

DOOSAN ENERBILITY CO., LTD.
(Formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)

Separate Financial Statements

December 31, 2022 and 2021

(With Independent Auditors' Report Thereon)

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Independent Auditors' Report

Based on a report originally issued in Korean

To the Shareholders and Board of Directors of
Doosan Enerbility Co., Ltd. (formerly, Doosan Heavy Industries & Construction Co., Ltd.) :

Opinion

We have audited the separate financial statements of Doosan Enerbility Co., Ltd. ("the Company"), which comprise the separate statements of financial position as of December 31, 2022 and 2021, the separate statements of profit or loss and comprehensive income or loss, changes in equity and cash flows for the years then ended, and notes, comprising significant accounting policies and other explanatory information.

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, 2022 and 2021, and its separate financial performance and its separate cash flows for the years then ended in accordance with Korean International Financial Reporting Standards ("K-IFRS").

We also have audited, in accordance with Korean Standards on Auditing ("KSAs"), the Company's Internal Control over Financial Reporting ("ICFR") as of December 31, 2022 based on the criteria established in Conceptual Framework for Designing and Operating ICFR issued by the Operating Committee of ICFR in the Republic of Korea, and our report dated March 21, 2023 expressed an unmodified opinion on the effectiveness of the Company's ICFR.

Basis for Opinion

We conducted our audits in accordance with KSAs. Our responsibilities under those standards are further described in the *Auditors' 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 Republic of Korea, and we have fulfilled our 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.

1) Uncertainty in estimated total contract cost

As described in the note 3 to the separate financial statements, the Company estimates percentage-of completion of performance obligation satisfied over time by using the input method and recognizes revenue over time depending on the progress.

Determining the percentage-of-completion is influenced by the estimated total contract cost and the adequacy of the cumulative input cost and the total contract cost estimate is based on management's accounting estimates and judgements, so uncertainty exists. Therefore, as there is a risk of overstatement of revenue due to an error in judgment or intent, we have identified the uncertainty in estimated total contract cost as a key audit matter.

The following audit procedures were performed regarding uncertainty in estimated total contract cost

- Evaluation and testing of internal controls related to the determination and modification of estimated total contract cost
- For major projects completed during the current year, performed retrospective review by comparing the actual cost incurred during the current year and construction cost estimated at the end of the prior year
- Inquiries and inspection of documents for projects with significant changes in estimated total contract cost
- Comparison of estimated total contract cost with those of other similar projects
- Inquiries and analytical review of changes in the percentage-of-completion for each reporting period
- For major projects, inquiries and inspection of documents if there were significant differences between the progress rate in the respective monthly progress reports received from customers and the percentage-of-completion calculated based on cost
- Performed site visits for on-going construction sites and sites which have equipment under construction

2) Impairment of investment in subsidiaries.

As described in the note 2 to the separate financial statements, the Company assesses whether there are any indicators of impairment for investment in subsidiaries and conducts an impairment test for such investments with impairment indicators. The Company compares the carrying amount of investment in subsidiaries with the recoverable amount which is measured as the value in use using discounted cash flow projection to determine whether the investment is impaired.

In calculating the value in use, significant judgments by management and uncertainties are involved in forecasting future cash flows and estimating key assumptions (growth rate, discount rate, etc.). Therefore, we identified the impairment of investment in subsidiaries as a key audit matter.

The following audit procedures were performed regarding impairment of investment in subsidiaries.

- Evaluation and testing of internal controls related to impairment test for investment in subsidiaries
- Evaluate the eligibility and independence of management experts involved in value in use estimation
- Inquiries and assessment of the valuation model applied by the Company
- Verifying the mathematical accuracy of the valuation model applied to the estimation of the value in use of the investment in subsidiaries
- Understanding of the future cash flows and agreeing whether the estimated future cash flow agrees to business plan approved by the Company's management
- Testing the appropriateness of major assumptions (discount rate, growth rate, etc.) applied in the valuation model by comparing to benchmark of peer industry and historical financial information of the investee
- Evaluation of the sensitivity analysis results for the discount rate and permanent growth rate presented by the Company to assess the impact of changes in major assumptions on the impairment assessment

**Other Matter**

The procedures and practices utilized in the Republic of Korea to audit such separate financial statements may differ from those generally accepted and applied in other countries.

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

Management is responsible for the preparation and fair presentation of the separate financial statements in accordance with K-IFRS, 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.

Auditors' 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 auditors' 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 KSAs 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 KSAs, 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.
- 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, then we are required to draw attention in our auditors' 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 auditors' 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 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 auditors' 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 auditors' report is Hyun Joong Kim.

KPMG Samjong Accounting Corp.

Seoul, Korea
March 21, 2023

This report is effective as of March 21, 2023, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the accompanying separate financial statements and notes thereto. Accordingly, the readers of the audit report should understand that the above audit report has not been updated to reflect the impact of such subsequent events or circumstances, if any.

DOOSAN ENERBILITY CO., LTD.
(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)
Separate Statements of Financial Position
As of December 31, 2022 and 2021

(In won)

	Note	2022	2021
Assets			
Cash and cash equivalents	4,10	₩ 307,351,155,785	423,695,206,240
Short-term financial instruments	4,5,10,32	84,578,982,219	446,816,817,888
Trade receivables, net	4,7,10,24,33	516,229,885,729	244,299,816,479
Other receivables, net	4,7,10,33	240,877,533,160	174,526,066,190
Due from customers for contract work, net	7,24,33	970,226,754,294	1,297,216,356,404
Prepayments, net	24	501,387,142,119	373,337,560,917
Prepaid expenses, net		55,907,148,754	81,768,397,353
Short-term loans, net	4,7,10,33	377,110,993,460	146,163,474,649
Derivative financial assets	4,9,10	61,948,119,608	20,325,859,084
Firm commitment assets	9	54,927,582,112	44,744,321,589
Inventories, net	8,24	326,311,364,073	361,059,871,793
Other current assets, net	4,7,10,14	38,785,760,289	27,456,454,270
Assets held for sale	11,12,31,33,35	1,967,248,725	42,569,442,490
Total current assets		3,537,609,670,327	3,683,979,645,346
Long-term financial instruments	4,5,10	25,250,349,839	22,738,389,537
Long-term investments in securities	4,6,10,32	184,067,898,255	176,629,898,243
Long-term other receivables	4,7,10	48,236,000,139	-
Investments in subsidiaries, associates and joint ventures	11,32,33,35	4,499,041,752,505	5,349,988,195,927
Long-term loans, net	4,7,10,33	39,434,963,537	44,758,897,200
Property, plant and equipment, net	12,14,32,35	3,152,146,629,853	3,309,494,887,803
Intangible assets, net	13	1,002,660,776,966	974,589,544,845
Investment property	14,15,33	159,698,021,422	79,533,763,370
Derivative financial assets	4,9,10	15,693,757,806	7,740,627,803
Firm commitment assets	9	40,539,228,724	20,692,914,690
Deferred tax assets	29	345,731,247,422	180,001,253,226
Guarantee deposits, net	4,7,10	36,690,654,806	76,702,649,500
Due from customers for contract work, net	7,24,33	102,739,503,644	102,739,503,644
Other non-current assets, net	4,7,10,14	-	2,280,947,851
Total non-current assets		9,651,930,784,918	10,347,891,473,639
Total assets		₩ 13,189,540,455,245	14,031,871,118,985

See accompanying notes to the separate financial statements.

DOOSAN ENERBILITY CO., LTD.

(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)

Separate Statements of Financial Position, Continued

As of December 31, 2022 and 2021

(In won)

	Note	2022	2021
Liabilities			
Trade payables	4,10,33	₩ 1,213,543,335,420	1,075,638,077,057
Short-term borrowings	4,10,16,31,32,34	1,249,782,165,306	3,279,422,509,546
Other payables	4,10	45,952,658,693	178,580,940,502
Advance received	24	24,949,333,090	37,311,941,924
Due to customers for contract work	24,33	1,461,400,379,627	1,155,525,093,020
Withholdings		3,759,245,449	14,661,493,592
Accrued expenses	4,10	119,373,896,230	82,342,659,211
Current portion of long-term debt	4,10,16,31,32,33,34	641,666,907,881	899,500,414,565
Current lease liabilities	4,10,14,33,34	29,843,904,543	26,140,812,082
Derivative financial liabilities	9,10	70,113,997,145	184,346,228,963
Firm commitment liabilities	9	16,535,690,334	9,135,351,642
Provisions	18,24	182,202,922,197	196,415,920,863
Other current liabilities	4,10	180,494,828	4,974,128,318
Total current liabilities		5,059,304,930,743	7,143,995,571,285
Bonds	4,10,16,31,32,34	259,132,247,745	422,363,429,340
Long-term borrowings	4,10,16,31,32,33,34	1,113,279,503,721	122,492,709,630
Long-term other payables	4,10	9,509,897,301	13,601,344,053
Defined benefit liabilities, net	17	113,117,096,887	105,513,435,495
Deposits received	4,10	180,922,160,982	176,049,875,195
Non-current lease liabilities	4,10,14,33,34	142,460,437,485	157,488,642,186
Derivative financial liabilities	9,10	39,201,565,557	35,691,182,736
Firm commitment liabilities	9	6,307,158,879	5,217,579,370
Provisions	18	111,506,249,955	88,336,115,444
Other non-current liabilities	4,10	41,167,301,365	59,536,899,354
Total non-current liabilities		2,016,603,619,877	1,186,291,212,803
Total liabilities		7,075,908,550,620	8,330,286,784,088
Equity			
Capital stock	19	3,256,061,215,000	2,675,624,980,000
Capital surplus	16,19,20	2,812,160,288,451	1,811,241,858,539
Other components of equity	19,21	(1,748,655,298)	(1,031,834,273)
Accumulated other comprehensive income	6,9,10,12,17,22	1,071,927,836,136	1,054,965,430,146
Retained earnings (accumulated deficits)	23	(1,024,768,779,664)	160,783,900,485
Total equity		6,113,631,904,625	5,701,584,334,897
Total liabilities and equity		₩ 13,189,540,455,245	14,031,871,118,985

See accompanying notes to the separate financial statements.

DOOSAN ENERBILITY CO., LTD.

(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)

Separate Statements of Profit or Loss

For the years ended December 31, 2022 and 2021

<i>(In won)</i>	Note		2022	2021
Sales	24,33	₩	5,284,439,413,737	3,592,881,973,679
Cost of sales	24,25,33		4,781,158,343,088	3,181,186,407,210
Gross profit			503,281,070,649	411,695,566,469
Selling and administrative expenses	10,25,26,33		417,975,683,399	276,410,496,287
Operating profit			85,305,387,250	135,285,070,182
Finance income and expenses			(231,909,938,687)	(53,411,337,909)
Finance income	10,27,33		572,795,906,994	616,858,661,662
Finance expenses	10,27,33		804,705,845,681	670,269,999,571
Other non-operating income and expenses			(1,173,885,896,331)	(216,564,040,453)
Other non-operating income	10,28,33		114,550,666,595	86,698,117,873
Other non-operating expenses	10,28,33		1,288,436,562,926	303,262,158,326
Loss before income tax			(1,320,490,447,768)	(134,690,308,180)
Income tax benefit	29		(108,647,073,055)	(161,291,354,762)
Profit (loss) for the year		₩	(1,211,843,374,713)	26,601,046,582
Earnings (loss) per share				
Basic earnings (loss) per share	30	₩	(1,960)	59
Diluted earnings (loss) per share	30		(1,960)	58

See accompanying notes to the separate financial statements.

