DOOSAN CORPORATION

Financial Statements

For the Years Ended December 31, 2021 and 2020
With the independent auditor's report

Doosan Corp.

Contents

Ernst & Young Han Young
2-4F, 6-8F, Taeyoung Building, 111, Yeouigongwon-ro,
Yeongdeungpo-gu, Seoul 07241 Korea

Tel: +82 2 3787 6600
Fax: +82 2 783 5890
ey.com/kr

Independent auditor's report

The Shareholders and Board of Directors
Doosan Corporation

Opinion

We have audited the accompanying separate statements of Doosan Corporation (the "Company"), which comprise the separate statements of financial position as of December 31, 2021 and 2020, and the separate statements of income, separate statements of comprehensive income, separate statements of changes in equity and separate statements of cash flows for the years then ended, and notes to the separate financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying separate financial statements present fairly, in all material respects, the separate financial position of the Company as of December 31, 2021 and 2020, and its separate financial performance and its separate cash flows for the years then ended in accordance with Korean International Financial Reporting Standards ("KIFRS").

We also have audited, in accordance with Korean Auditing Standards ("KGAAS"), the Group's internal control over financial reporting ("ICFR") as of December 31, 2021, based on criteria established in Conceptual Framework for designing and operating ICFR in accordance with KGAAS established by the Operating Committee of ICFR (the "ICFR Committee"), and our report dated March 22, 2022, expressed "an unqualified opinion thereon".

Basis for opinion

We conducted our audit in accordance with Korean Auditing Standards ("KGAAS"). Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the separate financial statements section of our report. We are independent of the Company in accordance with the ethical requirements that are relevant to our audit of the separate financial statements in the Republic of Korea, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key audit matters

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

(1) Impairment test of investments in subsidiaries

As described in Note 11 to the separate financial statements, the Company conducted an impairment test on investments in Doosan Heavy Industries & Construction Co., Ltd. as of December 31, 2021. And no impairment loss was recognized as a result of the impairment test. The Company estimated recoverable amount of investments in subsidiaries based on fair value less costs of disposal.

As of December 31, 2021, the carrying amount of investments in Doosan Heavy Industries & Construction Co., Ltd. is ₩2,655,736 million, accounting for 50.0% of its total assets. In addition, recoverable amount may vary depending on the inputs that involve management's judgement, which could have a significant effect on the separate financial statements. Therefore, we identified the estimate of recoverable amount of investments in Doosan Heavy Industries & Construction Co., Ltd. as a key audit matter.

The main audit procedures we have conducted in this regard are as follows:

- Testing of internal controls related to impairment testing of investment in subsidiary
- Inquiries and review of the valuation model used by management
- Review of the independence and eligibility of external expert management used in the internal valuation
- Compare with external information by utilizing auditors' valuation experts in order to evaluate the adequacy of key assumptions that management used in calculating recoverable amount
- Independent recalculation to verify the accuracy of the recoverable amount

Responsibilities of management and those charged with governance for the financial statements

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

In preparing the separate financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

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

Auditor's responsibilities for the audit of the separate financial statements

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

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

- Identify and assess the risks of material misstatement of the separate financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

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- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the separate financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the separate financial statements, including the disclosures, and whether the separate financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

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

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

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

The engagement partner on the audit resulting in this independent auditor's report is Sang Il Bae.

Ernst & Young Han Young

March 22, 2022

This audit report is effective as of March 22, 2022, the independent auditor's report date. Accordingly, certain material subsequent events or circumstances may have occurred during the period from the independent auditor's report date to the time this report is used. Such events and circumstances could significantly affect the accompanying separate financial statements and may result in modifications to this report.

Doosan Corporation

Separate financial statements
for the years ended December 31, 2021 and 2020

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

Sang Chul Kwak
Chief Executive Officer
Doosan Corporation

Doosan Corporation
Separate statements of financial position
as of December 31, 2021 and 2020
(Korean won)

	Notes		2021		2020
Assets					
Current assets:					
Cash and cash equivalents	4,10,34	₩	49,062,002,726	₩	69,610,060,495
Short-term financial instruments	4,5,10,32		534,554,468,125		111,236,952,164
Short-term investment securities	4,6,10		1,496,808,705		1,496,808,705
Trade receivables	4,7,10,33		229,241,566,625		325,198,703,029
Other receivables	4,7,10,33		72,423,691,713		93,992,454,124
Current derivative assets	4,9,10		34,449,259,957		216,852,287
Inventories	8		110,302,908,051		161,040,007,060
Assets held for sale	37		-		450,230,000,000
Other current assets			36,430,753,212		46,182,775,500
Total current assets			1,067,961,459,114		1,259,204,613,364
Non-current assets:					
Long-term financial instruments	4,5,10		11,541,924,268		34,123,191,517
Long-term investment securities	4,6,10,33		200,694,017,796		69,931,682,814
Investments in subsidiaries, joint ventures and associates	11		3,389,030,228,991		3,184,820,535,340
Property, plant and equipment	12,32		252,385,769,561		344,759,498,857
Intangible assets	13		53,034,944,769		85,570,219,710
Investment properties	14,32		298,855,089,108		358,755,211,554
Long-term other receivables	4,7,10,33		1,331,244,506		32,071,167,073
Deposits	4,10,33		33,209,987,159		35,442,233,077
Non-current derivative assets	4,9,10		-		8,607,221,215
Other non-current assets			242,221,381		543,103,696
Total non-current assets			4,240,325,427,539		4,154,624,064,853
Total assets		**₩**	**5,308,286,886,653**	**₩**	**5,413,828,678,217**

(Continued)

Doosan Corporation
Separate statements of financial position
as of December 31, 2021 and 2020 (cont'd)
(Korean won)

	Notes	2021	2020
Liabilities			
Current liabilities:			
Trade payables	4,10,33	₩ 111,658,160,009	₩ 198,561,769,033
Other payables	4,10,33	85,285,773,599	112,232,939,242
Short-term borrowings	4,10,15	668,399,166,468	709,761,495,000
Current portion of bonds	4,10,15	264,511,710,517	137,828,278,033
Current portion of long-term borrowings	4,10,15	-	102,508,113,664
Current portion of long-term asset-backed loans	4,10,15	65,738,259,513	95,262,501,050
Current lease liabilities	4,10,16	27,411,566,229	30,319,838,833
Derivative liabilities	4,9,10	1,314,440,934	-
Current provisions	18	7,816,715,745	9,646,143,382
Current tax liabilities	29	284,660,778,912	177,594,164,931
Other current liabilities		67,892,770,179	75,158,739,003
Total current liabilities		1,584,689,342,105	1,648,873,982,171
Non-current liabilities:			
Long-term other liabilities	4,10	18,294,675,461	30,237,316,738
Bonds	4,10,15	291,196,590,613	333,632,438,684
Long-term asset-backed loans	4,10,15	16,434,564,878	166,214,746,759
Non-current lease liabilities	4,10,16	234,720,033,224	245,578,467,835
Net defined benefit liabilities	17	28,501,921,186	15,882,772,080
Non-current provisions	18	3,588,928,973	-
Deferred tax liabilities	29	70,350,950,900	301,951,866,622
Other non-current liabilities		14,099,487,679	18,150,750,337
Total non-current liabilities		677,187,152,914	1,111,648,359,055
Total liabilities		**2,261,876,495,019**	**2,760,522,341,226**
Equity			
Share capital	1,19	123,738,105,000	123,738,105,000
Capital surplus	19,20	793,456,657,395	792,396,115,124
Other equity items	21	(1,149,030,789,975)	(1,147,970,247,704)
Accumulated other comprehensive income	22	33,322,013,575	37,297,569,826
Retained earnings	23	3,244,924,405,639	2,847,844,794,745
Total equity		**3,046,410,391,634**	**2,653,306,336,991**
Total liabilities and equity		**₩ 5,308,286,886,653**	**₩ 5,413,828,678,217**

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

Doosan Corporation
Separate statements of income
for the years ended December 31, 2021 and 2020
(Korean won)

	Notes		2021		2020
Sales					
Merchandise and finished goods	24,33	₩	749,886,753,107	₩	682,533,355,191
Others	24,33		206,688,249,145		203,418,245,600
Dividend	24,33		10,889,725,232		8,932,522,848
			967,464,727,484		**894,884,123,639**
Cost of sales					
Merchandise and finished goods	25,33		539,623,801,346		499,816,708,465
Others	25,33		161,931,865,315		155,155,354,837
Selling and administrative expenses	25,26,33		199,292,467,949		149,198,835,042
			900,848,134,610		**804,170,898,344**
Operating profit			**66,616,592,874**		**90,713,225,295**
Finance income	4,10,27		140,120,478,120		51,424,016,959
Finance expenses	4,10,27		86,751,534,593		114,138,871,246
Other non-operating income	28		68,875,065,239		120,500,289,967
Other non-operating expenses	28		74,597,360,710		44,408,743,418
Profit before income tax expenses			**114,263,240,930**		**104,089,917,557**
Income tax expenses	29		25,251,782,829		85,644,831,632
Profit from continuing operations			**89,011,458,101**		**18,445,085,925**
Profit from discontinued operations	36		**321,810,192,749**		**161,774,828,921**
Profit for the year		₩	**410,821,650,850**	₩	**180,219,914,846**
Earnings per share attributable to the equity holders of the Company	30				
Basic earnings per ordinary share from continuing operations		₩	**4,098**	₩	**583**
Basic earnings per ordinary share		₩	**23,070**	₩	**10,117**
Diluted earnings per ordinary share from continuing operations		₩	**4,098**	₩	**583**
Diluted earnings per ordinary share		₩	**23,070**	₩	**10,117**
Basic earnings per old-type preferred share from continuing operations		₩	**4,107**	₩	**585**
Basic earnings per old-type preferred share		₩	**23,120**	₩	**10,157**
Diluted earnings per old-type preferred share from continuing operations		₩	**4,107**	₩	**585**
Diluted earnings per old-type preferred share		₩	**23,120**	₩	**10,157**

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

Doosan Corporation
Separate statements of comprehensive income
for the years ended December 31, 2021 and 2020

(Korean won)

	Notes		2021		2020
Profit for the year		₩	**410,821,650,850**	₩	**180,219,914,846**
Other comprehensive income	22				
Items not to be subsequently reclassified to profit or loss					
Remeasurements of net defined benefit liabilities	17		(4,380,682,389)		736,611,615
Land revaluation surplus	12		2,418,961,806		-
Gain (Loss) on valuation of financial assets (designated) at fair value through	6		5,146,082,779		392,278,800,042
Gain (Loss) on valuation of derivatives designated as hedges	9		-		(34,024,518,250)
Items to be subsequently reclassified to profit or loss					
Gain (Loss) on valuation of derivatives designated as hedges	9		(1,007,003,703)		(1,359,678,739)
Total other comprehensive income			**2,177,358,493**		**357,631,214,668**
Total comprehensive income for the year		₩	**412,999,009,343**	₩	**537,851,129,514**

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

Doosan Corporation
Separate statements of changes in equity
for the years ended December 31, 2021 and 2020
(Korean won)

	Share capital	Capital surplus	Other equity items	Accumulated other comprehensive income	Retained earnings	Total
As of January 1, 2020	**₩ 123,738,105,000**	**797,120,154,295**	**₩ (1,146,808,916,304)**	**₩ 201,356,362,907**	**₩ 2,169,246,957,650**	**₩ 2,144,652,663,548**
Total comprehensive income:						
Profit for the year	-	-	-	-	180,219,914,846	180,219,914,846
Remeasurements of net defined benefit liabilities	-	-	-	-	736,611,615	736,611,615
Land revaluation surplus	-	-	-	(108,978,634,166)	108,978,634,166	-
Gain on valuation of financial assets (designated) at fair value through OCI	-	-	-	392,278,800,042	-	392,278,800,042
Loss on valuation of derivatives designated	-	-	-	(35,384,196,989)	-	(35,384,196,989)
Subtotal	**-**	**-**	**-**	**247,915,968,887**	**289,935,160,627**	**537,851,129,514**
Transactions with shareholders directly reflected in shareholders' equity and others:						
Cancellation of stock options	-	1,161,331,400	(1,161,331,400)	-	-	-
Payment of dividends	-	-	-	-	(23,312,085,500)	(23,312,085,500)
Changes in other capital surplus	-	(5,885,370,571)	-	-	-	(5,885,370,571)
Reclassification of accumulated other comprehensive income to retained earnings	-	-	-	(411,974,761,968)	411,974,761,968	-
Subtotal	**-**	**(4,724,039,171)**	**(1,161,331,400)**	**(411,974,761,968)**	**388,662,676,468**	**(29,197,456,071)**
As of December 31, 2020	**₩ 123,738,105,000**	**₩ 792,396,115,124**	**₩ (1,147,970,247,704)**	**₩ 37,297,569,826**	**₩ 2,847,844,794,745**	**₩ 2,653,306,336,991**
As of January 1, 2021	**₩ 123,738,105,000**	**792,396,115,124**	**₩ (1,147,970,247,704)**	**₩ 37,297,569,826**	**₩ 2,847,844,794,745**	**₩ 2,653,306,336,991**
Total comprehensive income:						
Profit for the year	-	-	-	-	410,821,650,850	410,821,650,850
Remeasurements of net defined benefit liabilities	-	-	-	-	(4,380,682,389)	(4,380,682,389)
Land revaluation surplus	-	-	-	(8,114,635,327)	10,533,597,133	2,418,961,806
Gain on valuation of financial assets (designated) at fair value through OCI	-	-	-	5,146,082,779	-	5,146,082,779
Loss on valuation of derivatives designated	-	-	-	(1,007,003,703)	-	(1,007,003,703)
Subtotal	**-**	**-**	**-**	**(3,975,556,251)**	**416,974,565,594**	**412,999,009,343**
Transactions with shareholders directly reflected in shareholders' equity and others:						
Cancellation of stock options	-	1,060,542,271	(1,060,542,271)	-	-	-
Payment of dividends	-	-	-	-	(19,894,954,700)	(19,894,954,700)
Subtotal	**-**	**1,060,542,271**	**(1,060,542,271)**	**-**	**(19,894,954,700)**	**(19,894,954,700)**
As of December 31, 2021	**₩ 123,738,105,000**	**₩ 793,456,657,395**	**₩ (1,149,030,789,975)**	**₩ 33,322,013,575**	**₩ 3,244,924,405,639**	**₩ 3,046,410,391,634**

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

Doosan Corporation
Separate statements of cash flows
for the years ended December 31, 2021 and 2020
(Korean won)

	Notes	2021	2020
Cash flows from operating activities			
Cash generated from operating activities:	34		
Profit for the year		₩ 410,821,650,850	₩ 180,219,914,846
Adjustments		(254,573,598,852)	40,242,876,890
Changes in operating assets and liabilities		(101,744,874,229)	(392,382,294,355)
		54,503,177,769	(171,919,502,619)
Interest received		6,897,894,980	4,600,890,649
Interest paid		(70,272,793,507)	(76,403,666,777)
Dividends received		9,914,977,646	19,663,818,607
Income tax paid		(274,272,852,818)	(27,673,498,109)
Net cash flows from operating activities		**(273,229,595,930)**	**(251,731,958,249)**
Cash flows from investing activities			
Cash inflows from investing activities:			
Decrease in short-term loans		3,000,000,000	19,793,546,000
Decrease in short-term financial instruments		34,390,784,612	224,100,000,000
Disposal of short-term investment securities		-	100,753,164,664
Decrease in long-term financial instruments		2,499,789,000	24,234,000,000
Disposal of long-term investment securities		-	237,176,902,448
Disposal of investment in subsidiaries and associates		-	78,486,457,521
Disposal of property, plant and equipment		20,895,446,304	119,791,153,666
Disposal of intangible assets		1,378,000,000	1,648,344,801
Disposal of investment properties		-	660,064,516,802
Decrease in long-term loans		624,246,479	3,020,999,313
Increase in government grants		1,276,724,714	96,437,593
Net cash flows from disposal of discontinued operations		1,149,209,571,874	33,287,077,974
		1,213,274,562,983	1,502,452,600,782
Cash outflows from investing activities:			
Increase in short-term loans		8,385,000,000	68,157,488,000
Increase in short-term financial instruments		436,961,976,244	315,790,372,641
Acquisition of short-term investment securities		-	97,891,277,951
Acquisition of long-term financial instruments		408,640,200	56,226,155,939
Acquisition of long-term investment securities		124,935,307,568	43,895,943,307
Acquisition of investments in subsidiaries and associates		88,384,839,000	576,426,779,208
Acquisition of property, plant and equipment		41,753,852,619	48,615,467,804
Acquisition of intangible assets		15,151,613,675	21,318,904,128
Acquisition of Investment properties		67,731,942	6,577,473,909
Increase in long-term loans		309,040,000	564,565,000
Cash outflows from other investing activities		817,374,480	-
		(717,175,375,728)	(1,235,464,427,887)
Net cash flows provided by investing activities		**496,099,187,255**	**266,988,172,895**
Cash flows from financing activities			
Cash inflows from financing activities:			
Increase in short-term borrowings		2,253,463,503,990	2,001,795,117,703
Issuance of bonds		221,029,620,000	333,375,916,800
Increase in long-term asset-backed loans		-	261,003,292,427
		2,474,493,123,990	2,596,174,326,930
Cash outflows from financing activities:			
Repayment of short-term borrowings		2,342,825,832,522	1,800,033,622,703
Repayment of current long-term borrowings		14,512,183,114	-
Repayment of current long-term asset-backed loans		96,499,058,261	-
Repayment of long-term asset-backed loans		84,088,841,739	150,000,000,000
Repayment of bonds		137,974,389,081	320,541,645,153
Repayment of lease liabilities		29,760,888,815	17,972,958,591
Repayment of long-term borrowings		-	351,750,166,127
Payment of dividends		19,894,954,700	23,312,085,500
		(2,725,556,148,232)	(2,663,610,478,074)
Net cash flows used in financing activities		**(251,063,024,242)**	**(67,436,151,144)**
Effect of exchange rate changes on cash and cash equivalents		**7,645,375,148**	**(4,515,567,001)**
Decrease in cash and cash equivalents due to split-off		**-**	**(39,034,360)**
Net increase(decrease) in cash and cash equivalents		**(20,548,057,769)**	**(56,734,537,859)**
Cash and cash equivalents, beginning of the year		**69,610,060,495**	**126,344,598,354**
Cash and cash equivalents, end of the year		**₩ 49,062,002,726**	**₩ 69,610,060,495**

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

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, 2021, is ₩123,738 million, including ₩24,447 million of preferred shares.

The Company's ordinary shares as of December 31, 2021 are owned as follows:

	Number of ordinary shares owned	Ownership percentage (%)
Related parties	7,804,536	47.23
Treasury stocks	3,000,866	18.16
Others	5,718,433	34.61
	16,523,835	100.00

In addition, 35.9% of preferred shares are owned by the largest shareholder and others and 51.6% of preferred shares are owned by others.

