reclassification of construction in progress to property, plant and equipment and others		25,939		16,821
Reclassification of bonds		319,460		235,000
Reclassification of long-term borrowings		182,858		207,321
Retirement of treasury stocks		58,409		61,480
Investment in kind		4,421		13,766

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

Changes in liabilities arising from financial activities for the year ended December 31, 2018 are as follows (Korean won in millions):

	Beginning balance	Cash flows from financing activities	Fluctuation of foreign exchange rate	Reclassification	Others	Ending balance
Current:						
Short-term borrowings	₩ 135,436	₩ (201,211)	₩	₩	₩ 170,500	₩ 104,725
Current portion of long-term borrowings	177,321	(284,001)		182,858	6,607	82,785
Current portion of bonds	274,620	(315,162)		299,477	40,722	299,657
	587,377	(800,374)		482,335	217,829	487,167
Non-current:						
Long-term borrowings	66,923	523,908	161	(182,858)	5,064	413,198
Bonds	299,130	427,030		(299,477)	20,586	447,269
Finance lease liabilities	17,221	(11,503)			6,730	12,448
	383,274	939,435	161	(482,335)	32,380	872,915
	₩ 970,651	₩ 139,061	₩ 161	₩	₩ 250,209	₩ 1,360,082

34. Merger

Details of merger for the year ended December 31, 2018 are as follows (Korean won in millions):

	2018	
Merged corporation	DIP Holdings Co., Ltd	Dootamall Co., Ltd.
Purpose	Improve management efficiency	Improve management efficiency
Main operating activities	Other financial services	Rental of real estate
Date of merger (date of acquisition)	March 1, 2018	June 1, 2018
Merger method	Merger of a wholly owned subsidiary	Merger of a wholly owned subsidiary

Assets acquired (inherited) and liabilities assumed due to merger are as follows (Korean won in millions):

	DIP Holdings Co., Ltd	Dootamall Co., Ltd.
Current assets	19,833	10,018
Cash and cash equivalents	19,643	347
Others	190	9,671
Non-current assets	289,900	732,491
Investments in subsidiaries and associates	287,400	-
Property, plant and equipment	-	322,799
Investment properties	-	406,287
Others	2,500	3,405
Total assets	309,733	742,509
Current liabilities	398	269,129
Non-current liabilities	23	252,377
Total liabilities	421	521,506
Net assets	309,312	221,003

Capital surplus and accumulated other comprehensive loss arising from the merger are as follows (Korean won in millions):

	DIP Holdings Co., Ltd	Dootamall Co., Ltd.
Book value of investments in subsidiaries	164,169	231,551
Acquired net asset amount	(309,312)	(221,003)
Accumulated other comprehensive loss	-	(87,005)
Capital surplus	(145,143)	97,553

The acquired net asset amount was determined as the carrying amount in the consolidated financial statements as of the acquisition date by applying the accounting for combinations of entities under common control, and the difference between the acquired net asset amount and carrying amount of investments in subsidiaries is adjusted in capital surplus.

Independent auditor's Internal Accounting Control System ("IACS") Review Report

To the Representative Director of
Doosan Corporation:

We have reviewed the accompanying Report on the Operations of IACS (the "Management's Report") of Doosan Corporation (the "Company") as of December 31, 2018. The Management's Report and the design and operation of IACS are the responsibilities of the Company's management. Our responsibility is to review the Management's Report and issue a review report, based on our procedures. The Company's management stated in the accompanying Management's Report that "based on the assessment of the IACS, the Company's IACS has been appropriately designed and is operating effectively as of December 31, 2018, in all material respect, in accordance with the IACS framework."

We conducted our review in accordance with the IACS Review Standards established by the Korean Institute of Certified Public Accountants. Those standards require that we plan and perform a review, objective of which is to obtain a lower level of assurance than an audit of the Management's Report, in all material respects. A review includes obtaining an understanding of a company's IACS and making inquiries regarding the Management's Report and, when deemed necessary, performing a limited inspection of underlying documents and other limited procedures.

The Company's IACS represents internal accounting policies and a system to manage and operate such policies to provide reasonable assurance regarding the reliability of financial statements prepared, in accordance with Korean International Financial Reporting Standards, for the purpose of preparing and disclosing reliable accounting information. Because of its inherent limitations, IACS may not prevent or detect a material misstatement of the financial statements. Also, projections of any evaluation of effectiveness of IACS to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Based on our review, nothing has come to our attention that causes us to believe that the Management's Report referred to above is not fairly stated, in all material respects, in accordance with the IACS Framework established by the Korea Listed Companies Association.

Our review is based on the Company's IACS as of December 31, 2018, and we did not review its IACS subsequent to December 31, 2018. This report has been prepared pursuant to the Acts on External Audit for Stock Companies in the Republic of Korea and may not be appropriate for other purposes or for other users.

Ernst & Young Han Young

March 21, 2019

Report on Internal Accounting control System ("IACS")

To the Shareholders, Board of Directors and auditor (Audit Committee) of Doosan Corporation.

Ⅰ. As the CEO and Internal Accounting Control Officer("IACO") of Doosan Corporation ("the Company"), assessed the status of the design and operation of the Company's IACS for the year ended December 31, 2018.

The Company's management including CEO and IACO is responsible for designing and operating IACS.

Ⅰ. As the CEO and IACO, assessed whether the IACS has been appropriately designed and is effectively operating to prevent and detect any error or fraud which may cause any misstatement of the financial statements, for the purpose of preparing and disclosing reliable financial statement.

Ⅰ. As the CEO and IACO, applied the IACS Framework established by Internal Accounting Control System Steering Committee for the assessment of design and operation of the IACS.

Based on assessment of the IACS, the Company's IACS has been appropriately designed and is operating effectively as of December 31, 2018, in all material respect, in accordance with the IACS Framework.

The Company's CEO and IACO, confirmed that the contents of the report are not misstated or displayed, and there is no missing information to be stated or displayed.

Also, the Company's CEO and IACO confirmed that the report did not contain or display any content that cause major misunderstanding, and sufficiently reviewed the report.

3, 11, 2019

Internal Accounting control officer Park Wan-seok

Chief Executive Officer Dong Hyun-Soo