DOOSAN ENERBILITY CO., LTD.
(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)
Separate Statements of Comprehensive Income or Loss
For the years ended December 31, 2022 and 2021

<i>(In won)</i>	Note	2022	2021
Profit (loss) for the year		₩ (1,211,843,374,713)	26,601,046,582
Other comprehensive income		43,253,100,554	161,926,982,902
Items that will not be reclassified			
subsequently to profit or loss		41,679,771,764	152,504,770,335
Remeasurements of defined benefit liabilities	17,29	25,697,821,618	8,013,096,521
Loss on valuation of fair value through other comprehensive income ("FVOCI") financial assets	6,29	(120,500,439)	-
Profit on revaluation of assets	12,29	16,102,450,585	144,491,673,814
Items that are or may be reclassified			
subsequently to profit or loss		1,573,328,790	9,422,212,567
Effective portion of changes in fair value of cash flow hedges	9,10,29	1,573,328,790	9,422,212,567
Total comprehensive income (loss) for the year		₩ (1,168,590,274,159)	188,528,029,484

See accompanying notes to the separate financial statements.

DOOSAN ENERBILITY CO., LTD.
(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)
Separate Statements of Changes in Equity
For the years ended December 31, 2022 and 2021

(In won)

	Capital stock	Capital surplus	Other components of equity	Accumulated other comprehensive income	Retained earnings (Accumulated deficit)	Total equity
Balance at January 1, 2021	₩ 1,937,707,325,000	2,623,051,847,367	620,128,929	901,448,271,520	(2,002,150,319,565)	3,460,677,253,251
Total comprehensive income :						
Profit for the year	-	-	-	-	26,601,046,582	26,601,046,582
Effective portion of changes in fair value of cash flow hedges	-	-	-	9,422,212,567	-	9,422,212,567
Remeasurements of defined benefit liabilities	-	-	-	-	8,013,096,521	8,013,096,521
Profit on revaluation of assets	-	-	-	144,094,946,059	396,727,755	144,491,673,814
Subtotal	-	-	-	153,517,158,626	35,010,870,858	188,528,029,484
Transactions with owners of the Company:						
Issuance of ordinary shares	239,219,780,000	359,337,177,143	-	-	-	598,556,957,143
Exercise of stock warrants	81,700,690,000	111,977,939,313	-	-	-	193,678,629,313
Stock option	-	283,741,579	(283,741,579)	-	-	-
Disposition of deficit	-	(2,127,923,349,192)	-	-	2,127,923,349,192	-
Acquisition of treasury stock	-	-	(1,982,779,910)	-	-	(1,982,779,910)
Spin-off and merger	416,997,185,000	844,514,502,329	614,558,287	-	-	1,262,126,245,616
Subtotal	737,917,655,000	(811,809,988,828)	(1,651,963,202)	-	2,127,923,349,192	2,052,379,052,162
Balance at December 31, 2021	₩ 2,675,624,980,000	1,811,241,858,539	(1,031,834,273)	1,054,965,430,146	160,783,900,485	5,701,584,334,897
Balance at January 1, 2022	₩ 2,675,624,980,000	1,811,241,858,539	(1,031,834,273)	1,054,965,430,146	160,783,900,485	5,701,584,334,897
Total comprehensive income (loss) :						
Loss for the year	-	-	-	-	(1,211,843,374,713)	(1,211,843,374,713)
Effective portion of changes in fair value of cash flow hedges	-	-	-	1,573,328,790	-	1,573,328,790
Remeasurements of defined benefit liabilities	-	-	-	-	25,697,821,618	25,697,821,618
Loss on change in fair value of FVOCI financial assets	-	-	-	(120,500,439)	-	(120,500,439)
Profit on revaluation of assets	-	-	-	15,509,577,639	592,872,946	16,102,450,585
Subtotal	-	-	-	16,962,405,990	(1,185,552,680,149)	(1,168,590,274,159)
Transactions with owners of the Company:						
Issuance of ordinary shares	414,364,500,000	722,579,110,040	-	-	-	1,136,943,610,040
Exercise of stock warrants	166,071,735,000	277,622,498,847	-	-	-	443,694,233,847
Stock option	-	716,821,025	(716,821,025)	-	-	-
Subtotal	580,436,235,000	1,000,918,429,912	(716,821,025)	-	-	1,580,637,843,887
Balance at December 31, 2022	₩ 3,256,061,215,000	2,812,160,288,451	(1,748,655,298)	1,071,927,836,136	(1,024,768,779,664)	6,113,631,904,625

See accompanying notes to the separate financial statements.

DOOSAN ENERBILITY CO., LTD.
(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)
Separate Statements of Cash Flows
For the years ended December 31, 2022 and 2021

(In won)

	Note	2022	2021
Cash flows from operating activities			
Cash generated from operations:	34 ₩	337,711,243,278	736,148,344,187
Profit (loss) for the year		(1,211,843,374,713)	26,601,046,582
Adjustments		1,508,399,763,576	496,753,896,488
Changes in operating assets and liabilities		41,154,854,415	212,793,401,117
Interest received		6,876,285,390	3,524,521,723
Interest paid		(144,784,834,508)	(172,973,554,777)
Dividends received		114,363,102,972	1,312,521,921
Income tax paid		(42,422,197,715)	(6,951,352,697)
Net cash provided by operating activities		271,743,599,417	561,060,480,357
Cash flows from investing activities			
Cash inflows from investing activities:			
Decrease in short-term financial instruments		659,753,310,980	288,267,029,836
Collection of short-term loans		65,294,100,000	31,254,474,523
Decrease in long-term financial instruments		1,736,398,866	83,880,636,012
Proceeds from disposal of short-term investments in securities		-	1,600,000,000
Proceeds from disposal of long-term investments in securities		17,988,145,450	1,480,101,402
Collection of long-term loans		4,824,060,000	11,890,233,660
Proceeds from disposal of investments in subsidiaries, associates and joint ventures		96,726,925,623	709,000,252,425
Proceeds from disposal of property, plant and equipment		3,880,263,789	61,204,664,922
Proceeds from disposal of intangible assets		350,000,000	80,000,000
Proceeds from investment properties		15,400,000,000	-
Decrease in lease receivables		2,455,823,349	2,335,009,067
Decrease in derivative financial assets		-	49,240,386,090
Decrease in assets held for sale		28,199,454,885	5,003,769,592
Cash inflows from investing activities related to spin-off and merger		-	309,084,462,403
Subtotal		896,608,482,942	1,554,321,019,932
Cash outflows for investing activities:			
Increase in short-term financial instruments		(298,743,248,853)	(620,533,016,470)
Increase in short-term loans		(309,501,401,622)	(11,769,636,167)
Increase in long-term financial instruments		(4,248,359,168)	(106,615,025,549)
Acquisition of long-term investments in securities		(9,632,616,850)	(47,504,722,175)
Increase in long-term loans		(113,280,240,037)	(45,080,765,000)
Acquisition of investments in subsidiaries, associates and joint ventures		(276,667,792,762)	(2,041,841,400)
Acquisition of property, plant and equipment		(54,654,666,255)	(47,868,124,737)
Acquisition of intangible assets		(118,350,607,140)	(128,670,437,149)
Acquisition of investment properties		-	(419,858,010)
Decrease in derivative financial liabilities		(142,140,077,479)	-
Subtotal		(1,327,219,010,166)	(1,010,503,426,657)
Net cash provided by (used in) investing activities		(430,610,527,224)	543,817,593,275

See accompanying notes to the separate financial statements.

DOOSAN ENERBILITY CO., LTD.

(formerly, DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.)

Separate Statements of Cash Flows, Continued

For the years ended December 31, 2022 and 2021

(In won)

	Note	2022	2021
Cash flows from financing activities			
Cash inflows from financing activities:			
Proceeds from long-term borrowings	₩	1,144,345,000,000	667,663,365,000
Issuance of bonds		270,000,000,000	93,391,863,763
Issuance of ordinary shares		1,147,789,665,000	-
Exercise of stock warrants		443,883,380,246	193,823,570,755
Subtotal		3,006,018,045,246	954,878,799,518
Cash outflows for financing activities:			
Decrease in short-term borrowings, net		(2,024,348,311,562)	(855,834,164,575)
Repayment of current portion of long-term debt		(868,242,655,936)	(968,651,379,992)
Payment of lease liabilities		(19,779,206,787)	(23,123,216,481)
Acquisition of treasury stock		-	(1,982,779,910)
Repayment of asset-backed borrowings		(49,600,000,000)	(77,639,119,912)
Expense of ordinary shares issuance		(11,671,319,540)	(7,034,742,146)
Subtotal		(2,973,641,493,825)	(1,934,265,403,016)
Net cash provided by (used in) financing activities		32,376,551,421	(979,386,603,498)
Effect of movements in exchange rates on cash held		10,146,325,931	16,572,255,898
Net increase (decrease) in cash and cash equivalents		(116,344,050,455)	142,063,726,032
Cash and cash equivalents at January 1		423,695,206,240	281,631,480,208
Cash and cash equivalents at December 31	₩	307,351,155,785	423,695,206,240

See accompanying notes to the separate financial statements.

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1. Reporting entity

Doosan Enerbility Co., Ltd. ("the Company") was incorporated on September 20, 1962, with its headquarters in Changwon, Korea. The Company engages in the manufacturing of a range of power generation equipment including boilers, turbines and generators, in engineering, procurement and construction of, thermal power plants and in general construction, seawater desalination and etc.

The Company was listed on the Korea Exchange on October 25, 2000 and its major stockholder as of December 31, 2022 is Doosan Corp. (holding 30.51% equity ownership).

The Company changed its name from Doosan Heavy Industries & Construction Co., Ltd. to Doosan Enerbility Co., Ltd. on March 29, 2022.

2. Significant accounting policies and basis of preparation

(1) Basis of separate financial statements

These financial statements are separate financial statements prepared in accordance with K-IFRS No. 1027, 'Separate Financial Statements' presented by a parent, an investor in an associate or a venturer in a joint venture, in which the investments are accounted for on the basis of the direct equity interest rather than on the basis of the reported results and net assets of the investees.

The principal accounting policies are set out below. Except for the effect of the amendments to K-IFRS and new interpretations set out below, the principal accounting policies used to prepare the separate financial statements as of and for the year ended December 31, 2022 are consistent with the accounting policies used to prepare the separate financial statements as of and for the year ended December 31, 2021.

The accompanying separate financial statements have been prepared on the historical cost basis except for certain 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.

1) Changes in accounting standards effective from January 1, 2022 are as follows:

- Onerous Contracts : Costs of Fulfilling a Contract – Amendments to K-IFRS No. 1037 : the amendments clarify the direct costs include both the incremental costs and an allocation of other costs directly related to fulfilling contracts when assessing whether the contract is onerous
- Reference to the Conceptual Framework – Amendments to K-IFRS No. 1103 'Business Combinations': the amendments update a reference of definition of assets and liabilities to be recognized in a business combination and add an exception for the recognition of liabilities and contingent liabilities
- Property, Plant and Equipment: Proceeds before Intended Use – Amendments to K-IFRS No. 1016 : the amendments clarify the accounting treatment for any proceeds from selling items produced while the Company is preparing the asset for its intended use, and the costs of producing those items

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2. Significant accounting policies and basis of preparation, Continued

- Annual improvements to K-IFRS 2018-2020

- K-IFRS No. 1109 'Financial Instruments': The amendments clarify Fees related to the 10% test for derecognition of financial liabilities
- K-IFRS No. 1101 'First time Adoption of Korean International Financial Reporting Standards' : The amendment permits a subsidiary that elects to apply paragraph D16(a) of K-IFRS No. 1101 (Subsidiaries that are first-time adopters) to measure cumulative translation differences using the amounts reported by the parent, based on the parent's date of transition to K-IFRS
- K-IFRS No. 1116 'Leases': The amendment to illustrative example regarding the reimbursement of leasehold improvements by the lessor is made, in order to resolve any potential confusion regarding the treatment of lease incentives that might arise because of how lease incentives are illustrated in that example

The Company believes that these amendments have no significant impact on the Company's separate financial statements.