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 as accounting based on direct equity investment, not based on the reported performance and net assets of the investee. 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, 2021 are the same as those adopted in the preparation of the separate financial statements for the year ended December 31, 2020, 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 for the first-time certain standards and amendments, which are effective for annual periods beginning on or after January 1, 2021.

Amendments to KIFRS 1109, KIFRS 1039, KIFRS 1107, KIFRS 1104 and KIFRS 1116 – Interest Rate Benchmark Reform - Phase 2
The amendments provide temporary reliefs which address the financial reporting effects when an interbank offered rate (IBOR) is replaced with an alternative nearly risk-free interest rate (RFR). The amendments include the following practical expedients:

- A practical expedient to require contractual changes, or changes to cash flows that are directly required by the reform, to be treated as changes to a floating interest rate, equivalent to a movement in a market rate of interest
- Permit changes required by IBOR reform to be made to hedge designations and hedge documentation without the hedging relationship being discontinued
- Provide temporary relief to entities from having to meet the separately identifiable requirement when an RFR instrument is designated as a hedge of a risk component

These amendments had no impact on the financial statements of the Company. The Company intends to use the practical expedients in future periods if they become applicable.

Amendments to KIFRS 1116 – Covid-19 Related Rent Concessions beyond 30 June 2021
On 28 May 2020, the IASB issued Covid-19-Related Rent Concessions - amendment to KIFRS 1116 *Leases*. The amendments provide relief to lessees from applying KIFRS 1116 guidance on lease modification accounting for rent concessions arising as a direct consequence of the Covid-19 pandemic. As a practical expedient, a lessee may elect not to assess whether a Covid-19 related rent concession from a lessor is a lease modification. A lessee that makes this election accounts for any change in lease payments resulting from the Covid-19 related rent concession the same way it would account for the change under KIFRS 1116 if the change were not a lease modification.

The amendment was intended to apply until June 30, 2021, but as the impact of the COVID-19 pandemic is continuing, on March 31, 2021, the IASB extended the period of application of the practical expedient to June 30, 2022.The amendment applies to annual reporting periods beginning on or after April 1, 2021. However, the Company has not received COVID-19-related rent concessions, but plans to apply the practical expedient if it becomes applicable within allowed period of application.

2.2.2 Standards issued but not yet effective

The new and amended 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. The Company intends to adopt these new and amended standards and interpretations, if applicable, when they become effective.

Amendments to KIFRS 1001 – *Classification of Liabilities as Current or Non-current*
The amendments to paragraphs 69 to 76 of KIFRS 1001 specify the requirements for classifying liabilities as current or non-current. The amendments clarify:

- What is meant by a right to defer settlement
- That a right to defer must exist at the end of the reporting period
- That classification is unaffected by the likelihood that an entity will exercise its deferral right
- That only if an embedded derivative in a convertible liability is itself an equity instrument would the terms of a liability not impact its classification

The amendments are effective for annual reporting periods beginning on or after January 1, 2023 and must be applied retrospectively. The Company is currently assessing the impact the amendments will have on current practice and whether existing loan agreements may require renegotiation.

Amendments to KIFRS 1103 – *Reference to the Conceptual Framework*
The amendments are intended to replace a reference to the Framework for the Preparation and Presentation of Financial Statements, issued in 1989, with a reference to the Conceptual Framework for Financial Reporting issued in March 2018 without significantly changing its requirements. The Board also added an exception to the recognition principle of KIFRS 1103 to avoid the issue of potential 'day 2' gains or losses arising for liabilities and contingent liabilities that would be within the scope of KIFRS 1037 or KIFRS 2121 *Levies,* if incurred separately. At the same time, the Board decided to clarify existing guidance in KIFRS 1103 for contingent assets that would not be affected by replacing the reference to the Framework for the Preparation and Presentation of Financial Statements. The amendments are effective for annual reporting periods beginning on or after January 1, 2022 and apply prospectively.

Amendments to KIFRS 1016 – *Property, Plant and Equipment: Proceeds before Intended Use*
The amendments prohibit entities deducting from the cost of an item of property, plant and equipment, any proceeds from selling items produced while bringing that asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Instead, an entity recognizes the proceeds from selling such items, and the costs of producing those items, in profit or loss. The amendment is effective for annual reporting periods beginning on or after January 1, 2022 and must be applied retrospectively to items of property, plant and equipment made available for use on or after the beginning of the earliest period presented when the entity first applies the amendment. The amendments are not expected to have a material impact on the Company.

Amendments to KIFRS 1037 – *Onerous Contracts – Costs of Fulfilling a Contract*
The amendments specify which costs an entity needs to include when assessing whether a contract is onerous or loss-making. The amendments apply a "directly related cost approach". The costs that relate directly to a contract to provide goods or services include both incremental costs and an allocation of costs directly related to contract activities. General and administrative costs do not relate directly to a contract and are excluded unless they are explicitly chargeable to the counterparty under the contract. The amendments are effective for annual reporting periods beginning on or after January 1, 2022. The Company will apply these amendments to contracts for which it has not yet fulfilled all its obligations at the beginning of the annual reporting period in which it first applies the amendments.

Amendments to KIFRS 1008 – Definition of Accounting Estimates
The amendments clarify the distinction between changes in accounting estimates and changes in accounting policies and the correction of errors. Also, they clarify how entities use measurement techniques and inputs to develop accounting estimates. The amendments are effective for annual reporting periods beginning on or after January 1, 2023 and apply to changes in accounting policies and changes in accounting estimates that occur on or after the start of that period. Earlier application is permitted as long as this fact is disclosed.

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

The amendments are not expected to have a material impact on the Company.

Amendments to KIFRS 1001 and KIFRS Practice Statement 2 – Disclosure of Accounting Policies
The amendments provide guidance and examples to help entities apply materiality judgements to accounting policy disclosures. The amendments aim to help entities provide accounting policy disclosures that are more useful by replacing the requirement for entities to disclose their 'significant' accounting policies with a requirement to disclose their 'material' accounting policies and adding guidance on how entities apply the concept of materiality in making decisions about accounting policy disclosures. The amendments to KIFRS 1001 are applicable for annual periods beginning on or after January 1, 2023 with earlier application permitted. Since the amendments to the Practice Statement 2 provide non-mandatory guidance on the application of the definition of material to accounting policy information, an effective date for these amendments is not necessary. The Company is currently assessing the impact of the amendments to determine the impact they will have on the Company's accounting policy disclosures.

Amendments to KIFRS 1012 – Narrowing the scope of the initial recognition exception of deferred income taxes
The amendments narrowed the scope of the initial recognition exemption so that it no longer applies to transactions that, on initial recognition, give rise to equal taxable and deductible temporary difference, thus to resolve accounting diversity in the recognizing of deferred tax assets and liabilities. Paragraphs 15 and 24 (initial recognition exemption of deferred income taxes) of KIFRS 1012 were amended to include an additional condition (3) where a deferred tax asset and liability shall be recognized for a temporary difference that arises on initial recognition of an asset or liability in a single transaction if that transaction give rise to equal amounts of taxable and deductible temporary differences. The amendments are effective for annual reporting periods beginning on or after January 1, 2023 with earlier adoption permitted. The amendments are not expected to have a material impact on the Company.

2018-2020 annual improvements to KIFRS standards process

KIFRS 1101 *First-time Adoption of International Financial Reporting Standards* – Subsidiary as a first-time adopter
The amendment permits a subsidiary that elects to apply paragraph D16(1) of KIFRS 1101 to measure cumulative translation differences using the amounts reported by the parent, based on the parent's date of transition to KIFRS. This amendment is also applied to an associate or joint venture that elects to apply paragraph D16(1) of KIFRS 1101. The amendment is effective for annual reporting periods beginning on or after January 1, 2022 with earlier adoption permitted.

KIFRS 1109 *Financial Instruments* – Fees in the '10 per cent' test for derecognition of financial liabilities
The amendment clarifies the fees that an entity includes when assessing whether the terms of a new or modified financial liability are substantially different from the terms of the original financial liability. These fees include only those paid or received between the borrower and the lender, including fees paid or received by either the borrower or lender on the other's behalf. An entity applies the amendment to financial liabilities that are modified or exchanged on or after the beginning of the annual reporting period in which the entity first
applies the amendment.
The amendment is effective for annual reporting periods beginning on or after January 1, 2022 with earlier adoption permitted. The Company will apply the amendments to financial liabilities that are modified or exchanged on or after the beginning of the annual reporting period in which the entity first applies the amendment. The amendments are not expected to have a material impact on the Company.

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 1036 *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 between 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 Investment in joint operation

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

When an entity performs an activity under a joint operation, the entity recognizes, as a co-operative, its own interest in the joint operation as follows:

- Own assets. Include own shares of assets that are jointly owned.
- Own debt. Including own shares of jointly-generated debt.
- The own share of output from joint sales.
- The own share of the output of the joint sales.
- Own expenses. Include own share of the costs incurred jointly.

The Company accounts for assets, liabilities, income and expenses of its own interests in joint operation in accordance with the standards that apply to certain assets, liabilities, income and expenses.

If a joint operating entity, such as selling or investing in an asset in a joint operation, is deemed to perform a transaction with another party in the joint operation, the entity shall notify the other party We are only aware of the limit on shareholding.

If the co-operative, the Company, conducts transactions such as joint sales and purchases of assets, the Company does not recognize its portion of the profit or loss until the assets are resold to a third party.

2.5 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*.

2.6 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 group 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.

2.7 Assets held for sale and Discontinued operation

2.7.1 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 between their previous carrying amount and fair value less costs to sell.

Property, plant and equipment and intangible assets are not depreciated or amortized once classified as held for sale or as held for distribution.

Assets and liabilities classified as held for sale or for distribution are presented separately as current items in the statement of financial position.

2.7.2 Assets scheduled for distribution to owners (or disposal groups)

The Company also applied the accounting policies related to the types, presentation and measurement of non-current assets (or disposal groups) classified as held for sale to non-current assets (or disposal entities) that are classified as scheduled for distribution to owners who exercise their qualifications as owners.

In addition, if all owners with the same kind of equity instruments are treated equally in distributing these non-cash assets to owners who exercise their qualifications as owners free of charge and the assets are ultimately not controlled by the same party or parties before and after the distribution, we recognize any dividend payable at the time of declaring the distribution (when approved in the shareholders' meeting). The dividend payable is measured at the fair value of the non-cash assets to be distributed at the end of each reporting period and at the settlement date, and the change in the carrying amount of the dividend payable is recognized in other capital items in the financial statement as an adjustment to the amount of the distribution.

In settling the dividend payable, the Company shall recognize any difference between the carrying amount of the non-cash assets distributed and the carrying amount of the dividend payable as profit or loss.

2.7.3 Discontinued operation

Disposal entity is a discontinued operation if:

- It is a separate main business line or business area.
- It is a part of a single plan to dispose of separate major business lines or business areas.
- It is a subsidiary acquired solely for sale.

The Company excludes the profit or loss from the results of the continuing operation and displays the profit or loss as a single amount in the income statement. Additional details of discontinued operations are disclosed in Note 36.

2.8 Revenue from contracts with customers

2.8.1 Identifying performance obligations

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

2.8.2 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.

2.8.3 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.

2.9 Lease

The Company determines whether the contract itself is a lease or the contract contains lease at the time of agreement, considering whether the contract exchange the control of the identified asset for a certain period of time with price of the contract.

The Company as a lessee

The Company applies a single method on every lease except short-term leases and leases of low-value assets. The Company recognizes lease liabilities that represent the obligation to pay the leases and right-to-use assets that represents right-to-use.

2.9.1 Right-of-use assets

The Company recognizes right-of-use assets on lease commencement date (the date when the underlying asset is usable). Right-of-use asset is measured as cost, and the Company applies cost model on subsequent measurement. To apply cost model, the Company deducts accumulated depreciation and accumulated loss of impairment, and recognizes adjustments base on remeasurement of lease liabilities. The cost of the right-of-use assets includes the amount of the perceived lease liabilities, the initial direct cost, and the lease fee paid before or after the lease commencement date with received lease incentive deducted. The right-of-use assets are depreciated on a flat basis over a short period of time between the lease period and the estimated useful life of the assets.

If the ownership of the underlying asset is transferred to the Company at the end of the lease term or if the Company is expected to exercise the purchase option at the cost of the right-of-use assets, depreciation is calculated using the estimated useful life of the underlying asset of the asset.

The right-of-use assets are also subject to damage and the relevant accounting policy is described in Note 2.19.

2.9.2 Lease liabilities

On lease commencement date, the Company recognizes lease liabilities at the present value of the lease to be paid over the lease period. The lease fee consists of a fixed fee (including a substantial fixed fee, and the lease incentive to receive is deducted), a variable lease payment that varies according to the index or rate, and an amount expected to be paid according to the residual value guarantee. Lease fee also includes the amount to be borne to terminate the lease if the Company is fairly certain to exercise buying options, considering exercise cost of the buying options and termination options to lease term.

A variable lease that does not varies according to the index of rate (unless not from the production of inventories) is recognized during the period of time when an event or condition that causes a lease happens.

When the Company evaluates the present value of lease fee, it uses the incremental borrowing interest rate of the lease commencement date because it cannot easily calculate the internal rate of return of the lease. After the lease commencement date, the amount of lease liabilities increases to reflect interest and decreases to reflect the lease fee paid. In addition, the book values of the lease liabilities are remeasured if there is a change in the lease term, a change in the lease fee (for example, a change in the future lease due to a change in the index or rate used to calculate the lease fee), or a change in the option assessment to buy the underlying asset.

2.9.3 Short-term lease and lease of low-value assets

The Company applies exemption rule for the recognition of short-term lease, which has a lease-term less than 12 months from the lease commencement date and do not include purchase options. In addition, the Company applies exemption rule for the recognition of leases of low-value assets on office equipment, etc., which is considered as low value assets. Lease fee of Short-term lease and leases of low-value of assets are recognized as cost based on straight-line method through the lease term.

The Company as lessor

The Company classifies leases that do not transfer most of the risks and compensation for the ownership of underlying assets as operating leases. Lease revenues are recognized based on straight-line method through the lease term and it can be classified as sales in the statements of income depending on the nature of the business.

2.10 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 2.24 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.

2.11 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.

2.12 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 statement 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 statement 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.

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.

2.13 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.

2.14 Taxation

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

2.14.1 Current tax

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

2.14.2 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.

2.14.3 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.

2.15 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 statement 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.

2.16 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.

2.17 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.

2.18 Intangible assets

2.18.1 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.

2.18.2 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.

2.18.3 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.

2.18.4 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.

2.18.5 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	5–10
Other intangible assets	4–15

2.19 Impairment of Property, plant and equipment and intangible assets other than goodwill

At the end of each reporting period, the Company reviews the carrying amounts of its Property, plant and equipment 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.

2.20 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.

2.21 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.

2.22 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.

2.22.1 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.

[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.

2.22.1 Financial assets (cont'd)

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 income and computed in the same manner as for financial assets measured at amortized cost. The remaining fair value changes are recognized in OCI. Upon derecognition, the cumulative fair value change recognized in OCI is recycled to profit or loss.

Financial assets designated at fair value through OCI (equity instruments)
Upon initial recognition, the 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 income 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.

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.

2.22.1 Financial assets (cont'd)

[Derecognition]

A financial asset (or, where applicable, a part of a financial asset or part of a group of similar financial assets) is primarily derecognized (i.e., removed from the 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.

[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.

2.22.2 Financial liabilities

[Initial recognition and measurement]

Financial liabilities are classified, at initial recognition, as financial liabilities at fair value through profit or loss, financial liabilities as subsequently measured at amortized cost, 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.

Financial liabilities as subsequently measured at amortized cost
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.

[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.

2.22.3 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.

2.22.4 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

2.23 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.

2.24 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.

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

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 income. However, any changes in the fair value of a hedging derivative of equity instrument that the Company elects to present in OCI are recognized in OCI. 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 income.

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

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

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

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

The 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.

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

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

2.25 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.

2.26 Approval of separate financial statements

The separate financial statements of the Company were approved by the Board of Directors on March 8, 2022 and will be finalized at the annual general meeting of shareholders on March 29, 2022.

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

The Company provides warranty for products when it recognizes the relevant revenue. The Company calculates the guarantee provision as the best estimate that is deemed necessary to enhance future and current warranty obligations at the end of each reporting period. The Company continues to market new products using complex technologies, and depending on the local laws and practices, these accounting estimates may be changed to establish additional provisions in the future fiscal periods.

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 12 and 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 Special taxation for investment and facilitation of mutually beneficial cooperation

In accordance with the *Special Taxation for Investment and Facilitation of Mutually Beneficial Cooperation*, if a certain portion of taxable income of each fiscal year is not utilized for investment and salary increase purpose, the Company is obliged to pay additional income taxes calculated by the same Act. As a result, as the Company reflects the tax consequences for investment and promotion of collaborative cooperation when measuring the income tax in the same period, the income tax to be borne by the Company in the future may vary depending on the level of investment, wage increase and mutually-beneficial cooperation in each year.

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

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

3.9 Leases – Estimating the incremental borrowing rate

When the Company cannot readily determine the interest rate implicit in the lease, it uses its incremental borrowing rate ("IBR") to measure lease liabilities. The IBR is the rate of interest that the Company would have to pay to borrow over a similar term, and with a similar security, the funds necessary to obtain an asset of a similar value to the right-of-use asset in a similar economic environment. The IBR therefore reflects what the Company 'would have to pay', which requires estimation when no observable rates are available (such as for subsidiaries that do not enter into financing transactions) or when they need to be adjusted to reflect the terms and conditions of the lease (for example, when leases are not in the subsidiary's functional currency).

The Company estimates the IBR using observable inputs (such as market interest rates) when available and is required to make certain entity-specific estimates (such as the Company's stand-alone credit rating).

3.10 Determining the lease term of contracts with renewal & termination options – Company as lessee

The Company determines the lease term as the non-cancellable term of the lease, together with any periods covered by an option to extend the lease if it is reasonably certain to be exercised, or any periods covered by an option to terminate the lease, if it is reasonably certain not to be exercised.

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

3.11 Lease classification – Company as lessor

The Company has sub-lease contacts for right-of-use assets classified as investment properties. The Company has determined, based on an evaluation of the terms and conditions of the arrangements for most sub-leasing contracts, such as the lease term not constituting a major part of the economic life of the right-of-use assets and the present value of the minimum lease payments not amounting to substantially all of the fair value of the right-of-use assets, that it retains substantially all the risks and rewards incidental to ownership of these properties and accounts for the contracts as operating leases.

3.12 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 other than the Company's functional currency as of December 31, 2021 and 2020 is as follows (Korean won in millions):

	December 31, 2021					
	USD	EUR	JPY	GBP	Others	Total
Assets	₩ 127,057	₩ 1,361	₩ 2,124	₩ 8,107	₩ 5,034	₩ 143,683
Liabilities	(61,229)	(1)	(1,910)	(1,272)	(58)	(64,470)
	₩ 65,828	₩ 1,360	₩ 214	₩ 6,835	₩ 4,976	₩ 79,213

	December 31, 2020					
	USD	EUR	JPY	GBP	Others	Total
Assets	₩ 264,621	₩ 29,214	₩ 249	₩ 76,325	₩ 6,262	₩ 376,671
Liabilities	(84,473)	(2,190)	(2,594)	(1,248)	-	(90,505)
	₩ 180,148	₩ 27,024	₩ (2,345)	₩ 75,077	₩ 6,262	₩ 286,166

A sensitivity analysis on the Company's profit before income tax expenses assuming a 10% increase and decrease in currency exchange rates for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	Impact on profit before income tax expenses	
	2021	2020
10% Increase	₩ 7,921	₩ 28,617
10% Decrease	(7,921)	(28,617)

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, 2021 and 2020.

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, 2021 and 2020 is as follows (Korean won in millions):

		December 31, 2021		December 31, 2020
Financial assets	₩	31,202	₩	137,202
Financial liabilities		(285,500)		(213,512)
	₩	(254,298)	₩	(76,310)

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, 2021 and 2020 is as follows (Korean won in millions):

	Impact on profit before income tax expenses			
		2021		2020
1% Increase	₩	(2,543)	₩	(763)
1% Decrease		2,543		763

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 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.

The carrying amount of the financial assets exposed to credit risk as of December 31, 2021 and 2020 is as follows (Korean won in millions). The carrying amount indicates the maximum exposure to credit risk.

		December 31, 2021
Cash and cash equivalents	₩	49,062
Short-term and long-term financial instruments		546,096
Trade and other receivables		302,997
Deposits		33,210
Short-term and long-term investment securities (excluding equity securities):		
Financial assets at fair value through profit or loss		12,764
Derivative assets		203
	₩	944,332

		December 31, 2020
Cash and cash equivalents	₩	69,610
Short-term and long-term financial instruments		145,360
Trade and other receivables		451,262
Deposits		49,150
Short-term and long-term investment securities (excluding equity securities):		
Financial assets at fair value through profit or loss		11,764
Derivative assets		8,824
	₩	735,970

Apart from the above, in the case of contracts such as financial guarantees provided by the Company, the amount of guarantees to be paid by the Company at the request of the guarantee is the maximum amount exposed to the credit risk (see Note 31).

4.2 Credit risk (cont'd)

Details of trade receivables exposed to credit risk, presented using forecast model, as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021							
	Trade receivables							
	Individually assessed trade receivables (*1)	Trade receivables assessed for impairment on a collective basis (*2)						Total
		Within due	Less than 3 months	3–6 months	6–12 months	More than 12 months	Subtotal	
Book value	₩ 184,260	₩ 61,184	₩ 1,634	₩ 116	₩ 337	₩ 112	₩ 63,383	₩ 247,643
Expected credit loss rate	9.97%	-	-	-	0.59%	33.04%		
Expected credit loss	₩ 18,362	₩ -	₩ -	₩ -	₩ 2	₩ 37	₩ 39	₩ 18,401

(*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.

	December 31, 2020							
	Trade receivables							
	Individually assessed trade receivables (*1)	Trade receivables assessed for impairment on a collective basis (*2)						Total
		Within due	Less than 3 months	3–6 months	6–12 months	More than 12 months	Subtotal	
Book value	₩ 250,248	₩ 90,482	₩ 1,915	₩ 845	₩ 460	₩ 1,589	₩ 95,291	₩ 345,539
Expected credit loss rate	8.01%	-	0.47%	2.25%	8.70%	14.54%		
Expected credit loss	₩ 20,041	₩ -	₩ 9	₩ 19	₩ 40	₩ 231	₩ 299	₩ 20,340

(*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, 2021 and 2020 is as follows (Korean won in millions):

	December 31, 2021					
		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	₩ 1,775,291	₩ 1,847,499	₩ 1,229,272	₩ 280,936	₩ 195,910	₩ 141,381
Interest on financial liabilities	-	43,607	34,410	8,446	751	-
	₩ 1,775,291	₩ 1,891,106	₩ 1,263,682	₩ 289,382	₩ 196,661	₩ 141,381

	December 31, 2020					
		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	₩ 2,154,693	₩ 2,239,775	₩ 1,425,875	₩ 426,114	₩ 220,391	₩ 167,395
Interest on financial liabilities	-	67,025	42,262	19,160	5,603	-
	₩ 2,154,693	₩ 2,306,800	₩ 1,468,137	₩ 445,274	₩ 225,994	₩ 167,395

The above-mentioned maturity analysis is based on an undiscounted cash flow according to the contract, which differs from the carrying amount of non-derivative liabilities presented in the separate statements of financial position. It also includes the interest expenses on financial liabilities to be paid in the future. Apart from the above-mentioned non-derivative liabilities, as of December 31, 2021, financial guarantee liabilities of the Company are explained in Note 31.

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, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021	December 31, 2020
Total liabilities	₩ 2,261,876	₩ 2,760,522
Total equity	3,046,410	2,653,306
Debt-to-equity ratio	74.25%	104.04%

5. Restricted financial assets

Details of restricted financial assets as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021	December 31, 2020	Description
Short-term financial instruments	₩ 534,554	₩ 111,207	Deposits, shared growth deposit, establishment of the right of pledge and others
Long-term financial instruments	11,539	34,123	Bank transaction deposits, deposits provided for business, establishment of the right of pledge and others
	₩ 546,093	₩ 145,330	

6. Short-term and long-term investment securities

Short-term and long-term investment securities as of December 31, 2021 and 2020 are as follows (Korean won in millions):

		December 31, 2021	December 31, 2020
Short-term investment securities	Financial assets at fair value through profit or loss	₩ 1,497	₩ 1,497
Long-term investment securities	Financial assets (designated) at fair value through OCI	69,453	59,664
	Financial assets at fair value through profit or loss	131,241	10,267
		200,694	69,931
		₩ 202,191	₩ 71,428

Details of short-term and long-term investment securities as of December 31, 2021 and 2020 are as follows (Korean won in millions):

			December 31, 2021	December 31, 2020
Financial assets (designated) at fair value through OCI	Marketable equity securities	Preferred shares of Solus Advanced Materials Co., Ltd. and others (*1)	₩ 26,218	₩ 19,429
	Non-marketable equity securities	Sosius-Well to Sea Investment 2nd Private Equity Funds for Corporate Financial Stability and others	43,235	40,235
			69,453	59,664
Financial assets at fair value through profit or loss	Non-marketable equity securities	SiO2 Medical Products, Inc. (*2)	119,974	-
	Contributions	Machinery Financial Cooperative and others	3,666	3,828
	Beneficiary certificates	Pangaea Ventures Fund IV and others	4,241	3,539
	Debt securities	Kodit 2020 the 9th Securitization Specialty Co., Ltd. and others(*3)	4,857	4,397
			132,738	11,764
			₩ 202,191	₩ 71,428

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

(*1) Some of these equity securities were provided as collateral to Korea Development Bank and Korea Exim Bank as of December 31, 2021 (see Note 32).

(*2) The Company acquired convertible preferred shares issued by SiO2 Medical Products, Inc. during the year ended December 31, 2021. Even though the Company has significant influence on the Board of Directors of the investee, shares acquired are classified as financial assets measured at fair value through profit or loss in accordance with KIFRS 1109, as the existing ownership, in substance, does not currently give it access to returns associated with ownership interests.

(*3) Some of the debt securities were provided as collateral to Kodit 2020 the 9th Securitization Specialty Co., Ltd. and others as of December 31, 2021.

Changes in financial assets at fair value for the years ended in December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021				
	Beginning balance	Acquisition	Disposal	Valuation	Ending Balance
Financial assets (designated) at fair value through OCI	₩ 59,664	₩ 3,000	₩ -	₩ 6,789	₩ 69,453
Financial assets at fair value through profit or loss	11,764	121,935	(961)	-	132,738
	₩ 71,428	₩ 124,935	₩ (961)	₩ 6,789	₩ 202,191

	2020					
	Beginning balance	Acquisition	Disposal (*1)	Valuation	Reclassification (*2)	Ending Balance
Financial assets (designated) at fair value through OCI(*1, *2)	₩ 220,150	₩ 137,891	₩ (375,609)	₩ 578,311	₩ (501,079)	₩ 59,664
Financial assets at fair value through profit or loss	10,764	3,896	(2,896)	-	-	11,764
	₩ 230,914	₩ 141,787	₩ (378,505)	₩ 578,311	₩ (501,079)	₩ 71,428

(*1) On December 14, 2020, ordinary shares of Solus Advanced Materials Co., Ltd. (5,521,220 shares) held by the Company was sold to Sky Lake Long-term Strategic Investment Co., Ltd. (disposal amount: ₩237,035 million). On the date of disposal, the fair value of the ordinary shares was ₩277,717 million. As of the date of disposal, the accumulated gain on valuation of financial assets at fair value through OCI of ₩145,620 million, which was recognized in accumulated other comprehensive income, was reclassified to retained earnings.

(*2) On November 26, 2020, as the Company obtained control over DFC, the ordinary and preferred shares of DFC held by the company were replaced to Investments in subsidiaries. On the date of replacement, the fair value of the ordinary and preferred shares was ₩501,079 million. As of the date of replacement, the accumulated gain on valuation of financial assets at fair value through OCI of ₩300,379 million, which was recognized in accumulated other comprehensive income, was reclassified to retained earnings.

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

Changes in accumulated other comprehensive income of financial assets (designated) at fair value through OCI for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021									
			Beginning balance		Valuation		Disposal		Reclassification		Ending balance
Equity instruments designated at fair value through OCI	Accumulated other comprehensive income before income tax	₩	3,722	₩	6,789	₩	-	₩	-	₩	10,511
	Income tax effect		(900)		(1,643)		-		-		(2,543)
		₩	2,822	₩	5,146	₩	-	₩	-	₩	7,968

		2020									
			Beginning balance		Valuation		Disposal (see Note 6)		Reclassification (see Note 6)		Ending balance
Equity instruments designated at fair value through OCI	Accumulated other comprehensive income before income tax	₩	74,593	₩	578,311	₩	(200,855)	₩	(448,327)	₩	3,722
	Income tax effect		(18,051)		(186,032)		55,235		147,948		(900)
		₩	56,542	₩	392,279	₩	(145,620)	₩	(300,379)	₩	2,822

7. Trade and other receivables

Trade and other receivables as of December 31, 2021 and 2020 consist of the following (Korean won in millions):

	December 31, 2021							
		Gross amount		Present value discount		Provision for impairment		Book value
Current:								
Trade receivables	₩	247,643	₩	-	₩	(18,401)	₩	229,242
Non-trade receivables		50,764		-		(1,705)		49,059
Accrued income		8,246		-		-		8,246
Short-term loans		15,093		-		(5)		15,088
Current portion of long-term financial lease receivables		-		-		-		-
Others		31		-		-		31
	₩	321,777	₩	-	₩	(20,111)	₩	301,666

	December 31, 2021							
		Gross amount		Present value discount		Provision for impairment		Book value
Non-current:								
Trade receivables	₩	-	₩	-	₩	-	₩	-
Non-trade receivables		-		-		-		-
Long-term loans		1,331		-		-		1,331
Financial lease receivables		-		-		-		-
	₩	1,331	₩	-	₩	-	₩	1,331

7. Trade and other receivables (cont'd)

	December 31, 2020			
	Gross amount	Present value discount	Provision for impairment	Book value
Current:				
Trade receivables	₩ 345,539	₩ -	₩ (20,340)	₩ 325,199
Non-trade receivables	36,908	-	(3,584)	33,324
Accrued income	146	-	-	146
Short-term loans	60,127	-	(5)	60,122
Current portion of long-term financial lease receivables	603	(216)	-	387
Others	13	-	-	13
	₩ 443,336	₩ (216)	₩ (23,929)	₩ 419,191

	December 31, 2020			
	Gross amount	Present value discount	Provision for impairment	Book value
Non-current:				
Trade receivables	₩ -	₩ -	₩ -	₩ -
Non-trade receivables	-	-	-	-
Long-term loans	27,667	-	-	27,667
Financial lease receivables	5,428	(1,024)	-	4,404
	₩ 33,095	₩ (1,024)	₩ -	₩ 32,071

Changes in allowance for doubtful accounts for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021				
	Beginning balance	Provision for impaired receivables (reversal)	Write off	Division	Ending balance
Trade receivables	₩ 20,340	₩ 335	₩ (785)	₩ (1,489)	₩ 18,401
Non-trade receivables	3,584	600	(2,255)	(224)	1,705
Short-term loans	5	-	-	-	5
	₩ 23,929	₩ 935	₩ (3,040)	₩ (1,713)	₩ 20,111

	2020					
	Beginning balance	Provision for impaired receivables (reversal)	Write off	Others	Division	Ending Balance
Trade receivables	₩ 20,753	₩ 875	₩ (908)	₩ (372)	₩ (8)	₩ 20,340
Non-trade receivables	1,315	(14)	-	2,293	(10)	3,584
Short-term loans	763	(758)	-	-	-	5
Long-term trade receivables	181	-	-	-	(181)	-
Long-term non-trade receivables	35	-	-	-	(35)	-
	₩ 23,047	₩ 103	₩ (908)	₩ 1,921	₩ (234)	₩ 23,929

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

8. Inventories

Details of inventories as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021			December 31, 2020		
	Acquisition cost	Valuation allowance	Book value	Acquisition cost	Valuation allowance	Book value
Merchandise	₩ 490	₩ (9)	₩ 481	₩ 18,872	₩ (2,079)	₩ 16,793
Finished goods	33,316	(4,896)	28,420	35,458	(4,394)	31,064
Work in process	18,156	-	18,156	19,016	-	19,016
Raw materials	60,850	(1,849)	59,001	85,843	(3,984)	81,859
Materials in transit	1,589	-	1,589	9,043	-	9,043
Others	2,656	-	2,656	3,265	-	3,265
	₩ 117,057	₩ (6,754)	₩ 110,303	₩ 171,497	₩ (10,457)	₩ 161,040

The amount of (reversal of) write-down of inventories is ₩(-)279 million and ₩3,508 million for the years ended December 31, 2021 and 2020, respectively.

9. Derivatives

Overview of derivative contracts are as follows:

Derivative contracts	Purpose	Description
Currency forward contracts	Cash flow hedge	The Company designated the currency forward contracts as hedging instrument to hedge the cash flow risk arising from changes in foreign currency of forecast sales
Equity forward contracts	Fair value hedge	The Company designated the equity forward contracts as hedging instrument to hedge the fair value risk arising from changes in the fair value of financial assets at fair value through OCI
Stock swap, Stock warrants and others	Held for trading	Changes in fair value are recognized in profit or loss

Details of gain (loss) on valuation of derivatives as of December 31, 2021 and 2020 are as follows (Korean won in millions, foreign currency in thousands):

	December 31, 2021						
	Buy		Sell				
	Currency	Amount	Currency	Amount	Assets (liabilities)	Gain (loss)	Accumulated other comprehensive income (*1)
Currency forward contracts	KRW	142,677	USD	121,000	₩ (1,111)	₩ -	₩ (1,111)
Stock warrants (*2)					34,246	25,639	-
Stock swap (*3)					-	58,055	-
					₩ 33,135	₩ 83,694	₩ (1,111)

(*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 DHC.

(*3) The amounts are gain (loss) on valuation of fair value of contract. During the year ended December 31, 2021, the Company invested the ordinary shares and preferred shares of DFC in kind to DHC.

	December 31, 2020						
	Buy		Sell				
	Currency	Amount	Currency	Amount	Assets (liabilities)	Gain (loss)	Accumulated other comprehensive income (*1)
Currency forward contracts	KRW	13,272	USD	12,000	₩ 217	₩ -	₩ 217
Stock warrants (*2)					8,607	8,607	-
Equity forward contracts (*3)					-	6,248	-
					₩ 8,824	₩ 14,855	₩ 217

(*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 DHC.

(*3) Apart from gain (loss) on valuation of derivatives, a loss on valuation of fair value hedge derivatives of ₩34,024 million arising from stock forward contracts was recognized as other comprehensive income in the separate statements of comprehensive income. During the current reporting period, the entire amount of accumulated other comprehensive income was reclassified to retained earnings as stock forward contracts and hedged item were derecognized from the separate statement of financial position due to their maturity.

10. Financial instruments by category

Categories of financial instruments as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021					
Financial assets	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	₩ -	₩ -	₩ -	₩ 49,062	₩ 49,062	₩ 49,062
Short-term and long-term financial instruments	-	-	-	546,096	546,096	546,096
Short-term and long-term investment securities	132,738	69,453	-	-	202,191	202,191
Trade and other receivables	-	-	-	302,997	302,997	302,997
Derivative assets	34,246	-	203	-	34,449	34,449
Deposits	-	-	-	33,210	33,210	33,210
	₩ 166,984	₩ 69,453	₩ 203	₩ 931,365	₩ 1,168,005	₩ 1,168,005

	December 31, 2021					
Financial liabilities	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	₩ -	₩ -	₩ 8,360	₩ 206,879	₩ 215,239	₩ 215,239
Borrowings, bonds and asset-backed loans	-	-	-	1,306,281	1,306,281	1,306,281
Lease liabilities	-	-	-	262,132	262,132	262,132
Derivative liabilities	-	1,314	-	-	1,314	1,314
	₩ -	₩ 1,314	₩ 8,360	₩ 1,775,292	₩ 1,784,966	₩ 1,784,966

	December 31, 2020					
Financial assets	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	₩ -	₩ -	₩ -	₩ 69,610	₩ 69,610	₩ 69,610
Short-term and long-term financial instruments	9,000	-	-	136,360	145,360	145,360
Short-term and long-term investment securities	11,764	59,664	-	-	71,428	71,428
Trade and other receivables	-	-	-	451,262	451,262	451,262
Derivative assets	8,607	-	217	-	8,824	8,824
Deposits	-	-	-	35,442	35,442	35,442
	₩ 29,371	₩ 59,664	₩ 217	₩ 692,674	₩ 781,926	₩ 781,926

	December 31, 2020					
Financial liabilities	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	₩ -	₩ -	₩ 7,445	₩ 333,587	₩ 341,032	₩ 341,032
Borrowings, bonds and asset-backed loans	-	-	-	1,545,208	1,545,208	1,545,208
Lease liabilities	-	-	-	275,898	275,898	275,898
	₩ -	₩ -	₩ 7,445	₩ 2,154,693	₩ 2,162,138	₩ 2,162,138

10. Financial instruments by category (cont'd)

Fair value measurements of financial instruments by fair value hierarchy levels as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021			
	Level 1	Level 2	Level 3	Total
Financial assets at fair value:				
Financial assets at fair value through profit or loss	₩ -	₩ -	₩ 132,738	₩ 132,738
Financial assets (designated) at fair value through OCI	26,218	-	43,235	69,453
Derivative assets	-	203	34,246	34,449
	26,218	203	210,219	236,640
Financial liabilities (designated) at fair value:				
Financial liabilities at fair value through profit or loss	-	-	-	-
Derivative liabilities designated as hedging instruments	-	1,314	-	1,314
	-	1,314	-	1,314
	₩ 26,218	₩ (1,111)	₩ 210,219	₩ 235,326

	December 31, 2020			
	Level 1	Level 2	Level 3	Total
Financial assets at fair value:				
Financial assets at fair value through profit or loss	₩ -	₩ 9,000	₩ 11,764	₩ 20,764
Financial assets (designated) at fair value through OCI	19,429	-	40,235	59,664
Derivative assets	8,607	217	-	8,824
	28,036	9,217	51,999	89,252
Financial liabilities (designated) at fair value:				
Financial liabilities at fair value through profit or loss	-	-	-	-
Derivative liabilities designated as hedging instruments	-	-	-	-
	-	-	-	-
	₩ 28,036	₩ 9,217	₩ 51,999	₩ 89,252

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.