2) New and revised K-IFRSs in issue, but not yet effective

- Classification of Liabilities as Current or Non-current (*K-IFRS No. 1001 'Presentation of Financial Statements'*): the amendments clarify that liabilities are classified as either current or non-current, depending on the substantive rights that exist at the end of the reporting period. Also, the amendments provide guidance on how to apply the concept of materiality to accounting policy disclosures

- Definition of Accounting Estimates (*K-IFRS No. 1008 'Accounting policies, changes in accounting estimates and errors'*): the amendments define accounting estimates and clarify how to distinguish them from changes in accounting policies

- Deferred Tax related to Assets and Liabilities arising from a Single Transaction (*K-IFRS No. 1012 'Income Taxes'*): the amendments include an additional condition to the exemption to initial recognition of an asset or liability that a transaction does not give rise to equal taxable and deductible temporary differences at the time of the transaction

- New Standard (*K-IFRS No. 1117 'Insurance Contract'*): the standard estimates future cash flows of an insurance contract and measures insurance liabilities using discount rates applied with assumptions and risks at the measurement date

The Company anticipates that the application of the enactment and amendments will not have a significant impact on the Company's separate financial statements.

(2) Investments in subsidiaries, associates and joint ventures

The Company has elected to use book value as deemed cost for subsidiaries, joint ventures and associates at the date of transition to K-IFRS. After the date of transition, subsidiaries, joint ventures and associates are measured at cost. Dividend income from investments in subsidiaries, joint ventures and associates is recognized in profit or loss in the period when the shareholders' right to receive payment has been established.

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2. Significant accounting policies and basis of preparation, Continued

(3) Foreign currency translation

The Company's separate financial statements are presented in the currency of the primary economic environment in which it operates (its functional currency). The functional currency of the Company and the presentation currency for the separate financial statements of the Company are Korean won. Transactions in currencies other than the entity's functional currency is recognized at the rates of exchange prevailing at the dates of the transactions. Foreign currency gain (loss) from settlements of foreign currency transactions or translation of monetary items denominated in foreign currencies are recognized in profit or loss whereas the gain (loss) from qualified cash flow hedge and net investment hedge for foreign operations is deferred as an equity item.

(4) Cash and cash equivalents

Cash and cash equivalents include cash on hand, demand deposits, short-term, highly liquid investments with maturities (or date of redemption) of three months or less upon acquisition. Bank overdraft is classified as short-term borrowings on the separate statements of financial position.

(5) Non-derivative financial assets

1) Initial recognition and measurement

Trade and other receivables, and debt investment are initially recognized when they are originated. Other financial assets and financial liabilities are recognized when the Company becomes a party to the contractual provisions of the instruments.

A financial asset and financial liability (unless it is a trade receivable - trade without a significant financing component that is initially measured at the transaction price) are initially measured at fair value plus, for an item not at fair value through profit or loss ("FVTPL"), transaction costs that are directly attributable to its acquisition.

2) Classification and subsequent measurement

On initial recognition, a financial asset is classified as measured at: amortized cost; FVOCI - debt investment; FVOCI - equity investment; or FVTPL.

The classification of financial assets is generally based on the business model in which a financial asset is managed and its contractual cash flow characteristics. In case of changing its business model, all affected financial asset are reclassified on the first day of the first reporting period after the change in the business model.

A financial asset is measured at amortized cost if it meets both of the following conditions and is not designated as at FVTPL:

- it is held within a business model whose objective is to hold assets to collect contractual cash flow; and
- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

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A debt investment is measured at FVOCI if it meets both of the following conditions and is not designated as at FVTPL:

- it is held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets; and
- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

On initial recognition of an equity investment that is not held for trading, the Company may irrevocably elect to present subsequent changes in the investment's fair value in other comprehensive income. This election is made on an investment-by-investment basis and irrevocable election can be made at initial recognition.

All financial assets not classified as measured at amortized cost or FVOCI as described above are measured at FVTPL. This includes all derivative financial assets. On initial recognition, the Company may irrevocably designate a financial asset that otherwise meets the requirements to be measured at amortized cost or at FVOCI as at FVTPL if doing so eliminates or significantly reduces an accounting mismatch that would otherwise arise.

The Company makes an assessment of the objective of the business model in which, financial assets is held at a portfolio level because this best reflects the way the business is managed, and information is provided to management. The information considered includes:

- the stated policies and objectives for the portfolio and the operation of those policies in practice;
- how the performance of the business model and the financial assets held within that business model are evaluated and reported to the entity's key management personnel;
- the risks that affect the performance of the business model (and the financial assets held within that business model) and, in particular, the way in which those risks are managed;
- how managers of the business are compensated (e.g., whether the compensation is based on the fair value of the assets managed or on the contractual cash flows collected); and
- the frequency, volume and timing of sales of financial assets in prior periods, the reason for those sales and expectation about future sales activity for financial asset.

Transfers of financial assets to third parties in transactions that do not qualify for derecognition are not considered sales for this purpose, consistent with the Company's continuing recognition of the assets.

Portfolio of financial assets that meet the definition of trading or which performance is evaluated on a fair value basis is measured at FVTPL.

For the purposes of this assessment, 'principal' is defined as the fair value of the financial assets on initial recognition. 'Interest' is defined as consideration for the time value of money and for the credit risk associated with the principal amount outstanding during a particular period of time and for other basic lending risks and costs (e.g., liquidity risk and administrative costs), as well as a profit margin.

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2. Significant accounting policies and basis of preparation, Continued

In assessing whether the contractual cash flows are solely payments of principal and interest, the Company considers the contractual terms of the instrument. This includes assessing whether the financial asset contains a contractual term that could change the timing or amount of contractual cash flows such that it would not meet this condition. In making this assessment, the Company considers:

- contingent events that would change the amount or timing of cash flows;
- terms that may adjust the contractual coupon rate, including variable-rate features;
- prepayment and extension features; and
- terms that limit the Company's claim to cash flows from specified assets (e.g., non-recourse features).

A prepayment feature is consistent with the solely payments of principal and interest criterion if the prepayment amount substantially represents unpaid amounts of principal and interest on the principal amount outstanding, which may include reasonable additional compensation for early termination of the contract. Additionally, for a financial asset acquired at a discount or premium to its contractual par amount, a feature that permits or requires prepayment at an amount that substantially represents the contractual par amount plus accrued (but unpaid) contractual interest (which may also include reasonable additional compensation for early termination) is treated as consistent with this criterion if the fair value of the prepayment feature is insignificant at initial recognition.

The following accounting policies apply to the subsequent measurement of financial assets.

Classification	Subsequent measurement
Financial assets at FVTPL	These assets are subsequently measured at fair value. Net gains and losses, including any interest or dividend income, are recognized in profit or loss.
Financial assets at amortized cost	These assets are subsequently measured at amortized cost using the effective Interest method. The amortized cost is reduced by impairment losses. Interest income, foreign exchange gains and losses and impairment are recognized in profit or loss. Any gain or loss on derecognition is recognized in profit or loss.
Debt investments at FVOCI	These assets are subsequently measured at fair value. Interest income calculated using the effective interest method, foreign exchange gains and losses and impairment are recognized in profit or loss. Other net gains and losses are recognized in OCI. On derecognition, gains and losses accumulated in OCI are reclassified to profit or loss.
Equity investments at FVOCI	These assets are subsequently measured at fair value. Dividends are recognized as income in profit or loss unless the dividend clearly represents a recovery of part of the cost of the investment. Other net gains and losses are recognized in OCI and are never reclassified to profit or loss.

3) De-recognition

The Company derecognizes a financial asset when the contractual rights to the cash flows from the asset expire, or it transfers the rights to receive the contractual cash flows in a transaction in which substantially all the risks and rewards of ownership of the financial asset are transferred or in which the Company neither transfers nor retains substantially all of the risks and rewards of ownership and it does not retain control of the financial asset.

The Company enters into transactions whereby it transfers assets recognized in its statement of financial position but retain either all or substantially all of the risks and rewards of the transferred assets. In these cases, the transferred assets are not derecognized.

2. Significant accounting policies and basis of preparation, Continued

4) Offsetting between financial assets and financial liabilities

Financial assets and financial liabilities are offset and the net amount is presented in the separate statement of financial position only when the Company currently has a legally enforceable right to offset the recognized amounts, and there is the intention to settle on a net basis or to realize the asset and settle the liability simultaneously.

2. Significant accounting policies and basis of preparation, Continued

(6) Impairment of financial assets

1) Recognition of impairment on financial assets

The Company recognizes loss allowances for expected credit losses ("ECLs") on:

- financial assets measured at amortized costs;
- debt securities measured at FVOCI; and
- contract assets defined by K-IFRS No. 1115

The Company's impairment losses are likely to be recognized a lifetime ECLs based on the extent of increase in credit risk since inception except for below asset to be recognized loss allowances measured on 12-month.

- credit risk of debt instruments is low at the end of reporting date
- credit risk has not increased significantly since the initial recognition of debt investment (lifetime ECLs: ECL that resulted from all possible default events over the expected life of a financial instrument)

The Company adopted an accounting policy to recognize loss allowances at an amount equal to lifetime ECLs for trade receivables and contract assets.

In assessing whether the credit risk on a financial instrument has increased significantly since initial recognition and estimating ECLs, the Company considers both quantitative and qualitative information that is reasonable and supportable, including historical experience and forward-looking information that is available without undue cost or effort.

Lifetime ECLs are resulted from all possible default events over the expected life of a financial instrument. And 12-month ECLs are resulted from possible default events within the 12 months (or a shorter period if the expected life of the instrument is less than 12 months) after the reporting date.

2) Measurement of ECL

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all cash shortfalls (i.e., the difference between the cash flows due to the entity in accordance with the contract and the cash flows that the Company expects to receive). ECLs are discounted at the effective interest rate of financial instrument.

3) Credit-impaired financial instrument

A debt instrument carried at amortized cost and FVOCI is assessed at the end of each reporting period to determine whether there is objective evidence that it is impaired. A financial asset is impaired if objective evidence indicates that the loss event had a negative effect on the estimated future cash flows of that asset that can be estimated reliably.

Objective evidence that a financial asset is impaired includes:

- significant financial difficulty of the issuer or borrower;
- a breach of contract, such as default or delinquency in interest or principal payments;
- the lender, for economic or legal reasons relating to the borrower's financial difficulty, granting to the borrower a concession that the lender would not otherwise consider;

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- it becoming probable that the borrower will enter bankruptcy or other financial reorganization; or
 - the disappearance of an active market for that financial asset because of financial difficulties.
- 4) Presentation of credit loss allowance on financial position

For loss allowance on financial assets measured at amortized cost is deducted from the carrying amount of the respective assets, while loss allowance on debt instruments at FVOCI is recognized in OCI.

5) De-recognition

The Company derecognizes a financial asset when it has no reasonable expectations of recovering the contractual cash flows on a financial asset in its entirety or a portion thereof. The Company assess whether there are reasonable expectations of recovering the contractual cash flows from customers and individually assess the timing and amount of write-off. The Company does not expect that such write-off will be recovered but they may be subject to collection activity according to the Company past due collection process.

(7) Trade receivables

Trade receivables are amounts owed by customer for products and services provided in the ordinary course of business. Trade receivables expected to be collected within one year are classified as current assets. Otherwise they are classified as non-current assets. Trade receivables are initially measured at fair value except that they do not contain a significant financing component in accordance with K-IFRS No. 1115 'Revenue from contracts with customers' and are presented as net of allowance for doubtful accounts, estimated on an individual basis based on past bad debt experience.

(8) Inventories

Inventories are stated at the lower of cost and net realizable value. Cost of inventories includes fixed and variable manufacturing overhead costs which are systematically allocated to inventories by appropriate methods based on each category of inventory. The cost of inventories is determined by the specific identification method for finished goods, work-in-process and materials in transit, and moving average method for all other inventories.

The Company periodically reviews changes in net realizable value of inventories (current replacement cost for raw materials) due to damage, obsolescence, decline in selling prices and others and recognizes loss on inventory valuation. Loss on inventory valuation is charged to cost of sales when it is ordinary and to other non-operating expense when it is extraordinary. When the circumstances that previously caused inventories to be written down below cost no longer exist and the new market value of inventories subsequently recovers, the valuation loss is reversed to the extent of the original valuation loss and the reversal is deducted from cost of sales.

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2. Significant accounting policies and basis of preparation, Continued

(9) Property, plant and equipment

Property, plant and equipment is stated at cost less subsequent accumulated depreciation and accumulated impairment losses. After initial recognition, the land is stated as fair value at revaluation date less accumulated impairment loss. The revaluation is performed periodically to ensure that carrying value of the asset does not differ materially from its fair value at the end of reporting period. When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment. The cost of an item of property, plant and equipment includes expenditure that is directly attributable to the acquisition of the asset including the initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located.

Subsequent costs are capitalized only if it is highly probable that future economic benefits associated with the assets will flow into the Company.

Depreciation of property, plant and equipment is calculated to the cost of each asset less residual value using the straight-line method over the estimated useful lives of the assets as follows:

	Useful lives
Buildings	10~40 years
Structures	10~40 years
Machinery	3~20 years
Right-of-use asset	Lease term
Others	3~15 years

If a part of a property, plant and equipment has significant cost in relation to the total cost of property, plant and equipment, 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.

When there is indicator for impairment, and the carrying amount of property, plant and equipment is higher than the recoverable amount, the carrying amount is adjusted to the recoverable amount and the difference is recognized as an impairment loss. Meanwhile, when the recoverable amount subsequently exceeds the carrying amount of the impaired asset, the excess is recorded as a reversal of impairment loss to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation, if no impairment loss had been recognized. Upon derecognition of a property, plant and equipment, the difference between the net disposals proceed and carrying amount of the item is recognized in other non-operating income (expense).

A revaluation surplus is recorded in OCI and credited to the asset revaluation reserve in equity. However, to the extent that it reverses a revaluation deficit of the same asset previously recognized in profit or loss, the increase is recognized in profit and loss. A revaluation deficit is recognized in the statement of profit or loss, except to the extent that it offsets an existing surplus on the same asset recognized in the asset revaluation reserve.

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2. Significant accounting policies and basis of preparation, Continued

(10) Investment Property

Investment properties are properties held to earn rentals and/or for capital appreciation. Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, the book value of investment property is presented at the cost less accumulated depreciation and accumulated impairment.

While land is not depreciated, building excluding investment property transferred from lease assets is depreciated using the straight-line method over the useful lives between 10 and 40 years.

The Company reviews the depreciation method, the estimated useful lives and residual values of Investment property 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.

(11) Intangible assets

Intangible assets are initially measured at cost and are carried at cost less accumulated amortization and accumulated impairment losses. Subsequent expenditure on an intangible asset is capitalized only when it is probable that the expected future economic benefits that are attributable to the asset will increase.

Intangible assets other than goodwill and intangibles with indefinite useful lives are amortized on a straight-line basis over their estimated useful lives from the date that they are available for use. The estimated useful lives of the intangible assets are as follows:

	Useful lives
Industrial property rights	5~10 years
Development costs	5~20 years
Others	1~20 years

Expenditures relating to development activities are capitalized when the result of the development is for the development of new products or substantial improvement of functions of existing products; there is technical and commercial feasibility of completing the development; and the Company has the ability to measure reliably the expenditure attributable to the development. Capitalized development costs include expenditure on materials, salaries, wages and other employment-related costs of personnel directly engaged in generating assets and related overhead cost which is systematically allocated. Capitalized development costs are presented at the acquisition cost less accumulated amortization and accumulated impairment losses. Capitalized development costs are amortized using the straight-line method over the estimated useful life and amortization expenses are included in cost of goods manufactured and amortization in selling and administrative expenses. The expenditure on research and development which does not meet conditions noted above is recognized as an expense when it is incurred.

The estimated useful life and amortization method for intangible assets with finite useful lives are reviewed at the end of each reporting period and for the assets which have been assessed as having indefinite useful life, that assessment is revisited each period, with the effect of any changes in estimate being accounted for as a change in accounting estimate.

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2. Significant accounting policies and basis of preparation, Continued

However, useful lives of other intangible assets, which are determined to be indefinite since there is no foreseeable limit to the period over which the assets are expected to generate net cash inflows for the Company, are not amortized but tested for impairment once a year.

(12) 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, are added to the cost of those assets, until such time as the assets are substantially ready for their intended use or sale. Financial assets, inventories that are manufactured in short-term or produced by other method, and assets available for their intended use or sales at the time of acquisition are not eligible for qualifying assets.

Where funds are borrowed specifically, costs eligible for capitalization are the actual costs incurred less any income earned on the temporary investment of such borrowings. Where funds are part of a general pool, the eligible amount is determined by applying a capitalization rate to the expenditure on that asset. The capitalization rate will be the weighted average of the borrowing costs (excluding special purposed borrowing in order to acquire qualifying assets) applicable to the general pool. The borrowing costs eligible for capitalization cannot exceed actual amount of borrowing costs incurred for the reporting period.

(13) Impairment of non-financial assets

The carrying amounts of the Company's non-financial assets other than assets arising from contracts with customer, costs to obtain or fulfil a contract, employee benefits, inventories, deferred tax assets and non-current assets held for sale, are reviewed at the end of the reporting period to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. Goodwill and intangible assets that have indefinite useful lives or that are not yet available for use, irrespective of whether there is any indication of impairment, are tested for impairment annually by comparing their recoverable amounts to their carrying amounts.

The Company estimates the recoverable amount of an individual asset, and if it is impossible to measure the individual recoverable amount of an asset, the Company estimates the recoverable amount of cash-generating unit ("CGU"). The recoverable amount of an asset or CGU is the greater of its value in use and its fair value less costs to sell. The value in use is estimated by applying a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or CGU for which estimated future cash flows have not been adjusted, to the estimated future cash flows expected to be generated by the asset or CGU.

An impairment loss is recognized in profit or loss to the extent the carrying amount of the asset exceeds its recoverable amount, immediately.

2. Significant accounting policies and basis of preparation, Continued

Goodwill acquired in a business combination is allocated to each CGU that is expected to benefit from the synergy arising from the business acquired. Any impairment identified at the CGU level will first reduce the carrying value of goodwill and then be used to reduce the carrying amount of the other assets in the CGU on a pro rata basis. Except for impairment losses in respect of goodwill which are never reversed, an impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized.

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2. Significant accounting policies and basis of preparation, Continued

(14) Non-derivative financial liabilities

The Company classifies non-derivative financial liabilities into financial liabilities at FVTPL or other financial liabilities in accordance with the substance of the contractual arrangement and the definitions of financial liabilities. The Company recognizes financial liabilities in the separate statement of financial position when the Company becomes a party to the contractual provisions of the financial liability.

1) Financial liabilities at FVTPL

Financial liabilities at FVTPL include financial liabilities held for trading or designated as such upon initial recognition. Subsequent to initial recognition, financial liabilities at FVTPL are measured at fair value, and changes therein are recognized in profit or loss. Upon initial recognition, any directly attributable transaction costs are recognized in profit or loss as incurred.

2) Financial liabilities at amortized cost

Non-derivative financial liabilities other than financial liabilities at FVTPL are classified as financial liabilities at amortized cost. At the date of initial recognition, financial liabilities at amortized cost are measured at fair value less any directly attributable transaction costs. Subsequent to initial recognition, financial liabilities at amortized cost are measured at amortized cost using the effective interest rate method.

3) Derecognition of financial liability

The Company derecognizes financial liability when its contractual obligations are discharged, cancelled or expired. The Company also derecognizes a financial liability, when its terms are modified and the cash flows of the modified liability are substantially different, in which case a new financial liability based on the modified terms is recognized a fair value. On derecognition of a financial liability, the difference between the carrying amount extinguished and the consideration paid (including any non-cash assets transferred of liabilities assumed) is recognized in profit or loss.

(15) Borrowings

Borrowings are measured initially at fair value, net of transaction costs and subsequently at amortized cost using the effective interest method, with interest expense being recognized on an effective yield basis. The difference between the amount received and the redemption amount is amortized using the effective interest method and recognized in profit or loss. Borrowings are classified as non-current liabilities when the Company has an unconditional right to defer settlement of the liability for at least twelve months after the end of the reporting period. Otherwise, borrowings are classified as current liabilities.

2. Significant accounting policies and basis of preparation, Continued

(16) Compound financial instrument

Compound financial instruments issued by the Company are classified as a financial liability or an equity instrument in accordance with the substance of the contractual arrangement. The conversion right of convertible bonds and stock warranties embedded in compound financial instrument issued by the Company which can, at the option of the holder, be converted into a fixed number of equity instruments in the Company, is classified as equity.

The liability component of a convertible bonds and bonds with stock warranties is recognized at the fair value of a similar liability on initial recognition and be measured at amortized cost by applying the effective interest method until it is extinguished. The equity component is measured by deducting the fair value of the liability component from the fair value of the compound financial instrument as a whole on initial recognition. Any tax effect is also reflected, and such instrument is not subsequently remeasured.

The conversion right that is an embedded derivative is recognized at the market value of a similar derivative or at the fair value derived from an appropriate valuation model. Subsequent changes in fair value of the conversion right are recognized in profit or loss.

Transaction costs related to a compound financial instrument are allocated to the liability and equity components in proportion to the allocation of proceeds.

(17) Financial guarantee contracts

The Company has financial guarantee contract liabilities, which are obligations to pay specific amounts for indemnifying creditors' loss on insolvency of specific debtors according to initial or revised contract provisions of liabilities on the payment date. Financial guarantee contract liabilities are initially measured at their fair value less the direct transaction cost relating to the issuance. Subsequently, financial guarantee contract liabilities are measured at the higher of the amount of the loss allowance determined in accordance with K-IFRS No. 1109 'Financial instruments', and the amount initially recognized less the cumulative amortizations recognized in accordance with the K-IFRS No. 1115.

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2. Significant accounting policies and basis of preparation, Continued

(18) Employee benefits liability

The Company operates various types of benefit plans, and generally makes contributions calculated based on periodic actuarial calculations to separately administered funds such as qualifying insurance companies or trust funds.

Defined benefit plans are post-employment benefit plans other than defined contribution plans. Generally, under the defined benefit plan, amounts to be paid as retirement benefits are determined by reference to a formula usually based on employees' earnings, years of service, ages and other considerations. The retirement benefit obligation recognized in the separate statements of financial position represents the present value of the defined benefit obligation, less fair value of plan assets and adjustment for unrecognized past service cost. The defined benefit obligation is calculated by an independent actuary using the projected unit credit method. The present value of the defined benefit obligation is denominated in the same currency in which the benefits are expected to be paid, and calculated at the discount rate which is the yield at the reporting date on high quality corporate bonds that have maturity dates approximating the terms of the Company's obligation.

Actuarial gain or loss from changes in actuarial assumptions or differences between actuarial assumptions and actual results is recognized in other comprehensive income or loss, which is immediately reflected in retained earnings. Past service cost is directly recognized in profit or loss in the period the plan amendment or curtailment occurs.

(19) 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. A provision is measured using the present value of the cash flows estimated to settle the present obligation when the effect of the time value of money is material.

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. The increase in provision due to passage of time is recognized as interest expense. If the existence of an obligation to transfer economic benefit is no longer probable, the related provision is reversed during the period. 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. In this case, any income arising from the third-party reimbursement is netted off against the related expense to be recognized in the separate statements of profit or loss from the recognition of provisions.

2. Significant accounting policies and basis of preparation, Continued

(20) Leases

The Company determines whether the contract is a lease or includes a lease at the time of the agreement. If the contract requires a transfer of control over the use of the identified asset for a certain period of time in exchange for consideration, the contract will either be a lease or include a lease. When determining whether a contract transfers control of the use of the identified asset, the Company uses the definition of a lease in K-IFRS No. 1116.