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.

10. Financial instruments by category (cont'd)

Comprehensive income (loss) by categories of financial instruments for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021													
	Profit or loss (*1)												Other comprehensive income (*2)	
	Interest		Dividends		Financial guarantee		Impairment (reversal)		Disposal		Foreign exchange			
Financial assets:														
Financial assets at amortized cost	₩	15,933	₩	-	₩	-	₩	(935)	₩	(659)	₩	30,285	₩	-
Financial assets at fair value through profit or loss		-		-		-		-		-		-		-
Financial assets (designated) at fair value through OCI		-		35		-		-		-		-		6,789
	₩	15,933	₩	35	₩	-	₩	(935)	₩	(659)	₩	30,285	₩	6,789
Financial liabilities:														
Financial liabilities at amortized cost	₩	(74,019)	₩	-	₩	-	₩	-	₩	(989)	₩	(7,451)	₩	-
Financial guarantee contract		-		-		10,765		-		-		-		-
	₩	(74,019)	₩	-	₩	10,765	₩	-	₩	(989)	₩	(7,451)	₩	-

(*1) Profit or loss includes the amounts classified as profit or loss from discontinued operations in separate statement of profit or loss.

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

	2020													
	Profit or loss (*1)												Other comprehensive income (*2)	
	Interest		Dividends		Financial guarantee		Impairment (reversal)		Disposal		Foreign exchange			
Financial assets:														
Financial assets at amortized cost	₩	4,794	₩	-	₩	-	₩	(91)	₩	(1,675)	₩	(15,029)	₩	-
Financial assets at fair value through profit or loss		-		162		-		-		-		-		-
Financial assets (designated) at fair value through OCI		-		30		-		-		(1,671)		-		578,311
	₩	4,794	₩	192	₩	-	₩	(91)	₩	(3,346)	₩	(15,029)	₩	578,311
Financial liabilities:														
Financial liabilities at amortized cost	₩	(79,558)	₩	-	₩	-	₩	-	₩	(839)	₩	6,407	₩	-
Financial guarantee contract		-		-		5,310		-		-		-		-
	₩	(79,558)	₩	-	₩	5,310	₩	-	₩	(839)	₩	6,407	₩	-

(*1) Profit or loss includes the amounts classified as profit or loss from discontinued operations in separate statement of profit or loss.

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

10. Financial instruments by category (cont'd)

Apart from the above financial instruments, comprehensive income (loss) by derivatives for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021						2020					
	Profit or loss				Other comprehensive loss (*1)		Profit or loss				Other comprehensive loss (*1)	
	Valuation		Disposal				Valuation		Disposal			
Derivatives held for trading	₩	83,694	₩	-	₩	-	₩	14,855	₩	5,449	₩	-
Derivatives designated as fair value hedges		-		-		-		-		-		(46,930)
Derivatives designated as cash flow hedges		-		(4,537)		(1,329)		-		212		(1,794)
	₩	83,694	₩	(4,537)	₩	(1,329)	₩	14,855	₩	5,661	₩	(48,724)

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

Financial assets and liabilities subject to an enforceable master-netting arrangement or similar agreement as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021						December 31, 2020					
	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	₩	-	₩	-	₩	-	₩	6,325	₩	(2,856)	₩	3,469
Other receivables		-		-		-		36		(36)		-
	₩	-	₩	-	₩	-	₩	6,361	₩	(2,892)	₩	3,469
Financial liabilities:												
Trade payables	₩	-	₩	-	₩	-	₩	14,059	₩	(2,892)	₩	11,167

11. Investments in subsidiaries, joint ventures and associates

Details of investments in subsidiaries, joint ventures and associates as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	Location	Ownership interests (%)	December 31, 2021	December 31, 2020
Subsidiaries:				
Doosan Heavy Industries & Construction Co., Ltd. (“DHC”) (*1,2)	Korea	39.26	₩ 2,655,736	₩ 2,050,512
Doosan Fuel Cell Co., Ltd. (“DFC”) (*2)	Korea	-	-	501,079
Oricom Inc.	Korea	62.83	23,168	23,168
Doosan Bears Inc.	Korea	100.00	15,559	15,559
Doosan Business Research Institute Co., Ltd.	Korea	100.00	8,000	8,000
Doosan Cuvex Co., Ltd. (*1)	Korea	33.57	69,314	69,314
Doosan Property Co., Ltd. (formerly, DBC Co., Ltd.) (*1)	Korea	46.00	49,004	49,004
Doosan Robotics Inc. (*3)	Korea	100.00	86,000	72,000
Doosan Mobility Innovation Inc. (*4)	Korea	100.00	72,300	54,800
Doosan Logistics Solution Co., Ltd. (*5)	Korea	100.00	24,500	20,000
Doosan Digital Innovation America LLC	USA	100.00	4,889	4,889
Doosan Information & Communications Beijing Co., Ltd.	China	100.00	3,230	3,230
Doosan Digital Innovation Europe Ltd.	UK	100.00	4,870	4,870
Doosan Electro-Materials (Changshu) Co., Ltd.	China	100.00	45,964	45,964
Doosan Electro-Materials America, LLC	USA	100.00	8,837	8,837
Doosan Electro-Materials Vietnam Company Ltd. (*13)	Vietnam	100.00	12,300	4,865
Doosan Industrial Vehicle Europe N.V. (*9)	Belgium	-	-	16,934
Doosan Industrial Vehicle U.K. Ltd. (*9)	UK	-	-	1,909
Doosan Logistics Europe GmbH (*9)	Germany	-	-	1,979
Doosan Industrial Vehicle America Corp. (*9)	USA	-	-	27,016
Doosan Industrial Vehicle China Co., Ltd. (*9)	China	-	-	10,617
Doosan Fuel Cell America, Inc. (*10)	USA	100.00	192,405	112,512
Doosan Energy Solutions America, Inc. (*11)	USA	100.00	37,339	1,680
Doosan (Hong Kong) Ltd.	China	100.00	-	-
Doosan Electro-Materials Singapore Pte. Ltd.	Singapore	100.00	-	-
Doosan Shanghai Chemical Materials Co., Ltd.	China	100.00	-	-
D-Pay 2nd Co., Ltd. (*6)	Korea	-	-	-
New Star Motive 1st Co., Ltd. (*6,7)	Korea	-	-	-
			3,313,415	3,108,738
Associates:				
Prestolite Asia Ltd. (*9)	Korea	-	-	468
Wise Fashion Co., Ltd. (*8)	Korea	19.34	3,018	3,018
KDDI Korea Corporation (*8)	Korea	10.76	-	-
PT. SEGARA AKASA	Indonesia	30.00	71	71
Mastern Professional Investment Type Private Security Investment Trust No.98	Korea	25.45	70,000	70,000
SiO2 Medical Products, Inc. (*8,12)	USA	8.35	-	-
			73,089	73,557

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

	Location	Ownership interests (%)	December 31, 2021	December 31, 2020
Joint venture:				
Sichuan Kelun-Doosan Biotechnology Company Limited	China	50.00	2,526	2,526
			₩ 3,389,030	₩ 3,184,821

(*1) The (potential) share of the decision-making rights of the above subsidiaries for assessing whether they have control or not is less than half, but it has been determined that they have de facto control.

(*2) The Company invested the ordinary shares and preferred shares of DFC in kind to DHC and acquired 47,843,956 ordinary shares (acquisition amount: ₩605,224 million) during the year ended December 31, 2021.

(*3) The Company made its paid-in capital increase by ₩14,000 million during the current year.

(*4) The Company made its paid-in capital increase by ₩17,500 million during the current year.

(*5) The Company made its paid-in capital increase by ₩4,500 million during the current year.

(*6) Although the Company does not hold a significant stake in a special-purpose company, considering the terms of the arrangement in which the structured entity was established, the Company decided that it had control over the activities of the structured entity that could have the most significant impact on the special-purpose company's earnings.

(*7) The investee was liquidated during the year ended December 31, 2021.

(*8) Although the Company's ownership interest in the investee is less than 20%, the investee is classified as an associate considering the exercise of voting rights in the Board of Directors.

(*9) During the year ended December 31, 2021, the investee was succeeded to the newly established Doosan Industrial Vehicle Co., Ltd. by the split-off.

(*10) The Company acquired ₩79,893 million by debt for equity swap during the current year.

(*11) The Company made its paid-in capital increase by ₩35,659 million during the current year.

(*12) The Company acquired convertible preferred shares issued by SiO2 Medical Products, Inc. during the year ended December 31, 2021. Even though the Company has significant influence on the Board of Directors of the investee, shares acquired are classified as financial assets measured at fair value through profit or loss in accordance with KIFRS 1109, as the existing ownership, in substance, does not currently give it access to returns associated with ownership interests (see Note 6).

(*13) During the year ended December 31, 2021, the Company made its paid-in capital increase by ₩16,726 million. Meanwhile, the Company conducted impairment test and recognized impairment loss on investment in subsidiaries ₩9,291 million during the year ended December 31, 2021. The impairment loss on investment in subsidiaries was classified as other non-operating expenses in separate statement of profit or loss.

Some of the investments in subsidiaries were provided as collateral to the Korea Development Bank and Korea Exim Bank (see Note 32).

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

Announced market prices of investments in subsidiaries, joint ventures and associates as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021		December 31, 2020	
	Book value	Fair value	Book value	Fair value
Subsidiaries:				
DHC	₩ 2,655,736	₩ 4,182,177	₩ 2,050,512	₩ 2,121,724
Oricom	23,168	46,809	23,168	39,591
DFC	-	-	501,079	565,898

The Company determines whether impairment loss is recognized in respect of subsidiaries, 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, 2021. 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 ₩2,655,736 million as of December 31, 2021.

The recoverable amount of investments in DHC was calculated based on fair value less costs of disposal, and the measurement of the fair value was determined based on the market price disclosed in the active market.

As a result of measuring the recoverable amount, there is no impairment loss recognized for DHC during the current year as the carrying amount of the investment stock does not exceed the recoverable amount.

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, 2021 and 2020 are as follows (Korean won in millions):

	2021					
	Land	Buildings and Structures	Machinery	Others	Construction in progress	Total
January 1	₩ 110,485	₩ 108,649	₩ 46,776	₩ 61,700	₩ 17,149	₩ 344,759
Acquisition/capital expenditure	465	17,347	1,378	13,085	28,824	61,099
Acquisition of government grants	-	-	(12)	(20)	-	(32)
Reclassification	(4,324)	32,154	8,215	7,085	(15,703)	27,427
Disposal	(11,104)	(4,535)	(105)	(670)	-	(16,414)
Depreciation	(19)	(17,662)	(10,351)	(15,067)	-	(43,099)
Asset revaluation	3,063	-	-	-	-	3,063
Decrease due to division (see Note 35)	(58,365)	(10,310)	(4,543)	(44,047)	(6,429)	(123,694)
Impairment	-	-	-	(723)	-	(723)
December 31	₩ 40,201	₩ 125,643	₩ 41,358	₩ 21,343	₩ 23,841	₩ 252,386
Acquisition cost	₩ 26,284	₩ 179,389	₩ 223,340	₩ 141,494	₩ 24,889	₩ 595,396
Accumulated depreciation (accumulated impairment losses are included)	-	(53,746)	(181,968)	(120,134)	(1,048)	(356,896)
Government grants	-	-	(14)	(17)	-	(31)
Accumulated revaluation surplus	13,917	-	-	-	-	13,917

	2020					
	Land	Buildings and Structures	Machinery	Others	Construction in progress	Total
January 1	₩ 384,978	₩ 151,727	₩ 77,177	₩ 74,927	₩ 22,823	₩ 711,632
Acquisition/capital expenditure	188	63,158	2,593	28,230	25,324	119,493
Reclassification	(134,610)	(55,072)	11,218	614	(24,597)	(202,447)
Disposal	(72,366)	(32,730)	(1,664)	(11,581)	(5,061)	(123,402)
Depreciation	(61)	(14,333)	(17,078)	(25,115)	-	(56,587)
Decrease due to division (see Note 35)	(67,644)	(4,101)	(25,470)	(5,375)	(1,080)	(103,670)
Impairment	-	-	-	-	(260)	(260)
December 31	₩ 110,485	₩ 108,649	₩ 46,776	₩ 61,700	₩ 17,149	₩ 344,759
Acquisition cost	₩ 86,923	₩ 162,804	₩ 229,547	₩ 213,743	₩ 18,197	₩ 711,214
Accumulated depreciation (accumulated impairment losses are included)	(22)	(54,155)	(182,760)	(152,015)	(1,048)	(390,000)
Government grants	-	-	(11)	(28)	-	(39)
Accumulated revaluation surplus	23,584	-	-	-	-	23,584

In addition, the Company's land and buildings are partially pledged as collateral for loans from financial institutes (see Note 32).

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

Changes in right-of-use assets classified as property, plant and equipment for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021				
	Land	Buildings and Structures	Machinery	Others	Total
January 1	₩ 166	₩ 57,370	₩ 1,355	₩ 6,573	₩ 65,464
Acquisition/capital expenditure	-	15,077	184	3,011	18,272
Reclassification	-	31,256	(92)	(53)	31,111
Disposal (*1)	-	(9)	-	(441)	(450)
Depreciation	(19)	(14,478)	(617)	(3,974)	(19,088)
Decrease due to division (see Note 35)	(147)	(2,775)	-	(156)	(3,078)
December 31	₩ -	₩ 86,441	₩ 830	₩ 4,960	₩ 92,231
Acquisition cost	₩ -	₩ 99,895	₩ 4,900	₩ 29,478	₩ 134,273
Accumulated depreciation	-	(13,454)	(4,070)	(24,518)	(42,042)

(*1) The amount is due to the termination of the lease contract and others.

	2020				
	Land	Buildings and Structures	Machinery	Others	Total
January 1	₩ -	₩ 4,266	₩ 1,209	₩ 10,133	₩ 15,608
Acquisition/capital expenditure	188	62,682	900	2,797	66,567
Reclassification to property, plant and equipment	-	-	-	(17)	(17)
Disposal (*1)	-	(1,692)	-	(374)	(2,066)
Depreciation	(22)	(7,875)	(754)	(5,614)	(14,265)
Decrease due to division (see Note 35)	-	(11)	-	(352)	(363)
December 31	₩ 166	₩ 57,370	₩ 1,355	₩ 6,573	₩ 65,464
Acquisition cost	₩ 188	₩ 64,906	₩ 5,023	₩ 27,944	₩ 98,061
Accumulated depreciation	(22)	(7,536)	(3,668)	(21,371)	(32,597)

(*1) The amount is due to the termination of the lease contract and others.

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. 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, 2021.

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.

Other comprehensive income recognized in the statement of comprehensive income related to revaluation model, which the Company applies to measurement of the land is ₩3,191 million as of December 31, 2021.

In addition, if the land were stated at cost, the land would amount to ₩26,284 million and ₩86,901 million as of December 31, 2021 and 2020, respectively.

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

Fair value measurements of land assets by fair value hierarchy level as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021			December 31, 2020		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Land	₩ -	₩ -	₩ 40,201	₩ -	₩ -	₩ 110,485

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)	Correlation between unobservable inputs and fair value arguments
Official Assessed Reference Land Price ("OARLP"): OARLP of similar parcels nearby the subject land and reflating corrections 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).
Trade Case Comparison method: When comparing the transaction case of an object that is similar to the target object, fair value is measured through the process of correcting the private information, correcting the timing, comparing the factors of the value formation and others	Private information correction	Fair value increases (decreases), if the private information correction increases (decreases).
	Point-in-time correction	Fair value increases (decreases), if the point-in-time correction increases (decreases).
	Value formation factor	Fair value increases (decreases), if the value forming factor increases (decreases).

Classification of depreciation for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021	2020
Cost of sales	₩ 27,057	₩ 24,033
Selling and administrative expenses	8,682	11,388
Loss from discontinued operations	7,360	21,166
	₩ 43,099	₩ 56,587

Classification of depreciation for the years ended December 31, 2021 and 2020 incurred in right-of-use assets classified as property, plant and equipment is as follows (Korean won in millions):

	2021	2020
Cost of sales	₩ 11,738	₩ 5,556
Selling and administrative expenses	5,680	5,518
Loss from discontinued operations	1,670	3,191
	₩ 19,088	₩ 14,265

13. Intangible assets

Changes in intangible assets for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021				
	Goodwill	Industrial rights	Development costs	Other intangible assets	Total
January 1	₩ 23,149	₩ 1,280	₩ 38,444	₩ 22,697	₩ 85,570
Acquisition/capital expenditure	-	239	13,806	1,106	15,151
Acquisition of government grants	-	-	(1,235)	(10)	(1,245)
Reclassification	-	-	152	397	549
Disposal	-	(1)	-	(225)	(226)
Amortization	-	(412)	(3,764)	(3,285)	(7,461)
Impairment	-	-	(2,765)	-	(2,765)
Decrease due to division (see Note 35)	(15,076)	(269)	(16,993)	(4,201)	(36,539)
December 31	₩ 8,073	₩ 837	₩ 27,645	₩ 16,479	₩ 53,034
Acquisition costs	₩ 8,073	₩ 4,926	₩ 76,761	₩ 61,757	₩ 151,517
Accumulated amortization (accumulated impairment losses are included)	-	(4,089)	(44,591)	(45,268)	(93,948)
Government grants	-	-	(4,525)	(10)	(4,535)

	2020				
	Goodwill	Industrial rights	Development costs	Other intangible assets	Total
January 1	₩ 107,711	₩ 1,389	₩ 27,071	₩ 28,101	₩ 164,272
Acquisition/capital expenditure	-	453	19,129	1,737	21,319
Acquisition of government grants	-	-	(78)	-	(78)
Reclassification	-	11	214	4,058	4,283
Disposal	-	(7)	-	(1,282)	(1,289)
Amortization	-	(419)	(3,195)	(4,805)	(8,419)
Impairment	-	-	(725)	-	(725)
Decrease due to division (see Note 35)	(84,562)	(147)	(3,972)	(5,112)	(93,793)
December 31	₩ 23,149	₩ 1,280	₩ 38,444	₩ 22,697	₩ 85,570
Acquisition costs	₩ 23,149	₩ 4,987	₩ 82,519	₩ 65,370	₩ 176,025
Accumulated amortization (accumulated impairment losses are included)	-	(3,707)	(39,679)	(42,673)	(86,059)
Government grants	-	-	(4,396)	-	(4,396)

The carrying amount of membership with indefinite useful lives in other intangible assets is ₩9,064 million and ₩10,570 million as of December 31, 2021 and 2020, respectively.

Meanwhile, expenditure on research and development, which was recognized as expenses, amounted to ₩22,604 million and ₩36,850 million for the years ended December 31, 2021 and 2020, respectively.

13. Intangible assets (cont'd)

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

CGUs	December 31, 2021		December 31, 2020		Description
Digital Innovation BU	₩	2,015	₩	2,015	Operation and development of software
Industrial Vehicles BG (*1)		-		15,076	Manufacturing and sale of forklifts
Fuel Cell BG		6,058		6,058	Manufacturing and sale of fuel cell
	₩	8,073	₩	23,149	

(*1) Part of its goodwill (carrying amount: ₩15,076 million) was succeeded to Doosan Industrial Vehicle Co., Ltd., the newly incorporated company, due to the split-off during the year ended December 31, 2021 (see Note 35).

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, 2021 are as follows:

	Digital Innovation BU	Fuel Cell BG
Discount rate	10.03%	17.09%
Permanent growth rate	0.00%	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, 2021.

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

Classification of amortization for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021		2020	
Cost of sales	₩	1,572	₩	1,183
Selling and administrative expenses		4,538		3,713
Loss from discontinued operations		1,351		3,523
	₩	7,461	₩	8,419

14. Investment properties

Changes in investment properties for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

2021	Land		Buildings		Construction in Progress		Total	
January 1	₩	158,545	₩	200,210	₩	-	₩	358,755
Acquisition		-		3,315		-		3,315
Disposal		-		-		-		-
Reclassification		4,325		(34,381)		-		(30,056)
Decrease due to division (see Note 35)		-		-		-		-
Valuation (*1)		15,744		(48,903)		-		(33,159)
December 31	₩	178,614	₩	120,241	₩	-	₩	298,855

2020	Land		Buildings		Construction in Progress		Total	
January 1	₩	453,465	₩	109,385	₩	14	₩	562,864
Acquisition		-		202,531		5,541		208,072
Disposal		(435,688)		(169,768)		(5,555)		(611,011)
Reclassification		134,610		63,463		-		198,073
Decrease due to division (see Note 35)		(57)		(86)		-		(143)
Valuation (*1)		6,215		(5,315)		-		900
December 31	₩	158,545	₩	200,210	₩	-	₩	358,755

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

The Company's land and buildings included in the above investment properties are pledged as collateral for borrowings from financial institutions (see Note 32).

In addition, lease income related to investment properties amounted to ₩12,252 million and ₩24,592 million for the years ended December 31, 2021 and 2020, respectively.

Changes in right-of-use assets classified as Investment properties for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021		2020	
January 1	₩	197,204	₩	-
Acquisition		3,248		202,431
Reclassification		(32,838)		-
Valuation		(48,853)		(5,227)
December 31	₩	118,761	₩	197,204

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. 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, 2021.

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, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021			December 31, 2020		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Land	₩ -	₩ -	₩ 178,614	₩ -	₩ -	₩ 158,545
Buildings	-	-	120,241	-	-	200,210
	₩ -	₩ -	₩ 298,855	₩ -	₩ -	₩ 358,755

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"): 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).
Trade case comparison method: When comparing the transaction case of an object that is similar to the target object, fair value is measured through the process of correcting the private information, correcting the timing, comparing the factors of the value formation, etc.	Private information correction	Fair value increases (decreases), if the private information correction increases (decreases)
	Point-in-time correction	Fair value increases (decreases), if point-in-time correction increases (decreases)
	Value formation factor	Fair value increases (decreases), if the value-forming factor 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 decreases (increases).
Discounted cash flow method: Fair value is measured by estimating the appropriate market rent for the remaining lease period from the present time of the evaluation by comparing transaction cases and then discounting it to the present value	Private information correction	Fair value increases (decreases), if the private information correction increases (decreases)
	Point-in-time correction	Fair value increases (decreases), if point-in-time correction increases (decreases)
	Value formation factor	Fair value increases (decreases), if the value-forming factor increases (decreases)
	Discount rate	Fair value increases (decreases), if the discount rate decreases (increases)

15. Bonds and borrowings

15.1 Bonds

Bonds as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	Annual interest rate (%) (*1)	December 31, 2021	December 31, 2020
The 296	-	₩ -	₩ 30,000
The 297	-	-	53,000
The 298	-	-	55,000
The 299	4.53	75,000	75,000
The 300	5.60	50,000	50,000
The 301	5.58	20,000	20,000
The 302	5.40	50,000	50,000
The 303	5.30	140,000	140,000
The 304	5.99	35,000	-
The 305	3.60	80,000	-
The 306-1	3.50	74,000	-
The 306-2	3.80	33,000	-
		557,000	473,000
Less: discount on bonds payable		(1,291)	(1,540)
		555,709	471,460
Less: reclassification of current portion of long-term bonds:		(264,512)	(137,828)
Principal amount of bonds		265,000	138,000
Discount on bonds payable		(488)	(172)
		₩ 291,197	₩ 333,632

(*1) Nominal interest rate

15.2 Short-term borrowings

Short-term borrowings as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	Creditor	Annual interest rate (%)	December 31, 2021	December 31, 2020
General borrowings	Woori Bank and others	2.50~4.15	₩ 668,399	₩ 709,761

15.3 Long-term borrowings

Long-term borrowings as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	Annual interest rate (%)	December 31, 2021	December 31, 2020
Borrowings in Korean won:			
Korea Development Bank	-	₩ -	₩ 20,000
Bank of China	-	-	30,000
Shinhan Bank	-	-	40,000
Borrowings in foreign currency:			
Korea Exim Bank	-	-	12,508
		-	102,508
Less: present value discounts		-	-
		-	102,508
Less: reclassification of current portion of long-term borrowings		-	(102,508)
		₩ -	₩ -

15.4 Asset-backed loans

The Company has transferred some of its future trade receivables and others to the securitization companies to carry out the asset-backed securitizations (ABS). Detail of the long-term asset-backed loans as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	Annual interest rate (%)	December 31, 2021	December 31, 2020
Asset-backed loan:			
D-Pay 2nd Co., Ltd.	4.06~4.50	₩ 82,500	₩ 150,000
New-Star Motive 1st Co., Ltd.	-	-	113,000
		82,500	263,000
Less: present value discounts		(327)	(1,522)
		82,173	261,478
Less: reclassification of current portion of long-term asset-backed loan		(65,738)	(95,263)
		₩ 16,435	₩ 166,215

With respect to the above Asset-backed loan, the carrying amount of the trade receivables and others recognized in the financial statement as of December 31, 2021 and 2020 is ₩26,163 million and ₩25,630 million, respectively, which did not meet the derecognition criteria (see Note 31).

16. Lease

16.1 Right-of-use assets

Changes in right-of-use assets classified as property, plant and equipment and investment properties for the years ended December 31, 2021 and 2020 are described in Notes 12 and 14. The composition of depreciation expenses by accounts arising from right-of-use assets classified as property, plant and equipment for the years ended December 31, 2021 and 2020 is described in Note 12.

In addition, the Company sold Doosan Tower, located in 275, Jangchungdan-ro, Jung-gu, Seoul, to Mastern Professional Investment Type Private Security Investment Trust No.98 during the previous year at ₩800,000 million. Upon sale of the asset, the Company also entered into a lease agreement with Mastern Professional Investment Type Private Security Investment Trust No.98 for lease of the asset. The net gain of ₩30,866 million from the sale and leaseback transaction was included in other non-operating income and expenses in the statement of profit or loss.

16.2 Lease liabilities

Changes in lease liabilities for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021	2020
January 1	₩ 275,898	₩ 17,509
Acquisition of lease assets	19,491	278,890
Payment of lease fees	(45,437)	(22,854)
Interest expense	15,676	4,881
Contract cancellation	(461)	(2,142)
Decrease due to division (see Note 35)	(3,035)	(386)
December 31	₩ 262,132	₩ 275,898

The maturity analysis of lease liabilities as of December 31, 2021 and 2020 is as follows (Korean won in millions):

	December 31, 2021				
	Nominal cash flows according to contract				
	Total	Less than 1 year	1–2 years	2–5 years	More than 5 years
Lease liabilities	₩ 332,055	₩ 41,221	₩ 39,584	₩ 110,169	₩ 141,081

	December 31, 2020				
	Nominal cash flows according to contract				
	Total	Less than 1 year	1–2 years	2–5 years	More than 5 years
Lease liabilities	₩ 356,159	₩ 44,509	₩ 38,614	₩ 105,641	₩ 167,395

16.2 Lease liabilities (cont'd)

Classification of expenses for the years ended December 31, 2021 and 2020 incurred in short-term lease and leases of low-value assets that are not included in right-of-use assets are as follows (Korean won in millions):

	2021	2020
Cost of sales	₩ 916	₩ 1,396
Selling and administrative expenses	567	972
Loss from discontinued operations	62	296
	₩ 1,545	₩ 2,664

Cash outflows from financing activities due to the repayment of lease liabilities are ₩45,437 million and ₩22,854 million for the years ended December 31, 2021 and 2020, respectively. Cash outflows from operating activities due to short-term and leases of low value fees are ₩1,545 million and ₩2,664 million for the years ended December 31, 2021 and 2020, respectively. Therefore, the total cash outflow of the lease is ₩46,982 million and ₩25,518 million for the years ended December 31, 2021 and 2020, respectively.

17. 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, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021		December 31, 2020	
Present value of defined benefit liabilities	₩	165,807	₩	168,022
Fair value of plan assets		(137,305)		(152,139)
Net defined benefit liabilities	₩	28,502	₩	15,883

Retirement benefits generated by defined benefits retirement pension charged to profit or loss for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021		2020	
Current service cost	₩	15,326	₩	20,200
Past service cost		20,633		-
Net interest cost		624		915
Effect from curtailment and settlement		-		59
	₩	36,583	₩	21,174

Classification of the retirement benefits generated by defined benefits retirement pension recognized in the statements of income for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021		2020	
Cost of sales	₩	9,224	₩	8,855
Selling and administrative expenses		25,696		6,053
Others		136		164
Loss from discontinued operations		1,527		6,102
	₩	36,583	₩	21,174

17. Net defined benefit liabilities (cont'd)

Changes in net defined benefit liabilities for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021		
	Defined benefit liabilities	Plan assets	Net defined benefit liabilities
Beginning balance	₩ 168,022	₩ (152,139)	₩ 15,883
Profit or loss:	-	-	-
Current service cost	15,326	-	15,326
Past service cost	20,633	-	20,633
Interest cost (income)	3,461	(2,837)	624
	39,420	(2,837)	36,583
Remeasurements:	-	-	-
Actuarial loss from change in demographic assumptions	10	-	10
Actuarial gain from change in financial assumptions	(1,961)	-	(1,961)
Others	6,410	1,321	7,731
	4,459	1,321	5,780
Transfer in	1,792	(803)	989
Transfer out	(2,514)	1,271	(1,243)
Decrease due to division (see Note 35)	(29,482)	28,261	(1,221)
Contributions by employer directly to plan assets	-	(24,486)	(24,486)
Benefit payments	(15,890)	12,107	(3,783)
Ending balance	₩ 165,807	₩ (137,305)	₩ 28,502

	2020		
	Defined benefit liabilities	Plan assets	Net defined benefit liabilities
Beginning balance	₩ 198,435	₩ (171,369)	₩ 27,066
Profit or loss:			
Current service cost	20,200	-	20,200
Interest cost (income)	4,063	(3,148)	915
Effect from curtailment and settlement	59	-	59
	24,322	(3,148)	21,174
Remeasurements:			
Actuarial loss from change in demographic assumptions	3,766	-	3,766
Actuarial gain from change in financial assumptions	(9,502)	-	(9,502)
Others	4,077	688	4,765
	(1,659)	688	(971)
Transfer in	2,658	(949)	1,709
Transfer out	(1,451)	592	(859)
Decrease due to division (see Note 35)	(33,135)	29,877	(3,258)
Contributions by employer directly to plan assets	-	(21,254)	(21,254)
Benefit payments	(21,148)	13,424	(7,724)
Ending balance	₩ 168,022	₩ (152,139)	₩ 15,883

17. Net defined benefit liabilities (cont'd)

Assumptions used for actuarial valuation as of December 31, 2021 and 2020 are as follows:

	December 31, 2021	December 31, 2020
Discount rate (%)	2.78	2.29
Salary growth rate (%):		
Employee	3.0~4.6	3.0~4.0
Executive	0.8	1.4

Details of plan assets as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021	December 31, 2020
Saving deposits and others	₩ 137,305	₩ 152,139

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, 2021 and 2020 is as follows (Korean won in millions):

	Impact on defined benefit obligation			
	December 31, 2021		December 31, 2020	
	Amount	Ratio	Amount	Ratio
Discount rate:				
1% increase	₩ (11,091)	(-) 6.69%	₩ (12,856)	(-) 7.65%
1% decrease	12,690	7.65%	14,846	8.84%
Salary growth rate:				
1% increase	12,382	7.47%	13,961	8.31%
1% decrease	(11,053)	(-) 6.67%	(12,383)	(-) 7.37%

The weighted average maturity of the defined benefit liabilities as of December 31, 2021 and 2020 is 7.4 years and 8.4 years, respectively. The Company expects to contribute ₩42,610 million for defined benefit plans in 2022.

18. Provisions

Changes in provisions for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021							
	Provision for product warranties		Provision for restoration		Other provisions		Total	
January 1	₩	9,609	₩	-	₩	37	₩	9,646
Increase(decrease)		2,943		1,296		5,707		9,946
Utilized		(4,489)		-		-		(4,489)
Decrease due to division (see Note 35)		(3,697)		-		-		(3,697)
December 31	₩	4,366	₩	1,296	₩	5,744	₩	11,406
Current	₩	2,054	₩	19	₩	5,744	₩	7,817
Non-current		2,312		1,277		-		3,589

	2020							
	Provision for product warranties		Provision for restoration		Other provisions		Total	
January 1	₩	9,393	₩	1,030	₩	37	₩	10,460
Increase(decrease)		12,429		61		-		12,490
Utilized		(9,649)		-		-		(9,649)
Decrease due to division (see Note 35)		(2,564)		(1,091)		-		(3,655)
December 31	₩	9,609	₩	-	₩	37	₩	9,646
Current	₩	9,609	₩	-	₩	37	₩	9,646
Non-current		-		-		-		-

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

19. Share capital and share premium

Changes in share capital and share premium for the years ended December 31, 2021 and 2020 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, 2020	16,523,835	4,889,500	₩	99,291	₩	24,447	₩	123,738	₩	322,462
Balance at December 31, 2020	16,523,835	4,889,500	₩	99,291	₩	24,447	₩	123,738	₩	322,462
Balance at January 1, 2021	16,523,835	4,889,500	₩	99,291	₩	24,447	₩	123,738	₩	322,462
Balance at December 31, 2021	16,523,835	4,889,500	₩	99,291	₩	24,447	₩	123,738	₩	322,462

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.

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

The number of shares with the limited voting rights under commercial law are 3,000,866 shares and 3,000,866 shares as of December 31, 2021 and 2020, respectively. In addition, if there is a resolution at the shareholders' meeting that the Company does not pay a certain dividend to the preferred shareholders, the preferred shares are deemed to have the voting right from the next shareholders' meeting until the end of the shareholders' meeting where shareholders resolute to pay dividends to preferred shareholders.

20. Capital surplus

Details of capital surplus as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021		December 31, 2020	
Share premium	₩	322,462	₩	322,462
Revaluation reserves		277,542		277,542
Other capital surplus		193,453		192,392
	₩	793,457	₩	792,396

21. Other equity items

Other capital items as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021		December 31, 2020	
Treasury stocks	₩	(185,025)	₩	(185,025)
Loss on disposal of treasury stocks		(16,738)		(16,738)
Stock options		1,043		2,104
Loss from capital reduction		(948,311)		(948,311)
	₩	(1,149,031)	₩	(1,147,970)

21.1 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, 2021 and 2020 are as follows (Korean won in millions, 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, 2020	3,000,866	612,104	3,612,970	₩	171,231	₩	13,794	₩	185,025
Balance at December 31, 2020	3,000,866	612,104	3,612,970	₩	171,231	₩	13,794	₩	185,025
Balance at January 1, 2021	3,000,866	612,104	3,612,970	₩	171,231	₩	13,794	₩	185,025
Balance at December 31, 2021	3,000,866	612,104	3,612,970	₩	171,231	₩	13,794	₩	185,025

21.2 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, 2021 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
14th	2012.3.30	2,987	2015.3.30 - 2022.3.30	156,200	63,647
15th	2013.3.29	9,600	2016.3.29 - 2023.3.28	128,100	43,353
16th	2014.3.28	11,049	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
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, 2021 and 2020 are as follows (Korean won in millions, except for share data):

	2021					
	Number of ordinary shares to be issued			Valuation amount		
	Beginning	Forfeited	Ending	Beginning	Forfeited	Ending
13th	2,444	(2,444)	-	₩ 166	₩ (166)	₩ -
14th	5,885	(2,898)	2,987	375	(185)	190
15th	16,303	(6,703)	9,600	707	(291)	416
16th	21,646	(10,597)	11,049	856	(419)	437
	46,278	(22,642)	23,636	₩ 2,104	₩ (1,061)	₩ 1,043

	2020					
	Number of ordinary shares to be issued			Valuation amount		
	Beginning	Forfeited	Ending	Beginning	Forfeited	Ending
12th	4,258	(4,258)	-	₩ 240	₩ (240)	₩ -
13th	3,168	(724)	2,444	215	(49)	166
14th	6,880	(995)	5,885	438	(63)	375
15th	25,362	(9,059)	16,303	1,100	(393)	707
16th	32,152	(10,506)	21,646	1,272	(416)	856
	71,820	(25,542)	46,278	₩ 3,265	₩ (1,161)	₩ 2,104

The weighted-average of remaining contractual life (from December 31, 2021 to maturity) of stock options is 1.6 years.

22. Accumulated other comprehensive income

Accumulated other comprehensive income as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021		December 31, 2020	
Gain on valuation of derivatives designated as hedges	₩	(844)	₩	164
Gain on valuation of financial assets (designated) at fair value through OCI		7,968		2,822
Land revaluation surplus		26,198		34,312
	₩	33,322	₩	37,298

23. Retained earnings

Retained earnings as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021		December 31, 2020	
Legal reserves	₩	67,423	₩	67,423
Unappropriated retained earnings		3,177,501		2,780,422
	₩	3,244,924	₩	2,847,845

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.