1) Lessee

At the commencement or effective date of the contract that includes the lease element, the Company allocates the consideration of the contract to each lease element based on its relative stand-alone price. However, the Company applies a practical expedient that does not separate the non-lease component for a real estate lease and accounts for the non-lease component related to the lease element as a single lease element.

The Company recognizes right-of-use assets and lease liabilities at the commencement date of the lease. Right-of-use assets are initially measured at cost, and the costs shall comprise the amount of the initial measurement of the lease liability, the initial direct costs incurred by the lessee, any lease payments made at or before the commencement date (less any lease incentives received) and an estimate of costs to be incurred by the lessee in dismantling and removing the underlying asset, or restoring the underlying asset or the site on which it is located.

Right-of-use assets are subsequently depreciated on a straight-line basis from the commencement of the lease to the end of the lease term. However, if the ownership of the right-of-use asset is transferred at the end of the lease term or the exercise price of the purchase option is reflected in the cost of the right-of-use asset, the right-of-use assets shall be depreciated until the end of the useful life of the underlying asset on the same basis as the depreciation of the property, plant and equipment. Also, right-of-use assets may be adjusted as a result of a reduction in impairment losses or a remeasurement of lease liabilities.

Lease liabilities are initially measured at the present value of the lease payments not paid as of the commencement of the lease. Lease is discounted at the intrinsic interest rate of the lease, but if the intrinsic interest rate is not readily calculated, the lease is discounted at the Company's incremental borrowing rate. Generally, the Company uses the incremental borrowing rate as the discount rate. Lease liabilities are amortized in accordance with the effective interest method. When remeasurement of a lease liability, the relevant right-of-use assets is adjusted and the remeasurement amount is recognized in profit or loss if the carrying amount of the right-of-use assets is reduced to nil.

Lease payments included in the measurement of the lease liability comprise the following:

- fixed payments, including in-substance fixed payments
- variable lease payments that depend on an index or a rate, initially measured using the index or rate as at the commencement date;
- amounts expected to be payable under a residual value guarantee; and
- the exercise price under a purchase option that the Company is reasonably certain to exercise, lease payments in an optional renewal period if the Company is reasonably certain to exercise an extension option, and penalties for early termination of a unless the Company is reasonably certain not to terminate early.

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As practical expedient, the Company does not recognize right-of-use assets and lease liabilities for short-term leases with a lease term of less than 12 months and low-value assets. The Company shall recognize the lease charges relating to these leases as expenses in accordance with the straight-line method over the lease term.

2) Lessor

The accounting policies applied during comparative periods by the Company as a lessor are not different from those in K-IFRS No. 1116. As a lessor, the Company determines whether the lease is a finance lease or an operating lease at the inception of the lease. To classify each lease, the Company generally determines whether the lease transfers most of the risks and rewards of ownership of the underlying asset. If most of the risks and rewards of ownership of the underlying asset are transferred to the lessee, the lease is classified as a finance lease, otherwise the lease is classified as an operating lease.

(21) Derivative financial instruments and hedge accounting

Derivatives are initially recognized at fair value at the date the derivative contract is entered into and are subsequently remeasured to their fair value at the end of each reporting period. The resulting gain or loss is generally recognized as profit or loss when it is incurred. However, the effective portion of changes in the fair value of derivatives that are designated and qualified as cash flow hedges is recognized in other comprehensive income or loss. The gain or loss relating to the ineffective portion is recognized immediately in profit or loss.

1) Hedge accounting

The Company operates fair value hedges to avoid the risk of fair value change, which is incurred from specific risk on assets, liabilities and firm contracts, and cash flow hedges to avoid the risk of future cash flow change, which is incurred from specific risk on expecting contracts.

At the inception of the hedge relationship, the Company documents the relationship between the hedging instrument and the hedged item, along with its risk management objectives and its strategy for undertaking various hedge transactions. Furthermore, at the inception of the hedge and on an ongoing basis, the Company assesses whether there is an economic relationship between the hedged item and the hedging instrument.

The Company assumes that the interest rate benchmark on which the hedged cash flows and/or hedged risk are based, or the interest rate benchmark on which the cash flows of the hedging instrument are based, is not altered as a result of the interest rate benchmark reform when uncertainly arises in assessment of the economic relationship between the hedged item and the hedging instrument.

To determine whether the hedged cash flows are expected to occur, the Company shall assume that the interest rate benchmark on which the hedged cash flows are based is not altered as a result of the interest rate benchmark reform. To determine for relationship once designated as cash flow hedging accounting whether discontinued cash flow hedging accounting is expected to occur, the Company shall assume that the interest rate benchmark on which the hedged cash flows are based is not altered as a result of the interest rate benchmark reform.

The Company has applied the reliefs in relation to the following hedge accounting, provided under the Phase 2 amendments.

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- when the uncertainty arising from the report is no longer present;
- when hedging relationship is discontinued

When modification related with hedged item and/or hedging instrument is made and uncertainty no longer arises on the interest rate benchmark which the hedged cash flows and/or hedged risk are based, or the interest rate benchmark which the cash flows of the hedging instrument are based, the Company changes the official designation of hedging relationship documented in the past to reflect the changes required by the interest rate benchmark reform.

The Company will amend the documentation to reflect the changes to the hedged risk, hedged item and/or hedging instrument as result of the interest rate reform until the end of the reporting period. These amendments of hedge documentation would not require discontinuing the hedging relationships.

When modification on the financial assets or liabilities designated as a hedging relationship or additional modification on designation of hedging relationship are made as a result of interest rate benchmark reform, the Company shall determine whether hedging accounting is no longer applicable and if the hedging accounting continues to be applied, the Company changes the official designation of hedging relationship documented in the past to reflect the changes required by the interest rate benchmark reform.

When modification of hedged item is made on hedging document to reflect the changes required by the interest rate benchmark reform, the amount accumulated in the cash flow hedge reserve shall be deemed to be based on the alternative benchmark rate.

For a discontinued hedging relationship, when the interest rate benchmark on which the hedged future cash flows had been based is changed as required by interest rate benchmark reform, for the purpose to determine whether the hedged future cash flows are expected occur, the amount accumulated in the cash flow hedge reserve shall be deemed to be based on the alternative benchmark rate.

a) Fair value hedges

Changes in the fair value of derivatives that are designated and qualified as fair value hedges (or gain or loss on foreign currency translation, when a financial instrument, not derivative is designated as the hedging instrument) are recognized in profit or loss immediately, together with any changes in the fair value of the hedged asset or liability that are attributable to the hedged risk.

b) Cash flow hedges

The effective portion of change in the fair value of derivatives that are designated and qualify as cash flow hedges for decreasing risk incurred from change of future cash flow on forecast transaction is recognized in other comprehensive income or loss. Amounts previously recognized in other comprehensive income or loss and accumulated in equity are reclassified to profit or loss in the periods when the hedged item is recognized in profit or loss, or is reflected in the carrying amount of the associated asset or liability when the forecasted transaction occurs. Even when hedge accounting is discontinued due to the expiration, termination or exercise of hedging instrument, subsequent accounting treatment of amounts recognized in other comprehensive income or loss and accumulated in equity is the same. However, when hedge accounting is discontinued due to forecast transaction being no longer expected to occur, the gain or loss accumulated in equity is recognized immediately in profit or loss.

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2) Separable embedded derivatives

Embedded derivatives are separate from the host contract and accounted for separately only if the following conditions have been met: (a) the economic characteristics and risks of the host contract and the embedded derivatives are not clearly and closely related to a separate instrument with the same terms as the embedded derivative that would meet the definition of a derivative, and (b) the hybrid (combined) instrument is not measured at fair value through profit or loss. Changes in the fair value of separable embedded derivatives are recognized immediately in profit or loss.

3) Other derivative financial instruments

Derivative financial instruments other than the effective portion of derivative financial instruments that are designated as the hedging instruments are measured at fair value. Gain or loss arising from changes in fair value is recognized in profit or loss.

(22) Dividend

Dividend payable is recognized as liability when declaration of the dividend is approved in the shareholders' meeting.

(23) Issued capital

Common stocks are classified as equity, and the incremental costs directly arising from capital transactions, net of tax are deducted from equity. Preferred stocks are classified as equity only if the preferred stocks are not redeemable or redeemable solely upon the Company's decision, or the distribution of dividends is solely upon the Company's decision. Once a general meeting of shareholders meeting approves dividends, the Company recognizes the dividend liability accordingly.

Own equity instruments that are reacquired (treasury shares) are recognized at cost and deducted from 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.

(24) Share-based payments

The Company measures the cost of share options granted to employees by reference to the estimated fair value at the date at which they are granted. The share-based payment expenses are recognized on a straight-line basis over the vesting period reflecting expected forfeiture rate. The Company determines the fair value of share option using the Black-Scholes option pricing model.

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2. Significant accounting policies and basis of preparation, Continued

(25) Due from (to) customers for contract work

When contract costs incurred to date plus recognized profits less recognized losses exceed progress billing, the surplus is shown as amounts due from customers for contract work. For contracts where progress billings exceed contract costs incurred to date plus recognized profits less recognized losses, the surplus is shown as the amounts due to customers for contract work. Amounts received before the related work is performed are included in the separate statement of financial position, as a liability, as advances received. Amounts billed for work performed but not yet paid by the customer are included in the separate statement of financial position under trade receivables.

(26) Government grants

Government grants are recognized only when there is reasonable assurance that the grant will be received and the company will comply with the conditions associated with the grant.

The benefits of government loans at an interest rate lower than the market interest rate are treated as government grants, and the government grants are measured as the difference between the fair value of the government loans calculated based on the market interest rate and the consideration received.

Asset-related government grants are deducted when determining the carrying amount of assets and presented in the statements of financial position. The government grants are recognized in profit or loss over the useful life of the related assets by reducing depreciation expenses.

Revenue-related government grants are recognized as revenue over the period based on a systematic basis in order to respond to expenses intended to be compensated. Government grants received for immediate financial assistance provided to the Company without compensation for expenses or losses already incurred or related costs in the future are recognized in profit or loss during the period in which the right to receive them is incurred.

(27) Taxes and deferred tax

Income tax expense is composed of current and deferred tax. Current and deferred tax are recognized in profit or loss, except when they relate to items that are recognized in other comprehensive income or loss or directly in equity, in which case, the current and deferred tax are also recognized in other comprehensive income or loss or directly in equity, respectively.

Income tax (current tax) expense is the sum of corporate tax for each fiscal year and tax added to corporate tax under corporate income tax law and other applicable laws. Additional income taxes or tax refunds for the prior periods are included in income tax expense for the current period when recognized. 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.

Deferred tax is recognized on temporary differences between the carrying amounts of assets and liabilities in the separate financial statements and the corresponding tax bases used in the computation of taxable income. Deferred tax assets and liabilities are not recognized if the temporary difference arises from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the taxable income nor the accounting income.

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2. Significant accounting policies and basis of preparation, Continued

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 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 income will be available to allow all or part of the asset to be recovered.

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2. Significant accounting policies and basis of preparation, Continued

(28) Assets held for sale

Non-current assets and disposal groups are classified as assets 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. Non-current assets (and disposal groups) classified as held for sale are measured at the lower of their previous carrying amount and fair value less costs to sell. If the fair value less costs to sell of the non-current assets held for sale (and disposal groups) decrease, impairment loss is recognized immediately in profit or loss. A gain should be recognized for any subsequent increase in fair value less costs to sell of an asset, but not in excess of the cumulative impairment loss previously recognized.

Non-current assets that are classified as assets held for sale or are part of disposal groups are no longer depreciated or amortized.

(29) Greenhouse gas emissions rights

In connection with Enforcement of Allocation and Trading of Greenhouse Gas Emissions Allowances, the Company applies the following accounting policies for greenhouse gas emissions rights and obligations.

1) Greenhouse gas emissions rights

Greenhouse gas emissions rights consist of the allowances received free of charge from the government and the ones purchased. The allowances received free of charge from the government are measured and recognized at zero, and emissions rights purchased are recognized at acquisition cost by including expenditures arising directly from the acquisition and any other costs incurred during normal course of the acquisition.