Separate statements of appropriation of retained earnings for the years ended December 31, 2021 and 2020 are as follows (Korean won):

	December 31, 2021		December 31, 2020	
Unappropriated retained earnings:				
Unappropriated retained earnings carried over from the previous year	₩	2,760,526,972,545	₩	2,078,512,004,650
Profit for the year		410,821,650,850		180,219,914,846
Remeasurements of net defined benefit liabilities		(4,380,682,389)		736,611,615
Reclassification of land revaluation surplus		10,533,597,133		108,978,634,166
Reclassification from AOCI to retained earnings		-		411,974,761,968
		3,177,501,538,139		2,780,421,927,245
Appropriation of retained earnings:				
Dividends		(35,772,341,000)		(19,894,954,700)
		(35,772,341,000)		(19,894,954,700)
Unappropriated retained earnings to be carried forward	₩	3,141,729,197,139	₩	2,760,526,972,545

Appropriation dates for 2021 and 2020 are March 29, 2022 and March 30, 2021, respectively.

23. Retained earnings (cont'd)

Details of dividends for the year ended December 31, 2021 are as follows (Korean won, except for share data and dividend amount):

	2021					
	Old-type preferred shares		New-type preferred shares		Ordinary shares	
Par value per share	₩	5,000	₩	5,000	₩	5,000
Year end (planned):						
Number of shares issued		3,996,462		893,038		16,523,835
Number of treasury stocks		564,242		47,862		3,000,866
Shares eligible for dividends		3,432,220		845,176		13,522,969
Number of shares eligible for dividends		3,432,220		845,176		13,522,969
Rate of dividend per par value		41%		40%		40%
Dividend per share	₩	2,050	₩	2,000	₩	2,000
Dividend amount (planned) (Korean won in millions)	₩	7,036	₩	1,690	₩	27,046

Details of dividends paid by the Company for the year ended December 31, 2021 are as follows (Korean won in millions, except for share data):

	Old-type preferred shares		New-type preferred shares		Ordinary shares		Total	
Annual dividends for previous year:								
Shares eligible for dividends		3,432,220		845,176		13,522,969		
Number of shares owned by the largest shareholder (*1)		670,126		43,397		7,208,417		
Number of shares eligible for dividends		2,762,094		801,779		6,314,552		
Dividend per share (Korean won)	₩	2,050	₩	2,000	₩	2,000		
Dividend amount	₩	5,662	₩	1,604	₩	12,629	₩	19,895

(*1) In accordance with a resolution at the Board of Directors' meeting held on February 9, 2021, the Company decided to pay differential dividends to all shareholders, except for those shares owned by Jeongwon Park and other related parties.

24. Revenues

Details of revenues for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

24.1 Disaggregation revenue

		2021		2020
Revenues from contracts with customers:				
Finished goods	₩	721,497	₩	659,840
Merchandise		28,390		22,693
Others		197,773		174,621
		947,660		857,154
Others:				
Dividend		10,890		8,933
Rental income and others		8,915		28,797
		19,805		37,730
	₩	967,465	₩	894,884

24.2 Disaggregation revenues from contracts with customers

		2021		2020
Type of Business:				
Electro-Materials BG	₩	711,827	₩	641,119
Digital Innovation BU		156,846		125,078
Others		78,987		90,957
	₩	947,660	₩	857,154
Timing of revenue recognition:				
Transfer at a point in time	₩	751,096	₩	683,157
Transfer over time		196,564		173,997
	₩	947,660	₩	857,154

25. Breakdown of expenses by nature

Breakdown of expenses by nature for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021		2020
Changes in inventories	₩	(19,731)	₩	8,581
Purchases of raw materials and merchandise		409,528		346,728
Employee benefits expenses		262,285		244,053
Depreciation and amortization		41,849		40,317
Others		206,917		164,492
	₩	900,848	₩	804,171

26. Selling and administrative expenses

Selling and administrative expenses for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021		2020
Salaries	₩	79,309	₩	78,384
Retirement benefits		25,752		6,077
Employee benefits		14,327		19,958
Travel expenses		1,948		1,618
Utility expenses		475		392
Sales commission		1,896		1,452
Taxes and dues		3,736		3,042
Depreciation		8,682		11,388
Advertising expenses		7,157		3,975
Research and development		19,774		13,361
(Reversal of provision) bad debt expenses		(234)		1,354
Amortization		4,538		3,713
Others		31,932		4,485
	₩	199,292	₩	149,199

27. Finance income and expenses

Finance income and expenses for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021		2020
Finance income:	₩	15,890	₩	4,794
Interest income		35		72
Dividend income		20,498		16,905
Gain on foreign currency transaction		9,238		3,827
Gain on foreign currency translation		-		5,661
Gain on derivative transactions		83,694		14,855
Gain on valuation of derivatives		10,765		5,310
Financial guarantee income		140,120		51,424
		15,890		4,794
Finance expenses:				
Interest expense		73,842		80,191
Loss on foreign currency transactions		11,341		14,824
Loss on foreign currency translations		522		16,133
Loss on repayment of bonds		-		839
Loss on repayment of borrowings		989		-
Other financial expenses		58		2,152
		86,752		114,139
	₩	53,368	₩	(62,715)

28. Other non-operating income and expenses

Other non-operating income and expenses for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021		2020
Other non-operating income:	₩	43,269	₩	62,388
Gain on disposal of investment in subsidiaries		5,733		6,127
Gain on disposal of property, plant and equipment		1,158		-
Gain on disposal of intangible assets		-		41,829
Gain on disposal of investment properties		15,845		6,333
Gain on valuation of investment properties		-		362
Gain on disposal of short-term investment securities		2,870		3,461
Others		68,875		120,500
		43,269		62,388
Other non-operating expenses:				
Loss on disposal of investment in subsidiaries		9,291		-
Loss on disposal of trade receivables		6		207
Other bad debt expense (reversal of provision)		470		(1)
Loss on disposal of property, plant and equipment		673		3,014
Loss on asset revaluation		128		-
Loss on disposal of intangible assets		5		19
Impairment loss of intangible assets		2,765		536
Loss on disposal of investment properties		-		14,165
Loss on valuation of investment properties		49,004		5,433
Loss on disposal of long-term financial assets		-		2,033
Donations		3,893		5,191
Others		8,362		13,812
		74,597		44,409
	₩	(5,722)	₩	76,091

29. Income tax expenses

Details of income tax expenses for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021		2020
Current income tax on profit for the year	₩	381,339	₩	189,035
Deferred tax:				
Origination and reversal of temporary differences		(231,897)		163,752
Charged or credited directly to equity		(695)		(178,813)
Income tax expenses classified as loss from discontinued operations		(123,495)		(88,329)
Income tax expenses	₩	25,252	₩	85,645

Changes in deferred tax assets and liabilities for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021				
		Changes			
	Beginning balance	Profit or loss	Equity	Division (see Note 35)	Ending balance
Accrued revenues	₩ (27)	₩ (30)	₩ -	₩ -	₩ (57)
Inventory valuation allowance	2,531	(897)	-	-	1,634
Investment securities	(160,929)	158,048	(1,643)	-	(4,524)
Property, plant and equipment and investment properties	(63,845)	34,293	(772)	-	(30,324)
Accrued expenses	17,601	(1,998)	-	-	15,603
Defined benefit liabilities	5,015	1,640	1,399	(297)	7,757
Others	(102,297)	41,536	321	-	(60,440)
	₩ (301,951)	₩ 232,592	₩ (695)	₩ (297)	₩ (70,351)

	2020				
		Changes			
	Beginning balance	Profit or loss	Equity	Division (see Note 35)	Ending balance
Accrued revenues	₩ (16)	₩ (11)	₩ -	₩ -	₩ (27)
Inventory valuation allowance	3,571	(1,040)	-	-	2,531
Investment securities	(41,224)	59,307	(179,012)	-	(160,929)
Property, plant and equipment	(91,985)	47,512	-	-	(44,473)
Investment properties	(40,339)	20,967	-	-	(19,372)
Accrued expenses	17,455	146	-	-	17,601
Defined benefit liabilities	6,549	(529)	(235)	(770)	5,015
Others	8,560	(111,291)	434	-	(102,297)
	₩ (137,429)	₩ 15,061	₩ (178,813)	₩ (770)	₩ (301,951)

The Company offsets deferred tax assets and deferred tax liabilities, if the Company has a legally enforceable right to set off current tax assets against current tax liabilities and the deferred tax assets against deferred tax liabilities relating to income taxes levied by the same taxation authority.

Temporary differences, net loss and tax credit carryforwards, which have not been recognized as deferred income tax assets and expired or unused as of December 31, 2021 and 2020 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.

29. Income tax expenses (cont'd)

Temporary differences from investments in subsidiaries, joint ventures and associates, which are not recognized as deferred tax assets (liabilities), as of December 31, 2021 and 2020 are as follows (Korean won in millions):

	December 31, 2021	December 31, 2020	Remarks
Investments in subsidiaries	₩ (630,403)	₩ (632,845)	Able to control the timing of the reversal of the temporary difference

The aggregate deferred tax relating to items that are charged or credited directly to equity for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021	2020
Gain (loss) on valuation of financial assets (designated) at fair value through OCI	₩ (1,643)	₩ (186,032)
Gain (loss) on valuation of derivatives	321	13,339
Land revaluation surplus	(772)	-
Remeasurements of net defined benefit liabilities	1,399	(235)
Other capital surplus	-	(5,885)
	₩ (695)	₩ (178,813)

A reconciliation of income tax expenses and accounting profit before income tax expenses for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021	2020
Profit before income tax expenses	₩ 114,263	₩ 104,090
Tax at domestic tax rates applicable to profit	20,024	29,105
Adjustments:		
Non-taxable income and non-deductible expenses	18,809	4,941
Tax credits	(4,703)	(4,245)
Additional income tax and tax paid for previous year	9,837	819
Corporate tax on unappropriated earnings of enterprises	9,034	5,333
Temporary difference not recognized as deferred income tax	4,342	48,391
Others	(32,091)	1,301
Income tax expenses	₩ 25,252	₩ 85,645
Average effective tax rate (Income tax expenses/Profit before income tax expenses)	22.10%	82.28%

30. Earnings per share

30.1 Basic earnings per share

Basic earnings per share for the years ended December 31, 2021 and 2020 are as follows (Korean won):

	2021			2020		
	Continuing	Discontinued	Total	Continuing	Discontinued	Total
Basic earnings per ordinary share	₩ 4,098	₩ 18,972	₩ 23,070	₩ 583	₩ 9,534	₩ 10,117
Basic earnings per old-type preferred share(*1)	4,107	19,013	23,120	585	9,572	10,157

(*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*.

Profit for the year attributable to the ordinary equity holders of the Company for the years ended December 31, 2021 and 2020 are as follows (Korean won):

	2021		
	Continuing	Discontinued	Total
Profit for the year	₩ 89,011,458,101	₩ 321,810,192,749	₩ 410,821,650,850
Less: Profit attributable to new-type preferred shares	(19,498,002,321)	-	(19,498,002,321)
Less: Profit attributable to old-type preferred shares	(14,095,844,820)	(65,256,236,905)	(79,352,081,725)
Profit for the year attributable to the ordinary equity holders of the Company	₩ 55,417,610,960	₩ 256,553,955,844	₩ 311,971,566,804

	2020		
	Continuing	Discontinued	Total
Profit for the year	₩ 18,445,085,925	₩ 161,774,828,921	₩ 180,219,914,846
Less: Profit attributable to new-type preferred shares	(8,550,432,756)	-	(8,550,432,756)
Less: Profit attributable to old-type preferred shares	(2,009,312,314)	(32,851,697,811)	(34,861,010,125)
Profit for the year attributable to the ordinary equity holders of the Company	₩ 7,885,340,855	₩ 128,923,131,110	₩ 136,808,471,965

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, 2021 and 2020 is as follows:

	2021		2020	
	Ordinary shares	Old-type preferred shares	Ordinary shares	Old-type preferred shares
Beginning outstanding shares	13,522,969	3,432,220	13,522,969	3,432,220
Weighted-average number of shares outstanding	13,522,969	3,432,220	13,522,969	3,432,220

30.2 Diluted earnings per share

Diluted earnings per share for the years ended December 31, 2021 and 2020 are as follows (Korean won):

	2021			2020		
	Continuing	Discontinued	Total	Continuing	Discontinued	Total
Diluted earnings per ordinary share	₩ 4,098	₩ 18,972	₩ 23,070	₩ 583	₩ 9,534	₩ 10,117
Diluted earnings per old-type preferred share	4,107	19,013	23,120	585	9,572	10,157

Diluted profit for the year attributable to the ordinary equity holders of the Company for the years ended December 31, 2021 and 2020 is as follows (Korean won):

	2021		
	Continuing	Discontinued	Total
Profit for the year attributable to the ordinary equity holders of the Company	₩ 55,417,610,960	₩ 256,553,955,844	₩ 311,971,566,804
Share-based compensation expense (after income tax)	-	-	-
Diluted profit for the year attributable to the ordinary equity holders of the Company	₩ 55,417,610,960	₩ 256,553,955,844	₩ 311,971,566,804

	2020		
	Continuing	Discontinued	Total
Profit for the year attributable to the ordinary equity holders of the Company	₩ 7,885,340,855	₩ 128,923,131,110	₩ 136,808,471,965
Share-based compensation expense (after income tax)	-	-	-
Diluted profit for the year attributable to the ordinary equity holders of the Company	₩ 7,885,340,855	₩ 128,923,131,110	₩ 136,808,471,965

Diluted weighted-average number of ordinary shares outstanding for the years ended December 31, 2021 and 2020 is as follows:

	2021	2020
Weighted-average number of ordinary shares outstanding	13,522,969	13,522,969
Exercise of stock options	-	-
Diluted weighted-average number of ordinary shares outstanding	13,522,969	13,522,969

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.

30.3 Conditions for preferred shares dividends

	Par value (Korean won)	Number of shares issued
Old-type preferred shares (*1)	₩ 5,000	3,996,462
New-type preferred shares (*2)	₩ 5,000	893,038

(*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.

31. Contingencies and commitments

31.1 Notes, bills and checks offered in security

As of December 31, 2021, the Company provided 1 blank note as collateral against Korea Defense Guarantee Cooperative for the guarantees to fulfill a contract of the Company.

31.2 Credit lines for borrowings

Credit lines for borrowings of the Company as of December 31, 2021 are as follows (Korean won in millions and foreign currency in thousands):

Description	Financial institutions	Credit line	
Operating borrowings and others	Korea Exim Bank and others	KRW	416,000
Credit bond mortgage limit	Woori Bank and others	KRW	6,500
Facility borrowings and others	Korea Exim Bank and others	KRW	99,500
L/C guarantees of payment and others	Korea Development Bank and others	USD	68,334
Commercial paper	Korea Investment & Securities Co., Ltd. and others	KRW	190,000
Electronic short-term bond	Korea Investment & Securities Co., Ltd. and others	KRW	110,000
Asset-backed loan	D-Pay 2nd Co., Ltd.	KRW	150,000
		KRW	972,000
		USD	68,334

31.3 Financial covenant

The subscription agreement of unsecured bonds issued by the Company requires the Company to maintain a debt-to-equity ratio less than 700%, limit the establishment of collateral rights within 500% of its own equity and limit disposal of an asset within 100% of total asset based on the Company's financial statements. If the Company fails to meet certain requirements mentioned above, an acceleration clause would be invoked for the immediate payment. As of December 31, 2021, the amount of bonds required to meet aforementioned debt covenant is ₩452,000 million.

As of December 31, 2021, the total amount of ₩162,500 million including long-term and short-term borrowings and asset-backed loans borrowed from Hana Bank and others, is required to maintain BBB0 of credit rating. If the Company fails to maintain credit rating, an acceleration clause would be invoked.

31.4 Transferred trade receivables

With respect to the Company’s asset-backed loan, the carrying amount of the trade receivables and others recognized in the financial statement as of December 31, 2021 is ₩26,163 million, which did not meet the derecognition criteria (see Note 15).

31.5 Litigation in progress

The Company is involved in lawsuits as a defendant with claims exposure of ₩5,526 million as of December 31, 2021. The ultimate outcome of the lawsuit cannot presently be determined.

31.6 Technical contract

The Company has technical license agreements with Mitsui & Co. Plastics Ltd. and others for the year ended December 31, 2021.

31.7 Guarantees of payment

Guarantees of payment provided by the Company as of December 31, 2021 are as follows (Korean won in millions and foreign currency in thousands):

Provided to	Amount		Description
Subsidiaries:			
Doosan Electro Materials (Changshu) Co., Ltd.	USD	17,000	An on-site guarantee of payment
Doosan Electro-Materials Vietnam Company Limited	USD	5,000	An on-site guarantee of payment
Doosan Industrial Vehicle Europe N.V.	EUR	10,000	An on-site guarantee of payment
Doosan Industrial Vehicle U.K. Ltd.	GBP	4,000	An on-site guarantee of payment
Doosan Industrial Vehicle China Co., Ltd.	CNY	4,800	An on-site guarantee of payment
Doosan Fuel Cell America, Inc.	USD	137,906	An on-site guarantee of payment
	KRW	191,125	An on-site guarantee of payment
Doosan Energy Solutions America, Inc.	USD	67,598	An on-site guarantee of payment
Doosan Industrial Vehicle Co., Ltd.	USD	29	An on-site guarantee of payment
D-Pay 2nd Co., Ltd.	KRW	82,500	An on-site guarantee of payment
Doosan Mecatec Co., Ltd.	USD	50,900	An on-site guarantee of payment
	KRW	30,000	An on-site guarantee of payment
Doosan Logistics Solution Co., Ltd.	EUR	10,000	An on-site guarantee of payment
	KRW	43,420	An on-site guarantee of payment
	USD	278,433	
	CNY	4,800	
	GBP	4,000	
	EUR	20,000	
	KRW	347,045	

In addition to the above, according to the spin-off during the year ended December 31, 2019, in accordance with Article 530-9, Paragraph 1 of *the Commercial Act*, the succeeding company after division (the Company) and the newly incorporated company (DFC and Solus Advanced Materials Co., Ltd. (formerly, Doosan Solus Co., Ltd.)) will be repaid in solidarity with respect to the debts of the company before the division.

According to the split-off during the year ended December 31, 2021, in accordance with Article 530-9, Paragraph 1 of *the Commercial Act*, the succeeding company after division (the Company) and the newly incorporated company (Doosan Industrial Vehicle Co., Ltd.) will be repaid in solidarity with respect to the debts of the company before the division.

31.7 Guarantees of payment (cont'd)

Guarantees of payment provided by third parties to the Company as of December 31, 2021 are as follows (Korean won in millions and foreign currency in thousands):

Provided to	Amount		Description
Seoul Guarantee Insurance	KRW	41,620	Performance guarantee
Machinery Financial Cooperative	KRW	8,923	Performance guarantee
Korea Software Financial Cooperative(*1)	KRW	2,365	Performance guarantee
Korea Development Bank	USD	10,334	Debt guarantee
Woori Bank and others	USD	21,591	L/C guarantee of payment
	KRW	52,908	
	USD	31,925	

(*1) In connection with this, as of December 31, 2021, equity share of ₩86 million is provided as collateral.

31.8 Other agreements

Doosan Property Co., Ltd. (formerly DBC Co., Ltd.), a subsidiary, contracted on selling Bundang Doosan Tower, located in 155, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do to Bundang Doosan Tower REIT Co., Ltd. as of January 8, 2021. As of the same day, the Company agreed on a five-year lease contract with DHC, Doosan Bobcat Inc., and Hyundai Doosan Infracore Co., Ltd. (formerly Doosan Infracore Co., Ltd.) after the sale of Bundang Doosan Tower. In this regard, the Company has been responsible for a part of Bundang Doosan Tower for five years after the sale. Meanwhile, if the Company fails to meet certain conditions, lease agreement will be extended on the same terms once for 5 years.

The Company accounts for the above-aforementioned joint lease contract as joint operation in which the parties jointly control the lease arrangement also and have the right to assets and liabilities of the leased asset in accordance with K-IFRS No. 1111 'Joint Arrangements'. As of December 31, 2021, the Company's ownership interests are 6.7%.

The Company sold Doosan Technology Institute located in Seongbok-dong, Suji-gu, Yongin-si, Gyeonggi-do during 2019, and has been responsible for the lease for 5 years after the sale.

The Company sold Doosan Tower, located in 275, Jangchungdan-ro, Jung-gu, Seoul, during the previous year, and has been responsible for leasing offices and shopping malls of Doosan Tower for five years after the sale. Meanwhile, if the lessor notifies the Company for extending the lease term of Doosan Tower within 6 months from the 4th year of the commencement date of the lease term, the Company's liability on lease agreement will be extended on the same terms once for 5 years.

The Company entered into an agreement with the Pangaea Ventures Fund IV, L.P. (total amount of investment commitment: USD 5,000 thousand), and the remaining investment commitment is USD 1,312 thousand as of December 31, 2021.

32. Pledged assets

The Company pledged certain assets as collateral for its financial liabilities as of December 31, 2021, which are as follows (Korean won in millions and foreign currency in thousands):

Institution	Pledged asset	Related accounts	Financial liabilities		Pledged amount	
Korea Development Bank	Fixed deposit, Jeung-pyeong, Ik-san plant and others	Short-term financial instruments, property, plant and equipment, investment properties and others	KRW	41,000	KRW	209,750
			KRW	-	USD	39,556
Kookmin Bank	Kimcheon plant		KRW	-	KRW	15,912
Woori Bank	Anmyeondo land and others		KRW	119,000	KRW	132,000
Hana Bank	Fixed deposit		KRW	9,990	KRW	9,990

Details of collateral provided by the Company for third parties are as follows (Korean won in millions):

As of December 31, 2021, DHC, a subsidiary of the Company, entered into an emergency operation fund of ₩3,000,000 million with Korea Development Bank and Korea Exim Bank (the “State-owned banks"). In relation to the emergency operation fund agreement, the Company has provided its assets as collateral to state-owned banks. As of December 31, 2021, the carrying amount of the borrowings is ₩31,990 million. The total assets that the Company has provided as collateral include investments in subsidiaries such as DHC and associates, equity instruments designated measured at fair value through OCI, property, plant and equipment, short-term financial instruments, treasury stocks. The total carrying amount of assets provided as collateral by the Company is ₩3,189,988 million.

If in case the borrower fails to repay or is requested by the lender for repayment due to accelerated clause, Korea Development Bank and the Korea Exim bank, the lenders in the borrowing agreements, may exercise its collateral rights to dispose, transfer, and delegate voting right.

In addition, DHC fully repaid the borrowings from State state-owned banks as of February 28, 2022, and the related agreement for providing collaterals covenant related with the financial improvement plan has been terminated.

33. Related party transactions

The details related to the disclosure of related parties as of December 31, 2021 and 2020 are as follows:

Relationship with the Company	December 31, 2021	December 31, 2020
Subsidiaries	Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries (*1)	Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries (*1)
	-	Doosan Infracore Co., Ltd.("DI") and its subsidiaries (*2)
	Doosan Bobcat Inc. ("DBI") and its subsidiaries (*2,3)	Doosan Bobcat Inc. and its subsidiaries (*2,3)
	-	Doosan Engineering & Construction Co., Ltd. and its subsidiaries (*4)
	Doosan Industrial Vehicle Co., Ltd. ("DIV") and its subsidiaries	-
	-	Doosan Fuel Cell Co., Ltd. ("DFC")
	Oricom Inc	Oricom Inc
	Doosan Bears Inc.	Doosan Bears Inc.
	Doosan Business Research Institute Co., Ltd.	Doosan Business Research Institute Co., Ltd.
	Doosan Cuvex Co., Ltd.	Doosan Cuvex Co., Ltd.
	Doosan Property Co., Ltd. (formerly, DBC Co., Ltd.) (*5)	Doosan Property Co., Ltd. (formerly, DBC Co., Ltd.) (*5)
	Doosan Robotics Inc.	Doosan Robotics Inc.
	Doosan Mobility Innovation Inc.	Doosan Mobility Innovation Inc.
	-	Mottrol Co., Ltd.
	D-Pay 2nd Co., Ltd.	D-Pay 2nd Co., Ltd.
	-	New Star Motive 1st Co., Ltd.
	Doosan Digital Innovation America, LLC	Doosan Digital Innovation America, LLC
	Doosan Information & Communications Beijing Co., Ltd.	Doosan Information & Communications Beijing Co., Ltd.
	Doosan Digital Innovation Europe Ltd.	Doosan Digital Innovation Europe Ltd.
	-	Doosan Mottrol (Jiangyin) Co., Ltd.
	Doosan (Hong Kong) Ltd. and its subsidiaries	Doosan (Hong Kong) Ltd. and its subsidiaries
	Doosan Electro-Materials Singapore Pte. Ltd.	Doosan Electro-Materials Singapore Pte. Ltd.
	Doosan Shanghai Chemical Materials Co., Ltd.	Doosan Shanghai Chemical Materials Co., Ltd.
	Doosan Electro-Materials (Changshu) Co., Ltd.	Doosan Electro-Materials (Changshu) Co., Ltd.
	Doosan Electro-Materials America, LLC	Doosan Electro-Materials America, LLC
	Doosan Electro-Materials Vietnam Company Ltd.	Doosan Electro-Materials Vietnam Company Ltd.
	-	Doosan Industrial Vehicle Europe N.V.
	-	Doosan Industrial Vehicle U.K. Ltd. and its subsidiaries
	-	Doosan Logistics Europe GmbH
	-	Doosan Industrial Vehicle America Corp. and its subsidiaries
	-	Doosan Industrial Vehicle China Co., Ltd.
	Doosan Fuel Cell America, Inc.	Doosan Fuel Cell America, Inc.
	Doosan Logistics Solution Co., Ltd.	Doosan Logistics Solution Co., Ltd.
	Doosan Energy Solutions America, Inc.	Doosan Energy Solutions America, Inc.

33. Related party transactions (cont'd)

Relationship with the Company	December 31, 2021	December 31, 2020
Associates	-	Prestolite ASIA LTD.
	KDDI KOREA Corporation	KDDI KOREA Corporation
	Wise Fashion Co., Ltd.	Wise Fashion Co., Ltd.
	PT. SEGARA AKASA	PT. SEGARA AKASA
	Mastern Professional Investment Type Private Security Investment Trust No.98	Mastern Professional Investment Type Private Security Investment Trust No.98
	SiO2 Medical Products, Inc.	-
Joint ventures	Sichuan Kelun-Doosan Biotechnology Company Limited	Sichuan Kelun-Doosan Biotechnology Company Limited
Other related parties	Doosan Engineering & Construction Co., Ltd. ("DEC) and its subsidiaries (*4)	-
	Bundang Doosan Tower REIT Co., Ltd. (*6)	-
	Doosan Yonkang Foundation (*6)	Doosan Yonkang Foundation (*6)
	Chung-Ang University and others (*6)	Chung-Ang University and others (*6)
	The Path With You (formerly, Dongdaemun Future Foundation) and others (*6,7)	The Path With You (formerly, Dongdaemun Future Foundation) and others (*6,7)

(*1) DBI and its subsidiaries as well as DEC and its subsidiaries are excluded.

(*2) During the current year, the investment division of DI was spun off and merged with DHC, and all business segments other than investment division of DI were decided to sell in the market.

(*3) During the current year, the Company obtained control over the investee and classified it as a subsidiary.

(*4) During the current year, the Company lost control over the investee and classified it as an other related parties.

(*5) During the current year, the name of the related party was changed.

(*6) It is not included in the scope of related parties of KIFRS 1024 but includes entities that belong to the same large-scale enterprise group under the *Monopoly Regulation and Fair Trade Act.*

(*7) During the current year, 'Dongdaemun Future Foundation changed its name to 'The Path With You'.

33. Related party transactions (cont'd)

Significant transactions for the years ended December 31, 2021 and 2020, between the Company and related parties are as follows (Korean won in millions):

	2021						
	Related parties	Sales	Other income	Others (disposal of assets, etc.)	Purchases	Other expenses	Others (purchase of assets, etc.)
Subsidiaries	DHC and its subsidiaries (*1)	₩ 115,606	₩ 9,479	₩ 2,837	₩ 5,483	₩ 3,776	₩ 88
	DI and its subsidiaries	31,081	-	-	24,248	406	35
	DBI and its subsidiaries	6,669	-	1	817	2,011	1,170
	DIV and its subsidiaries	203,455	278	-	27,649	54	-
	Others	176,900	9,230	1	11,560	11,616	295
		533,711	18,987	2,839	69,757	17,863	1,588
Associates		32	-	-	55	14,012	-
Other related parties (*1, 2)		10,438	17	18,470	4,032	3,207	15,138
		₩ 544,181	₩ 19,004	₩ 21,309	₩ 73,844	₩ 35,082	₩ 16,726

	2020						
	Related parties	Sales	Other income	Others (disposal of assets, etc.)	Purchases	Other expenses	Others (purchase of assets, etc.)
Subsidiaries	DHC and its subsidiaries (*1)	₩ 104,577	₩ 3,228	₩ 2	₩ 5,086	₩ 5,175	₩ 143
	DI and its subsidiaries	108,826	-	-	57,657	855	4,161
	DBI and its subsidiaries	17,361	-	-	798	2,060	7,359
	DIV and its subsidiaries	272,187	1,343	-	48,530	366	-
	Others	401,969	4,583	5,398	16,773	10,339	108
		904,920	9,154	5,400	128,844	18,795	11,771
Associates		2	-	800,000	-	4,650	248,417
Other related parties (*1, 2)		13,285	2,632	-	17,203	1,799	2,203
		₩ 918,207	₩ 11,786	₩ 805,400	₩ 146,047	₩ 25,244	₩ 262,391

(*1) DHC and its subsidiaries include details of transactions with DFC in the current and previous year, and the transaction details of other related parties for the previous year have been restated.

(*2) Other related parties include details of transactions with DEC and its subsidiaries in the current and previous year.

The above transaction details include amounts classified as profit or loss from discontinued operations in the current and previous income statements.

33. Related party transactions (cont'd)

As of December 31, 2021 and 2020, significant balances related to the transactions between the Company and related parties are as follows (Korean won in millions):

		December 31, 2021					
	Related parties	Trade receivables	Other receivables	Trade payables	Other payables	Lease liabilities	Asset-backed loan
Subsidiaries	DHC and its subsidiaries (*1)	₩ 95,970	₩ 22,561	₩ 686	₩ 1,767	₩ -	₩ -
	DI and its subsidiaries	-	-	-	-	-	-
	DBI and its subsidiaries	786	2,779	-	476	5,081	-
	DIV and its subsidiaries	2,667	639	-	958	-	-
	Others	56,627	24,885	2,609	4,590	-	82,500
		156,050	50,864	3,295	7,791	5,081	82,500
Associates		-	32,200	-	2,996	235,512	-
Joint ventures		-	1,238	-	-	-	-
Other related parties (*1,2)		4,389	7,613	2	570	13,756	-
		₩ 160,439	₩ 91,915	₩ 3,297	₩ 11,357	₩ 254,349	₩ 82,500

		December 31, 2020					
	Related parties	Trade receivables	Other receivables	Trade payables	Other payables	Lease liabilities	Asset-backed loan
Subsidiaries	DHC and its subsidiaries (*1)	₩ 44,582	₩ 10,270	₩ 248	₩ 1,505	₩ -	₩ -
	DI and its subsidiaries	10,720	33	23,678	4,047	1,632	-
	DBI and its subsidiaries	1,322	2,144	-	1,395	6,210	-
	DIV and its subsidiaries	132,384	2,927	12,094	1,158	-	-
	Others	51,015	104,612	4,994	2,377	-	263,000
		240,023	119,986	41,014	10,482	7,842	263,000
Associates		2	32,200	-	2,952	253,809	-
Joint ventures		-	-	-	-	-	-
Other related parties (*1,2)		3,670	6,340	55	754	1,825	-
		₩ 243,695	₩ 158,526	₩ 41,069	₩ 14,188	₩ 263,476	₩ 263,000

(*1) DHC and its subsidiaries include significant balances related to the transactions with DFC as of December 31, 2021 and 2020, and the balances of other related parties for the previous year have been restated.

(*2) Other related parties include details of transactions with DEC and its subsidiaries in the current and previous year.

The above receivables and payables include amounts classified as assets held for sale and liabilities held for sale in the previous financial statements.

33. Related party transactions (cont'd)

Fund and equity transactions for the years ended December 31, 2021 and 2020 between the Company and related parties are as follows (Korean won in millions):

2021

	Borrowing		Lease liabilities		Contribution		Dividend		Loan	
Related parties	Borrowings	Repayment	increase	Decrease	Received	Provided	Income	Paid	Loans	Repayment
Subsidiaries:										
DHC and its subsidiaries (*1)	₩ -	₩ -	₩ -	₩ -	₩ -	₩ 605,226	₩ -	₩ -	₩ -	₩ -
DI and its subsidiaries	-	-	-	1,660	-	-	-	-	-	-
DBI and its subsidiaries	-	-	1,076	2,578	-	-	-	-	-	-
DIV and its subsidiaries (*2)	-	-	-	-	-	(58,456)	-	-	-	-
Others(*1,3)	-	180,500	-	-	-	(785,801)	4,360	-	4,600	76,440
	-	180,500	1,076	4,238	-	(239,031)	4,360	-	4,600	76,440
Associates	-	-	-	32,308	-	118,980	5,228	-	-	-
Joint ventures	-	-	-	-	-	-	1,301	-	-	-
Other related parties	-	-	14,704	3,462	-	(468)	23	3,305	-	-
	₩ -	₩ 180,500	₩ 15,780	₩ 40,008	₩ -	₩ (120,519)	₩ 10,912	₩ 3,305	₩ 4,600	₩ 76,440

(*1) It contains DFC's ordinary shares and preferred shares were invested in kind to DHC (see Note 11).

(*2) It contains the sale of DIV's all ordinary shares acquired through the split-off to DBI (see note 35).

(*3) It contains a debt for equity swap for Doosan Fuel Cell America, Inc. during the current year.

2020

	Borrowing		Lease liabilities		Contribution		Dividend		Loan	
Related parties	Borrowings	Repayment	increase	Decrease	Received	Provided(*1)	Income	Paid	Loans	Repayment
Subsidiaries:										
DHC and its subsidiaries (*1)	₩ -	₩ -	₩ -	₩ -	₩ -	₩ 712,656	₩ -	₩ -	₩ -	₩ -
DI and its subsidiaries	-	-	3,468	1,969	-	-	-	-	-	-
DBI and its subsidiaries	-	-	7,359	1,382	-	-	-	-	-	-
Others(*1)	263,000	150,000	-	-	-	209,001	7,009	-	90,044	38,315
	263,000	150,000	10,827	3,351	-	921,657	7,009	-	90,044	38,315
Associates	-	-	258,309	8,315	-	70,071	12	-	-	-
Joint ventures	-	-	-	-	-	-	1,911	-	-	-
Other related parties (*2)	-	-	2,176	1,527	-	(277,717)	-	2,160	97,891	97,891
	₩ 263,000	₩ 150,000	₩ 271,312	₩ 13,193	₩ -	₩ 714,011	₩ 8,932	₩ 2,160	₩ 187,935	₩ 136,206

(*1) It contains 100 percent of Doosan Mecatec's ordinary shares were invested in kind to DHC.

(*2) Other related parties include details of transactions with DEC and its subsidiaries in the previous year.

33. Related party transactions (cont'd)

The above transactions include amounts classified as profit or loss from discontinued operations in the current and previous income statements.

The Company provided guarantees of payment and others to related parties as of December 31, 2021 (see Note 31).