Greenhouse gas emissions rights are held by the Company to fulfill the legal obligation and recorded as intangible assets. To the extent that the portion to be submitted to the government within one year from the end of reporting period, the greenhouse gas emissions rights are classified as current assets. Greenhouse gas emissions rights recorded as intangible assets are initially measured at cost and substantially remeasured at cost less accumulated impairment losses.

Greenhouse gas emissions rights with the intention to sell within a short period are classified as current assets and measured at fair value, and changes in fair value are recognized in profit or loss for the year. Greenhouse gas emissions rights are derecognized on submission to the government or when no future economic benefits are expected from its use or disposal.

2) Greenhouse gas emissions obligations

Greenhouse gas emissions obligations are the Company's present legal obligation to submit the greenhouse gas emissions allowances to the government and measured as the sum of the carrying amount of the allocated rights and best estimate of expenditure required to settle the obligation at the end of the reporting period for any excess emission. The Company derecognizes the emission obligations when the Company submits the emissions rights to the government.

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2. Significant accounting policies and basis of preparation, Continued

(30) Operation segments

The Company presents disclosure relating to operating segments on its consolidated financial statements in accordance with K-IFRS No. 1108 'Operating Segments' and such disclosures are not separately disclosed on these separate financial statements.

(31) Revenue from contracts with customers

1) Identify performance obligations

The Company is mainly engaged in the businesses of power generation facilities, industrial facilities, manufacturing of casting and forging products and comprehensive construction business. The Company identifies separate performance obligations in the contracts and determines whether each of the performance obligations is satisfied at a point of time or over time under K-IFRS No. 1115.

The Company identified as a separate performance obligation if the customer benefits from the good or service on its own or together with other readily available resources and the entity's promise to transfer the good or service separately is identifiable from other promises in the contract. In addition, the transaction price is allocated to each performance obligation in proportion to its stand-alone selling price and if the stand-alone selling price is not directly observable then the entity estimates the amount by using a suitable method.

2) Obligations to perform over period of time

The Company manufactures and sells specialized power machinery which are built based on customer's orders designating the design elements. The Company recognizes revenue over time measuring the progress towards complete satisfaction of the performance obligation, only when the asset in its completed state has no alternative use to the Company and there is an enforceable right to payment for performance completed to date.

3) Measurement of the percentage-of-completion by using the input method

The Company contracts for EPC plant construction contracts and power generating service contracts including purchasing, manufacturing and installing boiler, turbine and others and generally proceeds over a long period of time. The Company recognizes revenue following percentage-of-completion method, judging whether the construction/service contracts are provided over period if it meets all the following conditions:

- The customers simultaneously acquire and consume benefits that the Company provides
- The Company creates or enhances the value of the asset that customers control

However, to represent performance degree faithfully, the Company recognizes the amount equal to the cost of the goods to perform the obligation as revenue if it meets all of the following conditions:

- Undistinguished goods when the contract initiate
- Expected that the customer can control significantly before the service is provided related to the goods
- The cost of the goods transferred is more significant than the total cost expected to fully perform the obligation
- The Company is provided the goods from the third party
- Not significantly involved in the design and production of the goods

2. Significant accounting policies and basis of preparation, Continued

4) Variable consideration

The Company estimates an amount of variable consideration by using the method the Company expects to better predict the amount of consideration to which it will be entitled. The Company includes an amount of variable consideration in the transaction price only to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the return period expires.

5) Allocating the transaction price to performance obligations

The Company allocates the transaction price to each performance obligation on a relative stand-alone selling price basis. The Company uses adjusted market assessment approach to estimate the stand-alone selling price, however, for certain transactions, 'expected cost plus a margin approach' is used exceptionally.

6) Warranty obligation

The Company generally provide warranty contract with customers pursuant to the local laws and customs. Most of these warranties are assurance type of warranty and accrue provision based on reliable estimate under K-IFRS No. 1037, 'Provisions, Contingent Liabilities and Contingent Assets'.

However, if the Company provides extended warranty that is not assurance type of warranty under non-standardized contract, it is accrued as service type of warranty and separate to performance obligation requiring allocation of transaction price. Revenue is recognized over period of time.

3. Significant accounting estimates and assumptions

The estimates and underlying assumptions are reviewed on an ongoing basis. The estimates and underlying assumptions are based on historical experiences and other factors including expectation on possible future events. Actual results may differ from these estimates. The following are critical assumptions and key sources of estimation uncertainty at the end of reporting period, that have a significant risk of causing a material adjustment to the carrying amounts of the Company's assets and liabilities within the next financial year.

(1) Recognition of revenue

The Company recognizes revenue over time using the input method in relation to its performance obligation over time. Revenue is recognized as work progresses in the ratio of actual costs incurred to estimated total costs. In recognition of revenue according to the input method, the amount of revenue recognized differs depending on the measured progress, so it is required to estimate the method for measuring progress, estimated total contract costs, and changes in construction work. Any changes in the early stages of long-term projects in the scope and costs of project implementation in the construction period, and in construction plans may have a significant effect on the amount of revenue recognized.

(2) Defined benefit liability

The Company operates a defined benefit plan. Defined benefit liability is calculated by annual actuarial valuations as of the reporting date. In order to perform the actuarial valuations, assumptions for discount rates, future salary increases and others are required to be estimated.

(3) Provisions

Provisions are recognized when the Company has a present obligation (legal or constructive) as a result of a past event, and if it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and if a reliable estimate can be made of the amount of the obligation. In accordance with the relevant laws and practices, the estimated amounts may change to prescribe for additional provisions to be recognized in future periods.

(4) Deferred tax

Recognition and measurement of deferred tax assets and liabilities require judgment of the Company's management. Especially, the recognition of deferred tax asset and the scope of recognition are influenced by assumptions about future circumstances and judgment of management.

(5) Impairment of non-financial assets

The Company is assessing whether there is any indication that an asset may be impaired at the end of each reporting period. The Company estimates the recoverable amount of an asset when such indication exists or when an impairment test for an asset is required each year. Recoverable amount of an asset is the higher of its fair value less costs of disposal and its value in use. The recoverable amount is determined for individual assets. However, if an asset does not generate cash inflows that are largely independent of those from other assets, the recoverable amount is determined for the CGU to which the asset belongs. The asset is impaired if its carrying amount exceeds its recoverable amount and the carrying amount of the asset is reduced to its recoverable amount.

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4. Financial risk management

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

Financial risk management activities are performed by the treasury department in accordance with the risk management policies. In addition, the Company enters into derivative contracts to hedge against certain risks. The Company is trying to minimize the effect of financial risks by reorganizing financial risk management policy and monitoring financial risks regularly.

(1) Market risk

1) Foreign currency risk

The Company's exposure to the risk of changes in foreign currency exchange rates relates primarily to the Company's operating activities and net investments in foreign subsidiaries. The Company's objective of foreign currency risk management is to minimize uncertainty and volatility arising from fluctuations in foreign currency exchange rates. Foreign currency risk is managed in accordance with the Company's policy on foreign currencies, and currency trading for speculative purposes is prohibited.

The Company's basis for foreign currency management is to reduce income/loss volatility. 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 by using currency derivatives, such as currency forwards, for the remaining exposure.

The book value of the Company's monetary assets and liabilities denominated in foreign currencies, which represents the maximum exposure to foreign currency risk as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022				
		USD	EUR	JPY	GBP	Others(*1)
Financial assets	₩	440,142	10,998	4,178	101,020	156,728
Financial liabilities		325,951	179,462	23,367	3,181	44,642
Net assets (liabilities)	₩	114,191	(168,464)	(19,189)	97,839	112,086

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

(In millions of won)

		2021				
		USD	EUR	JPY	GBP	Others(*1)
Financial assets	₩	472,789	18,129	3,423	26,333	267,223
Financial liabilities		259,010	95,498	16,857	1,178	54,829
Net assets (liabilities)	₩	213,779	(77,369)	(13,434)	25,155	212,394

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

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4. Financial risk management, Continued

A sensitivity analysis on the Company's income before tax for the year, assuming a 10% increase and decrease in currency exchange rates, as of December 31, 2022 and 2021 are as follows:

(In millions of won)	2022		2021	
	10% increase	10% decrease	10% increase	10% decrease
Income before tax impact	₩ 13,646	(13,646)	36,053	(36,053)

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, 2022 and 2021.

2) Interest rate risk

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 borrowing or deposit with floating interest rates. The purpose of interest rate risk management is to minimize uncertainty and financial expense arising from interest rate fluctuation.

To manage its interest rate risk, the Company minimizes external borrowings using internal funds, reduces borrowings with high interest rates, maintains an appropriate balance between borrowings with floating interest rate and fixed-interest rate and improves system for short 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.

Floating rate financial assets and liabilities exposed to interest rate risk as of December 31, 2022 and 2021 are as follows:

(In millions of won)	2022		2021	
Financial assets	₩	133,800		107,000
Financial liabilities		611,000		929,111
Net liabilities	₩	(477,200)		(822,111)

A sensitivity analysis on the Company's income before tax for the year, assuming a 1% increase and decrease in interest rates, as of December 31, 2022 and 2021 are as follows:

(In millions of won)	2022		2021	
	1% increase	1% decrease	1% Increase	1% decrease
Income before tax impact	₩ (4,772)	4,772	(8,221)	8,221

3) Price risk

The Company is exposed to equity price risks arising from its listed equity investments among financial instruments. 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. Significant investments in the Company's portfolio are individually managed, and acquisition and disposal are approved by the Board of Directors.

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4. Financial risk management, Continued

(2) Credit risk

The Company is exposed to credit risk that a counterparty will not meet its obligations under a financial instrument or customer contract, leading to a financial loss. Credit risk arises from trade and other receivables, debt instruments, deposits in financial institutions, derivative financial instruments and financial guarantee contracts.

The Company enters into transactions with customers having met a certain level of credit quality and maintains policies and procedures on financial assets to manage such risks. The credit quality of a new customer is assessed based on publicly announced financial information and the information provided by credit rating agencies. Such assessment is used as a basis for determining a customer's credit limit. Furthermore, collaterals and credit guarantees are obtained as security, if necessary. In addition, the Company periodically reassesses the credit quality of customers by auditing credit limits and adjusts the amount covered by collaterals when deemed necessary. The Company also monitors whether the collection of financial assets have been impaired to take relevant actions.

The carrying amount of financial assets represents the Company's maximum exposure. The maximum exposure to credit risk as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Cash and cash equivalents	₩ 307,351	423,695
Short and long- term financial instruments	109,829	469,555
Trade receivables and other receivables	1,247,053	628,461
Deposits in financial institutions	36,691	76,703
Short and long- term investment in securities (excluding equity securities)	128,377	125,946
Derivative financial assets	77,642	28,066
Total	₩ 1,906,943	1,752,426

In addition to the above, the maximum amounts to be paid for the principal debtor related to financial guarantee contract are described in Notes 31 (6), (7) and (8).

The Company's receivables' aging analysis as of December 31, 2022 and 2021 are as follows:

(In millions of won)

(In millions of won)		2022					
		Receivables assessed for impairment individually or on a collective basis					
		Before maturity	0–3 months	3–6 months	6–12 months	More than 12 months	Total
Trade receivables	₩	396,256	56,441	26,671	47,737	368,377	895,482
Loans and other receivables		1,415,470	25,023	10,129	3,944	76,431	1,530,997
Accrued income		27,464	-	-	-	16,720	44,184
Lease receivables		2,281	-	-	-	-	2,281
Total	₩	1,841,471	81,464	36,800	51,681	461,528	2,472,944

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4. Financial risk management, Continued

(In millions of won)

		2021					
		Receivables assessed for impairment individually or on a collective basis					
		Before maturity	0-3 months	3-6 months	6-12 months	More than 12 months	Total
Trade receivables	₩	159,327	11,523	12,040	14,194	398,063	595,147
Loans and other receivables		945,886	12,463	3,837	3,893	113,219	1,079,298
Accrued income		13,865	-	-	-	16,720	30,585
Lease receivables		4,520	-	-	-	-	4,520
Total	₩	1,123,598	23,986	15,877	18,087	528,002	1,709,550

ECLs are measured at the present value of all cash shortfalls. If the Company does not have reasonable and supportable information that is available without overwhelming cost or effort to measure ECLs on an individual instrument basis, the Company can group financial instruments on the basis of shared credit risk characteristics.