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, 2021 and 2020 is as follows (Korean won in millions):

	2021	2020
Employee benefits	₩ 23,783	₩ 35,333
Retirement benefits	22,241	1,815
	₩ 46,024	₩ 37,148

34. Cash flow statement

The adjustments and changes in cash generated from operating activities in the separate statements of cash flows for the years ended December 31, 2021 and 2020 is as follows (Korean won in millions):

	2021	2020
Adjustments for:		
Interest expense	₩ 74,041	₩ 79,558
Income tax expenses	148,747	173,974
Loss on foreign currency translation	1,262	20,207
Loss on disposal of trade receivables	659	1,675
Loss on disposal of long-term financial assets	-	2,033
Loss on repayment of bonds	-	839
Loss on repayment of borrowings	989	-
Depreciation	43,099	56,587
Amortization	7,461	8,419
Loss on disposal of property, plant and equipment	760	3,424
Impairment loss on property, plant and equipment	723	260
Loss on valuation of property, plant and equipment	128	-
Loss on disposal of intangible assets	6	29
Impairment loss on intangible assets	2,765	725
Loss on disposal of investment properties	-	14,165
Loss on valuation of investment properties	49,004	5,433
Retirement benefits	36,448	21,010
Increase (reversal of) in bad debt expenses	335	875
Increase (reversal of) in other bad debt expenses	600	(784)
Increase (reversal of) in provisions	8,650	12,490
Write-down of inventories	(288)	3,197
Impairment loss on investment in associates	9,291	-
Interest income	(15,933)	(4,794)
Dividend income	(10,948)	(9,124)
Gain on foreign currency translation	(13,495)	(4,981)
Gain on valuation of derivatives	(83,694)	(14,855)
Gain on disposal of short-term investment securities	-	(362)
Gain on disposal of investment in subsidiaries	(43,269)	(62,388)
Gain/Loss on disposal of discontinued operations and impairment loss	(431,828)	(207,208)
Gain on disposal of property, plant and equipment	(5,739)	(6,166)
Gain on disposal of intangible assets	(1,158)	(184)
Gain on disposal of investment properties	-	(41,829)
Gain on valuation of investment properties	(15,845)	(6,333)
Financial guarantee income	(10,765)	(5,310)
Others	(6,580)	(339)
	₩ (254,574)	₩ 40,243

34. Cash flow statement (cont'd)

		2021		2020
Changes in operating assets and liabilities:				
Trade receivables	₩	(92,825)	₩	(63,335)
Other receivables		(19,232)		(15,202)
Inventories		(30,514)		3,436
Other current assets		11,267		2,711
Long-term other receivables		2,225		(37,687)
Other non-current assets		301		436
Trade payables		57,659		(131,987)
Other payables		23,149		(31,425)
Provisions		(4,489)		(9,649)
Other current liabilities		1,544		(9,893)
Long-term other payables		(17,526)		(71,660)
Retirement benefits paid		(8,564)		(7,724)
Defined benefit liabilities transferred from affiliated companies		(254)		851
Increase in plan assets		(24,486)		(21,254)
	₩	(101,745)	₩	(392,382)

Significant non-cash transactions for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

		2021		2020
Reclassification of construction in progress to property, plant and equipment and others	₩	15,703	₩	24,597
Reclassification of current portion of bonds		264,220		287,302
Reclassification of current portion of long-term borrowings		-		63,315
Reclassification of current portion of long-term asset-backed loan		65,848		95,263
Reclassification to the non-current assets held for sale		-		450,230
Acquisition or disposal of investment in subsidiaries		685,119		240,802

34. Cash flow statement (cont'd)

Details of changes in liabilities arising from financial activities for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021						
	Beginning balance	Cash flows from financing activities	Fluctuation of foreign exchange rate	Reclassification of current portion	Division (see Note 35)	Others	Ending balance
Short-term borrowings	₩ 709,761	₩ (89,362)	₩ -	₩ -	₩ (40,000)	₩ 88,000	₩ 668,399
Current portion of long-term borrowings	102,508	(14,512)	-	-	-	(87,996)	-
Current portion of bonds	137,828	(137,974)	-	264,220	-	438	264,512
Current portion of long-term asset-backed loan	95,263	(96,499)	-	65,848	-	1,126	65,738
Current lease liabilities	30,320	(29,762)	-	29,029	(2,098)	(77)	27,412
Long-term borrowings	-	-	-	-	-	-	-
Bonds	333,632	221,030	-	(264,220)	-	755	291,197
Long-term asset-backed loan	166,215	(84,089)	-	(65,848)	-	157	16,435
Non-current lease liabilities	245,578	-	-	(29,029)	(937)	19,107	234,719
	₩ 1,821,105	₩ (231,168)	₩ -	₩ -	₩ (43,035)	₩ 21,510	₩ 1,568,412

	2020						
	Beginning balance	Cash flows from financing activities	Fluctuation of foreign exchange rate	Reclassification of current portion	Division (see Note 35)	Others	Ending balance
Short-term borrowings	₩ 508,000	₩ 201,761	₩ -	₩ -	₩ -	₩ -	₩ 709,761
Current portion of long-term borrowings	143,315	(103,315)	(803)	63,315	-	(4)	102,508
Current portion of bonds	169,891	(320,542)	-	287,302	-	1,177	137,828
Current portion of long-term asset-backed loan	150,000	(150,000)	-	95,263	-	-	95,263
Current lease liabilities	8,925	(17,973)	-	10,282	(266)	29,353	30,321
Long-term borrowings	311,368	(248,435)	-	(63,315)	-	382	-
Bonds	286,998	333,376	-	(287,302)	-	560	333,632
Long-term asset-backed loan	-	261,003	-	(95,263)	-	475	166,215
Non-current lease liabilities	8,584	-	-	(10,282)	(120)	247,396	245,578
	₩ 1,587,081	₩ (44,125)	₩ (803)	₩ -	₩ (386)	₩ 279,339	₩ 1,821,106

35. Division

The Company decided to sell the Industrial vehicle segment in accordance with a resolution of the Board of Directors on March 11, 2021 and the key decision is as follows:

	Contents
Subject held for sale	All of the shares issued by the newly incorporated company held by the Company through the split-off of Industrial vehicle segment
Buyer	Doosan Bobcat Inc.

As of March 11, 2021, the Company contracted with DBI for the sale of the shares. In accordance with the resolution of the shareholders' meeting dated June 25, 2021, the Company completed the split-off of the Industrial Vehicle segment and newly established DIV as of July 1, 2021.

The details of the split-off are as follows:

	Divided company	Newly incorporated company
Company name	Doosan Corporation	Doosan Industrial Vehicle Co., Ltd.
Main business	Other businesses except for the divided segment	Manufacturing and sale of forklifts

The details of the assets and liabilities of the Industrial Vehicle segment carried over to the newly incorporated company are as follows (Korean won in millions):

Assets		Book amount	Liabilities		Book amount
Cash and cash equivalents	₩	40,068	Trade payables	₩	144,888
Trade receivables		191,896	Short-term borrowings		40,000
Other receivables		12,337	Other payables		32,423
Inventory		82,153	Current lease liabilities		2,098
Other current assets		2,101	Other current liabilities		9,422
Investment in subsidiaries, associates and joint ventures		58,924	Provisions		3,697
Property, plant and equipment		123,694	Net defined benefit liabilities		1,220
Intangible assets		36,539	Non-current lease liabilities		937
Deposit		1,967	Other non-current liabilities		2,653
Deferred income tax assets		297			
	₩	549,976		₩	237,338

Accordingly, the Company acquired all of the shares issued by the DIV, newly incorporated company, and sold the shares to DBI on July 6, 2021 (sales price: ₩750,433 million).

In accordance with Article 530-9, Paragraph 1 of *the Commercial Act*, the succeeding company after division (the Company) and the newly incorporated company (DIV) will be repaid in solidarity with respect to the debts of the company before the division.

The performance of the Industrial Vehicle segment carried forward to the newly incorporated company is indicated as a discontinued operation, and the comparative statements of income for the previous year has been restated (see Note 36).

35. Division (cont'd)

The Company decided to sell the Mottrol segment in accordance with a resolution of the Board of Directors on September 4, 2020 and the key decision is as follows:

	Contents
Subject held for sale	All of the shares issued by the newly incorporated company held by the Company through the split-off of Mottrol segment
Buyer	Sosius-Well to Sea Investment Co., Ltd. ("Sosius-Well to Sea consortium")

As of September 4, 2020, the Company contracted with Sosius-Well to Sea consortium for the sale of the shares. In accordance with the resolution of the shareholders' meeting dated October 20, 2020, the Company completed the division of the company on December 1, 2020, by dividing the Mottrol segment into Mottrol Co., Ltd.

The details of the split-off are as follows:

	Divided company	Newly incorporated company
Company name	Doosan Corporation	Mottrol Co., Ltd.
Main business	Other businesses except for the divided segment	Manufacturing and sale of hydraulic components, etc. and defense industry

The details of the assets and liabilities of the Mottrol segment carried over to the newly incorporated company are as follows (Korean won in millions):

Assets	Book amount		Liabilities	Book amount	
Cash and cash equivalents	₩	39	Trade payables	₩	79,209
Trade receivables		98,932	Other payables		5,525
Other receivables		256	Current lease liabilities		266
Inventory		71,620	Other current liabilities		72,612
Other current assets		6,629	Current provisions		2,564
			Net defined benefit liabilities		3,258
Investment in subsidiaries, associates and joint ventures		21,601	Non-current provisions		1,091
Property, plant and equipment		103,670	Non-current lease liabilities		120
Intangible assets		93,793	Other non-current liabilities		1,530
Investment properties		143			
Other long-term receivables		681			
Deposit		1,750			
Deferred income tax assets		770			
	₩	399,884		₩	166,175

According to the split-off, the divided company acquired all of the shares issued by the newly incorporated company. As of December 31, 2021, the shares were classified as assets held for sale (see Note 37). In addition, the sale of the shares was completed as of January 4, 2021 (Sales price: ₩450,230 million).

Under Article 530-9 paragraph 2 of *the Commercial Act*, neither the divided company nor the newly incorporated company is jointly and severally liable to pay the debt arisen before the spin-off. The newly incorporated company will only bear the liabilities that it is to assume under a division plan, among the liabilities of the divided company. The divided company shall only be responsible for the liabilities not born by the newly incorporated company.

The performance of the Mottrol segment carried forward to the newly incorporated company is indicated as a discontinued operation, and the comparative statements of income for the previous year has been restated (see Note 36).

36. Discontinued operations

Details of discontinued operations for the years ended December 31, 2021 and 2020 are as follows:

	2021	
Discontinued operations	Mottrol segment	Industrial Vehicle segment
Main business	Manufacturing and sales of hydraulic components, etc. and defense industry	Manufacturing and sales of engine related forklift, electric forklift, logistics equipment
Method	Split-off (*1)	Split-off (*2)

	2020		
Discontinued operations	Duty-free segment	Mottrol segment	Industrial vehicle segment
Main business	Sales of duty-free goods	Manufacturing and sales of hydraulic components, etc. and defense industry	Manufacturing and sales of engine related forklift, electric forklift, logistics equipment
Method	Transfer of business (*3)	Split-off (*1)	Split-off (*2)

(*1) In accordance with the resolution of the shareholders' meeting dated October 20, 2020, the Company completed the division on December 1, 2020, by dividing the Mottrol segment into Mottrol Co., Ltd. According to the split-off, the divided company acquired all of the shares issued by the newly incorporated company. As of December 31, 2021, the shares were classified as assets held for sale (see Note 37). In addition, the sale of the shares was completed as of January 4, 2021 (sales price: ₩450,230 million).

(*2) In accordance with the resolution of the shareholders' meeting dated June 25, 2021, the Company completed the division of the company on July 1, 2021, by dividing the Industrial vehicle segment into DIV. According to the split-off, the divided company acquired all of the shares issued by the newly incorporated company (see Note 35). In addition, the sale of the shares was completed as of July 6, 2021 (sales price: ₩750,433 million).

(*3) The Company has decided to suspend the duty-free segment in accordance with a resolution at the Board of Directors' meeting on October 29, 2019. On December 30, 2019, the Company entered into a contract with Hyundai Department Store Duty Free Co., Ltd. to sell part of its inventories and property, plant and equipment and intangible assets in its duty-free segment, and the sale was completed on February 13, 2020 with a total sale price of ₩33.7 billion.

The operating results of the above segments are marked as discontinued operations, and the comparative income statement has been restated.

36. Discontinued operations (cont'd)

Details of profit or loss from discontinued operations for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021					
	Mottrol segment		Industrial Vehicle segment		Total	
Sales	₩	-	₩	425,935	₩	425,935
Cost of sales		-		365,092		365,092
Selling and administrative expenses		-		46,607		46,607
Operating profit (loss)		-		14,236		14,236
Non-operating profit (loss)		-		(758)		(758)
Profit (loss) before income tax expenses		-		13,478		13,478
Income tax expenses (benefits)		-		3,707		3,707
		-		9,771		9,771
Profit or loss from disposal of discontinued operations before income tax expenses and impairment loss		(507)		432,334		431,827
Tax expenses (benefits) related to disposal of discontinued operations		(123)		119,911		119,788
		(384)		312,423		312,039
Profit or loss from discontinued operations	₩	(384)	₩	322,194	₩	321,810

	2020							
	Duty-free segment		Mottrol segment		Industrial Vehicle segment		Total	
Sales	₩	4,660	₩	505,577	₩	654,484	₩	1,164,721
Cost of sales		1,832		423,652		555,533		981,017
Selling and administrative expenses		9,783		43,886		80,798		134,467
Operating profit (loss)		(6,955)		38,039		18,153		49,237
Non-operating profit (loss)		404		293		(7,039)		(6,342)
Profit (loss) before income tax expenses		(6,551)		38,332		11,114		42,895
Income tax expenses (benefits)		(1,585)		9,276		2,575		10,266
		(4,966)		29,056		8,539		32,629
Profit or loss from disposal of discontinued operations before income tax expenses and impairment loss		(287)		207,495		-		207,208
Tax expenses (benefits) related to disposal of discontinued operations		(70)		78,132		-		78,062
		(217)		129,363		-		129,146
Profit or loss from discontinued operations	₩	(5,183)	₩	158,419	₩	8,539	₩	161,775

36. Discontinued operations (cont'd)

Cash flows from discontinued operations for the years ended December 31, 2021 and 2020 are as follows (Korean won in millions):

	2021					
	Mottrol segment		Industrial Vehicle segment		Total	
Net cash flows from operating activities	₩	-	₩	15,706	₩	15,706
Net cash flows from investing activities (*1)		441,075		696,499		1,137,574
Net cash flows from financing activities		-		-		-
	₩	441,075	₩	712,205	₩	1,153,280

(*1) It includes cash flow from the disposal of discontinued operations.

	2020							
	Duty-free segment		Mottrol segment		Industrial Vehicle segment		Total	
Net cash flows from operating activities	₩	(5,286)	₩	(39,684)	₩	27,548	₩	(17,422)
Net cash flows from investing activities (*1)		33,664		(7,355)		(30,804)		(4,495)
Net cash flows from financing activities		-		-		-		-
	₩	28,378	₩	(47,039)	₩	(3,256)	₩	(21,917)

(*1) It includes cash flow from the disposal of discontinued operations.

37. Assets held for sale

As described in Notes 35 on financial statements, the Company classified shares of the Mottrol Co., Ltd. as assets held for sale in the financial statements as of the end of the previous year (Korean won in millions):

	December 31, 2020					
	Book value before impairment		Impairment loss		Fair value less costs to sell	
Investment in subsidiaries	₩	450,230	₩	-	₩	450,230

In addition, the sale of the shares was completed as of January 4, 2021.

38. Uncertainty of the impact of COVID-19

In order to prevent the spread of COVID-19, a various prevention and control measures, including restrictions on travelling are being implemented worldwide, and as a result, the global economy has been extensively affected. In addition, governments are implementing various support measures to cope with COVID-19.

The Company primarily engages several businesses, such as copper clad laminates manufacturing, development and maintenance service of information technology system and others. The line items affected by COVID -19 pandemic are mainly the collectability of trade receivables (Notes 4 and 7), impairment of inventories, property, plant and equipment and intangible assets (Notes 8, 12 and 13), and recognition of provisions (Note 18). The Company has prepared the separate financial statements by reasonably estimating the impact of COVID -19 on the Company. However, there are significant uncertainties in estimating the timing for endpoint of COVID -19 and the impact of COVID-19 on the Company.

39. Events after the reporting period

In accordance with the Board of Directors' resolution of January 19, 2022, the Company decided to make a investment in paid-in capital increase of DHC. The details are as follows.

	Details
Investment due date	February 18, 2022
Investment object	18,222,047 ordinary shares of DHC
The amount of investment	₩252,375 million

In accordance with a resolution of the Board of Directors on March 8, 2022, the Company decided to acquire 2,909,292 ordinary shares, 2,320,672 convertible preferred shares, and bonds with stock warrants (number of shares to be issued under the exercise of new shares: 2,246,989) in Tesna Co., Ltd. held by AITRI LLC. and signed a stock transfer agreement. The total acquisition amount is ₩460,000 million, and the expected closing date of the transaction is April 29, 2022. Meanwhile, for the purpose of acquiring and holding the stocks, the Company newly established Doosan Investment Co., Ltd. as a subsidiary.

Independent auditor's report on internal control over financial reporting

The Shareholders and Board of Directors
Doosan Corporation

Opinion

We have audited Doosan Corporation's (the "Company") internal control over financial reporting ("ICFR") based on the Conceptual Framework for designing and operating ICFR established by the Operating Committee of ICFR (the "ICFR Committee") as of December 31, 2021.

In our opinion, the Company's ICFR has been effectively designed and operated, in all material respects, as of December 31, 2021, in accordance with the Conceptual Framework for designing and operating ICFR.

We also have audited, in accordance with the Korean Auditing Standards ("KGAAS"), the separate statement of financial position as of December 31, 2021, and the separate statements of income, separate statements of comprehensive income, separate statements of changes in equity and separate statements of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies, and our report dated March 22, 2022 expressed *"an unqualified opinion thereon".*

Basis for opinion on ICFR

We conducted our audit in accordance with KGAAS. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of ICFR section of our report.

We are independent of the Company in accordance with the ethical requirements that are relevant to our audit of ICFR in the Republic of Korea, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of management and those charged with governance for ICFR

Management is responsible for designing, implementing, and maintaining an effective ICFR, and for assessing the effectiveness of the ICFR included in the accompanying report on the effectiveness of the ICFR.

Those charged with governance are responsible for overseeing the Company's ICFR process.

Auditor's responsibilities for the audit of ICFR

Our responsibility is to express an opinion of the Company's ICFR based on our audit. We conducted our audit in accordance with KGAAS. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective ICFR was maintained in all material respects.

An audit of ICFR involves performing procedures to obtain audit evidence as to whether a material weakness exists. The procedures selected depend on the auditor's judgment, including the assessment of the risks that a material weakness exists. An audit also includes testing and evaluating the design and operating effectiveness of ICFR based on obtaining an understanding of ICFR and the assessed risk.

ICFR definition and inherent limitations

The Company's ICFR is implemented by those charged with governance, management, and other employees and is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with Korean International Financial Reporting Standards (“K-IFRS”). The Company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with K-IFRS, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the Company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements of the financial statements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that ICFR may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

The engagement partner on the audit resulting in this independent auditor’s report is Sang Il Bae.

Ernst & Young Han Young

March 22, 2022

This audit report is effective as of March 22, 2022, the independent auditor’s report date. Accordingly, certain material subsequent events or circumstances may have occurred during the period from the independent auditors’ report date to the time this report is used. Such events and circumstances could significantly affect the Company’s ICFR and may result in modifications to this report.

ICFR Operating Status Report by CEO

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

We, as the Chief Executive officer and the Internal Accounting Manager of Doosan Company, assessed operating status of the Company's Internal Control over Financial Reporting("ICFR") for the year ending December 31. 2021.

Design and operation of ICFR is the responsibility of the Company's management, including the Chief Executive Officer and the Internal Accounting Manager.

We evaluated whether the Company effectively designed and operated its ICFR to prevent and detect errors or frauds which may cause a misstatement in financial statements to ensure preparation and disclosure of reliable financial information.

We used the 'Conceptual Framework for Designing and Operating Internal Control over Financial Reporting' established by the Operating Committee of Internal Control over Financial Reporting in Korea (the"ICFR Committee") as the criteria for design and operation of the Company's ICFR. And we conducted an evaluation of ICFR based on the 'Management Guideline for Evaluating and Reporting Effectiveness of Internal Control over Financial Reporting' established by the ICFR Committee.

Based on our assessment, we concluded that the Company's ICFR is designed and operated effectively as of December 31, 2021, in all material respects, in accordance with the 'Conceptual Framework for Designing and Operating Internal Control over Financial Reporting.

We certify that this report does not contain any untrue statement of a fact, or omit to state a fact necessary to be presented herein. We also certify that this report does not contain or present any statements which might cause material misunderstandings of the readers, and we have reviewed and verified this report with sufficient care.

3 , 8 , 2022

Internal Accounting Manager **Baek Seung-am**

Chief Executive Officer **Kwak Sang-chul**