(3) Liquidity risk

The Company is exposed to liquidity risk, which is the risk that it will encounter difficulties in fulfilling the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Company manages liquidity risk by matching the duration of financial assets and liabilities through estimating future cash flows from its operating, investing and financing activities, and securing moderate levels of liquidity in advance.

A summary of expected maturity for the Company's financial liabilities, etc. as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022				
		Nominal cash flows according to contract				
	Book value	Total	Less than 1 year	1-2 years	2-5 years	More than 5 years
Principal on non-derivative financial liabilities (*1)	₩ 4,996,657	5,045,813	3,286,307	1,513,551	167,141	78,814
Interest on non-derivative financial liabilities	-	155,507	111,711	42,244	1,552	-
Derivative financial liabilities	109,316	116,280	73,951	21,027	19,901	1,401
Guarantee contract(*2)	-	2,354,609	2,354,609	-	-	-
Total	₩ 5,105,973	7,672,209	5,826,578	1,576,822	188,594	80,215

(*1) This includes provision for payment guarantees in the amount of ₩54,855 million.

(*2) Maximum exposure associated with the guarantee contracts is the maximum amounts of the obligation (See Note 31).

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4. Financial risk management, Continued

(In millions of won)

	2021					
	Nominal cash flows according to contract					
	Book value	Total	Less than 1 year	1-2 years	2-5 years	More than 5 years
Principal on non-derivative financial liabilities (*1)	₩ 6,473,189	6,532,723	5,560,976	718,263	152,343	101,141
Interest on non-derivative financial liabilities	-	57,553	53,193	3,977	383	-
Derivative financial liabilities	220,037	226,810	188,118	17,437	19,924	1,331
Guarantee contract(*2)	-	2,968,275	2,968,275	-	-	-
Total	₩ 6,693,226	9,785,361	8,770,562	739,677	172,650	102,472

(*1) This includes provision for payment guarantees in the amount of ₩54,855 million.

(*2) Maximum exposure associated with the guarantee contracts is the maximum amounts of the obligation.

The contractual amounts of financial liabilities in the above tables are calculated based on non-discounted cash flows (including estimated interest expense) and differ from its book values.

(4) Capital risk

The objective of the Company's capital risk management is to secure its ability to provide earnings to its shareholders and interested parties and sustain optimal capital structure to reduce the cost of capital. In order to sustain optimal capital structure, the Company uses a debt-to-equity ratio similar to other entities in the industry. Debt-to-equity ratio is calculated by dividing total liabilities by total equity.

Debt-to-equity ratios as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Total liabilities (A)	₩ 7,075,909	8,330,287
Total equity (B)	6,113,632	5,701,584
Debt-to-equity ratio (A/B)	115.74%	146.10%

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5. Restricted financial assets

Details of restricted financial assets as of December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>	2022	2021	Restrictions
Short-term financial instruments			Establishment of pledge related to financial loan
	₩ 36,080	277,115	and Government R&D projects(*1), and others
	36,499	157,702	Price Return Swap ("PRS") deposit(*2)
	12,000	12,000	Shared growth fund
Long-term financial instruments			Establishment of pledge related to financial loan,
	25,250	22,738	deposits for maintenance of checking accounts
			and leasehold deposit of Bundang Doosan Tower
Total	₩ 109,829	469,555	

(*1) The amounts are restricted in use and may only be used for specific national R&D projects.

(*2) This is deposit amount for the PRS contract that exchanges the profit from the changes in the stock price of Doosan Bobcat Inc..

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6. Long-term Investments in securities

(1) Investments in securities as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Description	2022	2021
Financial assets as measured at FVOCI	₩ 3,885	3,885
Financial assets as measured at FVTPL	180,183	172,745
Total	₩ 184,068	176,630

(2) Details of the Company's investments in securities as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Description	2022	2021
Long-term Financial assets as measured at FVOCI	₩ 3,885	3,885
Equity securities		
AI Asilah Desalination Company		
Woori Financial Group Inc.(*3, 4)	-	10,160
NuScale Power LLC	50,737	35,692
Kuwait Offset Fund	996	852
Others	73	95
SOC		
Incheon-Gimpo Expressway Co.(*4)	-	6,855
Gyeonggi East-West Beltway Co.(*1)	1,424	5,671
Investment in guarantee cooperative		
Machinery Financial Cooperative(*2)	8,655	8,620
Construction Guarantee Cooperative(*2)	81,535	81,317
Engineering Guarantee Insurance(*2)	6,813	5,448
Construction Industry Guarantee(*2)	14,844	7,518
Others	427	414
Beneficiary certificates		
Gyeongnam GNTech Creative Economy Innovation Fund	1,672	1,703
Korea EXIM Bank - Public Carbon Fund	326	326
Emerald Technology Ventures	12,681	8,074
Subtotal	180,183	172,745
Total	₩ 184,068	176,630

(*1) It has been pledged as collateral for developers' project financing as of December 31, 2022 (See Note 32).

(*2) It has been pledged as collateral for the Company's debt as of December 31, 2022 (See Note 32).

(*3) It has been succeeded from spin-off and merger of Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.)'s investment division in 2021.

(*4) Disposed in 2022.

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6. Long-term Investments in securities, Continued

(3) Changes in financial assets as measured at fair value for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022				
		January 1	Acquisition	Disposal	Gain or loss on valuation	December 31
Financial assets as measured at FVOCI	₩	3,885	-	-	-	3,885
Financial assets as measured at FVTPL		172,745	9,633	(18,094)	15,899	180,183
Total	₩	<u>176,630</u>	<u>9,633</u>	<u>(18,094)</u>	<u>15,899</u>	<u>184,068</u>

(In millions of won)

		2021					
		January 1	Acquisition	Disposal	Gain or loss on valuation	Others(*1)	December 31
Financial assets as measured at FVOCI	₩	3,885	-	-	-	-	3,885
Financial assets as measured at FVTPL		786,368	56,665	(1,480)	(12,806)	(656,002)	172,745
Total	₩	<u>790,253</u>	<u>56,665</u>	<u>(1,480)</u>	<u>(12,806)</u>	<u>(656,002)</u>	<u>176,630</u>

(*1) Includes the amount of reclassification between accounts.

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7. Trade and other receivables

(1) Trade and other receivables as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022			2021		
		Gross	Allowance for doubtful accounts	Book value	Gross	Allowance for doubtful accounts	Book value
Current asset:							
Trade receivables	₩	895,482	(379,252)	516,230	595,147	(350,847)	244,300
Other receivables		361,787	(120,909)	240,878	304,271	(129,745)	174,526
Accrued income		44,184	(21,302)	22,882	30,585	(16,392)	14,193
Short-term loans		455,134	(78,023)	377,111	224,670	(78,507)	146,163
Lease receivables		2,281	-	2,281	2,239	-	2,239
Subtotal		1,758,868	(599,486)	1,159,382	1,156,912	(575,491)	581,421
Non-current asset:							
Long-term other receivables		63,136	(14,900)	48,236	-	-	-
Long-term loans		650,940	(611,505)	39,435	550,357	(505,598)	44,759
Lease receivables		-	-	-	2,281	-	2,281
Subtotal		714,076	(626,405)	87,671	552,638	(505,598)	47,040
Total	₩	2,472,944	(1,225,891)	1,247,053	1,709,550	(1,081,089)	628,461

(2) Changes in allowance for doubtful accounts for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022				
		January 1	Provision for allowance	Write-off	Others	December 31
Trade and other receivables:						
Trade receivables	₩	350,847	50,433	(34,755)	12,727	379,252
Other receivables		129,745	11,144	(6,252)	1,172	135,809
Accrued income		16,392	4,984	-	(74)	21,302
Short and long-term loans		584,105	113,443	-	(8,020)	689,528
Subtotal		1,081,089	180,004	(41,007)	5,805	1,225,891
Others:						
Due from customers for contract work		112,391	(13,358)	-	-	99,033
Deposits		2,800	-	-	-	2,800
Subtotal		115,191	(13,358)	-	-	101,833
Total	₩	1,196,280	166,646	(41,007)	5,805	1,327,724

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7. Trade and other receivables, Continued

		2021		
		January 1	Provision for allowance	December 31
<i>(In millions of won)</i>				
Trade and other receivables:				
Trade receivables	₩	325,124	25,723	350,847
Other receivables		107,295	22,450	129,745
Accrued income		12,588	3,804	16,392
Short and long-term loans		548,481	35,624	584,105
Subtotal		993,488	87,601	1,081,089
Others:				
Due from customers for contract work		54,873	57,518	112,391
Deposits		2,339	461	2,800
Subtotal		57,212	57,979	115,191
Total	₩	1,050,700	145,580	1,196,280

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8. Inventories

Inventories as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022			2021		
		Acquisition cost	Valuation allowance	Book value	Acquisition cost	Valuation allowance	Book value
Finished goods	₩	24,288	(5,617)	18,671	23,916	(4,123)	19,793
Work-in-process		254,665	(25,949)	228,716	247,251	(23,164)	224,087
Raw materials		49,740	(3,548)	46,192	47,761	(3,214)	44,547
Supplies		20,744	(2,621)	18,123	19,351	(2,508)	16,843
Materials-in-transit		14,609	-	14,609	55,790	-	55,790
Total	₩	364,046	(37,735)	326,311	394,069	(33,009)	361,060

Losses on inventory valuation recognized within the cost of sales amounted to ₩4,726 million and ₩14,771 million for the years ended December 31, 2022 and 2021, respectively.

9. Derivatives

(1) Overview of the derivatives of the Company is as follows:

	Category	Summary
Fair value hedge	Forward exchange	Avoiding the risk of exchange rate fluctuations for foreign currency contracts that meet the requirements of the firm commitment
	Borrowing denominated in foreign currencies	Designating borrowings denominated in foreign currencies as hedging instruments to hedge the fair value change of firm commitments
Cash flow hedge	Currency forward exchange	Avoiding the cash flow risk due to fluctuations in the exchange rate of the expected foreign currency collection and the expected foreign currency expenditure related to the purchasing of foreign materials
	Interest rate swap ("IRS")	Contracts that pay a fixed rate and receive a variable rate on the future interest payment date in order to avoid the risk of cash flow fluctuations due to fluctuations in interest rates
Trading	Currency forward exchange	Contracts that concluded a currency forward exchange contract to avoid the risk of future cash flow fluctuations, but did not apply hedging accounting
	Currency rate swap ("CRS")	Contracts that pay a fixed rate of local currency and receive a fixed rate of foreign currency on the future interest and principal payment date in order to avoid the cash flow risk due to fluctuations in exchange rate, but did not apply hedging accounting
	PRS	Derivative contracts for the purpose of trading that settles the difference in the stock price between the time of sales and time of settlement

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9. Derivatives, Continued

The Company classified derivatives as non-current assets (liabilities) if their remaining maturity exceeds 12 months from the end of the reporting period to the contract maturity date, and current assets (liabilities) if they are within 12 months. When cash flow hedging is applied, the ineffective portion is recognized in profits (losses).

(2) Details of valuation of derivatives as of December 31, 2022 and 2021 are as follows:

(In millions of won, in thousands of foreign currency)

2022							
Buy		Sell		Derivative financial assets (liabilities)	Gain (loss) on valuation of derivative financial instruments	Accumulated other comprehensive income (loss) (*1)	Firm commitment assets (liabilities) (*2)
Currency	Amounts	Currency	Amounts				
Forward exchange:							
KRW	2,467,931	USD	2,009,370 ₩	(43,132)	(14,051)	3,588	82,850
KRW	65,379	EUR	47,060	1,209	1,243	200	(1,819)
KRW	67,650	JPY	5,822,910	7,715	2,249	1,067	(13,432)
KRW	344,402	Others		16,888	15,949	1,353	(9,771)
USD	532,345	KRW	671,009	(4,415)	(8,740)	4,499	12,425
EUR	165,430	KRW	227,151	(2,852)	(3,673)	823	530
JPY	8,718,190	KRW	96,869	(8,672)	519	(7,311)	502
Others		KRW	103,363	(4,721)	(2,415)	(3,535)	1,339
IRS				691	-	691	-
CRS				22,614	19,782	-	-
PRS(*3)				(16,999)	(16,999)	-	-
	Subtotal			(31,674)	(6,136)	1,375	72,624
Tax effect				-	-	(319)	-
	Total		₩	(31,674)	(6,136)	1,056	72,624

(*1) In consideration of the amounts adjusted in sales and cost of sales, the effective portion of changes in fair value of cash flow hedges amounting to ₩1,056 million, net of tax, was recognized in accumulated other comprehensive income or loss.

(*2) In consideration of the amounts adjusted in sales, firm commitment assets of ₩95,467 million and firm commitment liabilities of ₩22,843 million were recognized in the separate statements of financial position by applying a fair value hedge accounting.

(*3) The Company has entered into PRS contract that exchanges the profit from the changes in the stock price of Doosan Bobcat Inc..

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9. Derivatives, Continued

(In millions of won, in thousands of foreign currency)

2021							
Buy		Sell		Derivative financial assets (liabilities)	Gain (loss) on valuation of derivative financial instruments	Accumulated other comprehensive income (loss) (*1)	Firm commitment assets (liabilities) (*2)
Currency	Amounts	Currency	Amounts				
Forward exchange:							
KRW	1,983,930	USD	1,750,491 ₩	(91,984)	(122,217)	(813)	55,719
KRW	112,827	EUR	82,830	207	287	74	(194)
KRW	127,630	JPY	11,211,370	9,055	1,906	375	(4,352)
KRW	213,437	Others		(4,956)	(4,772)	(246)	2,175
USD	366,101	KRW	423,902	10,639	15,698	3,561	(2,296)
EUR	259,550	KRW	354,471	(1,401)	(1,213)	1,112	(17)
JPY	13,510,510	KRW	164,988	(22,103)	(1,042)	(6,052)	117
Others		KRW	79,971	1,496	246	1,307	(117)
Short and long-term borrowing denominated in foreign currencies(*3)							
KRW	-	USD	-	-	-	-	49
CRS				14,044	31,772	-	-
Stock warrant(*4)				-	56,148	-	-
PRS(*5)				(106,968)	(106,968)	-	-
Subtotal				(191,971)	(130,155)	(682)	51,084
Tax effect				-	-	165	-
Total				₩ (191,971)	(130,155)	(517)	51,084

(*1) In consideration of the amounts adjusted in sales and cost of sales, the effective portion of changes in fair value of cash flow hedges amounting to (-) ₩517 million, net of tax, was recognized in accumulated other comprehensive income or loss.

(*2) In consideration of the amounts adjusted in sales, firm commitment assets of ₩65,437 million and firm commitment liabilities of ₩14,353 million were recognized in the separate statements of financial position by applying a fair value hedge accounting.

(*3) The Company designated its short and long-term borrowings denominated in foreign currencies as hedging instruments to hedge the fair value change of firm commitments.

(*4) It is stock warrants of detachable bonds with stock warrants issued by Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) and the entire stock was sold in 2021.

(*5) The Company has entered into PRS contract that exchanges the profit from the changes in the stock price of Doosan Bobcat Inc..

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10. Financial instruments

(1) Financial assets as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022					
		Financial assets as measured at amortized cost	Financial assets as measured at FVOCI	Financial assets as measured at FVTPL	Other financial assets (*1)	Carrying amounts	Fair value
Cash and cash equivalents	₩	307,351	-	-	-	307,351	307,351
Short and long-term financial instruments		109,829	-	-	-	109,829	109,829
Short and long-term investment in securities		-	3,885	180,183	-	184,068	184,068
Derivative financial assets		-	-	44,557	33,085	77,642	77,642
Trade and other receivables		1,247,053	-	-	-	1,247,053	1,247,053
Deposits		36,691	-	-	-	36,691	36,691
Total	₩	1,700,924	3,885	224,740	33,085	1,962,634	1,962,634

(*1) Other financial assets include derivatives as hedged item.

(In millions of won)

		2021					
		Financial assets as measured at amortized cost	Financial assets as measured at FVOCI	Financial assets as measured at FVTPL	Other financial assets (*1)	Carrying amounts	Fair value
Cash and cash equivalents	₩	423,695	-	-	-	423,695	423,695
Short and long-term financial instruments		469,555	-	-	-	469,555	469,555
Short and long-term investment in securities		-	3,885	172,745	-	176,630	176,630
Derivative financial assets		-	-	17,280	10,786	28,066	28,066
Trade and other receivables		628,461	-	-	-	628,461	628,461
Deposits		76,703	-	-	-	76,703	76,703
Total	₩	1,598,414	3,885	190,025	10,786	1,803,110	1,803,110

(*1) Other financial assets include derivatives as hedged item.

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10. Financial instruments, Continued

(2) Financial liabilities as of December 31, 2022 and 2021 are as follows:

(In millions of won)

(In millions of won)

		2022				
		Financial liabilities as measured at amortized cost	Financial liabilities as measured at FVTPL	Other financial liabilities (*1)	Carrying amounts	Fair value
Trade and other payables	₩	1,269,006	-	-	1,269,006	1,269,006
Borrowings and bonds		3,263,861	-	-	3,263,861	3,263,861
Derivative financial liabilities		-	17,376	91,940	109,316	109,316
Financial guarantee liabilities		-	-	180	180	180
Lease liabilities		172,304	-	-	172,304	172,304
Others		236,451	-	-	236,451	236,451
Total	₩	4,941,622	17,376	92,120	5,051,118	5,051,118

(*1) Other financial liabilities include derivatives as hedged item and others.

(In millions of won)

(In millions of won)

		2021				
		Financial liabilities as measured at amortized cost	Financial liabilities as measured at FVTPL	Other financial liabilities (*1)	Carrying amounts	Fair value
Trade and other payables	₩	1,267,820	-	-	1,267,820	1,267,820
Borrowings and bonds		4,723,779	-	-	4,723,779	4,723,779
Derivative financial liabilities		-	122,009	98,028	220,037	220,037
Financial guarantee liabilities		-	-	4,018	4,018	4,018
Lease liabilities		183,629	-	-	183,629	183,629
Others		239,088	-	-	239,088	239,088
Total	₩	6,414,316	122,009	102,046	6,638,371	6,638,371

(*1) Other financial liabilities include derivatives as hedged item and others.

(3) Fair value hierarchy of financial instruments

As of December 31, 2022 and 2021, the Company uses the following hierarchy for determining and disclosing the fair value of financial instruments:

Level 1: Quoted (unadjusted) 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 primarily comprise listed equity investments classified as trading securities.

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 to fair value an instrument are observable, the instrument is included in level 2.

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10. Financial instruments, Continued

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

Specific valuation techniques used to value financial instruments include:

- quoted or dealer price of similar instruments.
- the fair value of forward foreign exchange contracts determined by using forward exchange rates at the reporting date, with the resulting value discounted to present value.
- other financial techniques such as discounted cash flow analysis.

The level of fair value measurements of financial instruments as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022			
		Level 1	Level 2	Level 3	Total
Financial assets measured at fair value:					
Measured at FVOCI	₩	-	-	3,885	3,885
Measured at FVTPL		50,749	44,557	129,434	224,740
Others		-	33,085	-	33,085
Total	₩	50,749	77,642	133,319	261,710
Financial liabilities measured at fair value:					
Measured at FVTPL	₩	-	17,376	-	17,376
Others		-	91,940	180	92,120
Total	₩	-	109,316	180	109,496

(In millions of won)

		2021			
		Level 1	Level 2	Level 3	Total
Financial assets measured at fair value:					
Measured at FVOCI	₩	-	-	3,885	3,885
Measured at FVTPL		10,196	17,280	162,549	190,025
Others		-	10,786	-	10,786
Total	₩	10,196	28,066	166,434	204,696
Financial liabilities measured at fair value:					
Measured at FVTPL	₩	-	122,009	-	122,009
Others		-	98,028	4,018	102,046
Total	₩	-	220,037	4,018	224,055

The above tables exclude financial assets and financial liabilities which are not measured at fair value as differences between the carrying amounts and fair values are not significant.

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10. Financial instruments, Continued

Assumptions used for the measurement of financial assets at fair value based on level 3 valuation techniques as of December 31, 2022 are as follows:

	Valuation techniques	Discount rate	Note
Gyeonggi East-West Beltway Co.	Dividend discount model	10.38%	Expected dividend cash flow for each financial period
Korea EXIM Bank - Public Carbon Fund	Estimated sales price valuation method	-	Expected sales price
Construction Guarantee Cooperative	Estimated sales price valuation method	-	Expected sales price
Machinery Financial Cooperative	Estimated sales price valuation method	-	Expected sales price
Engineering Guarantee Insurance	Estimated sales price valuation method	-	Expected sales price
Construction Industry Guarantee	Estimated sales price valuation method	-	Expected sales price
Gyeongnam GNTech Creative Economy Innovation Fund	Net asset value assessment	-	Fair value of net asset
Emerald Technology Venture	Estimated sales price valuation method	-	Return rate on investment
Al Asilah Desalination Company	Net asset value assessment	-	Fair value of net asset
Others	Estimated sales price valuation method, etc.	-	Expected sales price and others

Changes in financial assets included in Level 3 of the fair value hierarchy for the years ended December 31, 2022 and 2021 are summarized as follows and there is no transfer between levels of the fair value.

(In millions of won)

		2022					
		January 1	Acquisition	Disposal	Reclassified category(*1)	Gain or loss on valuation	December 31
Financial assets as measured at FVOCI	₩	3,885	-	-	-	-	3,885
Financial assets as measured at FVTPL		162,549	9,633	(9,737)	(35,692)	2,681	129,434
Total	₩	166,434	9,633	(9,737)	(35,692)	2,681	133,319

(*1) Reclassified from level 3 to level1 because the financial instruments were converted to be traded in active market in 2022.

(In millions of won)

		2021					
		January 1	Acquisition	Disposal	Gain or loss on valuation	Others	December 31
Financial assets as measured at FVOCI	₩	3,885	-	-	-	-	3,885
Financial assets as measured at FVTPL		103,388	48,827	(1,480)	11,814	-	162,549
Total	₩	107,273	48,827	(1,480)	11,814	-	166,434

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10. Financial instruments, Continued

(4) Gain or loss by categories of financial instruments

1) Gain or loss by categories of financial instruments for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

(In millions of won)		2022					
		Interest income (expense)	Dividend income	Gain or loss on valuation(*1)	Impairment loss on financial instruments	Gain or loss on disposal	Gain or loss on financial guarantee
Financial assets:							
Measured at							
amortized cost	₩	24,900	-	-	(180,033)	(129)	1,231
Measured at							
FVTPL		-	2,056	15,899	-	1,272	-
Financial liabilities:							
Measured at							
amortized cost	₩	(141,735)	-	-	-	-	-
Others		-	-	-	-	-	(1,632)

(*1) The amounts of gains and losses of foreign exchange and derivatives are excluded.

(In millions of won)

(In millions of won)		2021					
		Interest income (expense)	Dividend income	Gain or loss on valuation(*1)	Impairment loss on financial instruments	Gain or loss on disposal	Gain or loss on financial guarantee
Financial assets:							
Measured at							
amortized cost	₩	12,137	-	-	(89,610)	(988)	927
Measured at							
FVTPL		-	1,313	(12,806)	-	-	-
Financial liabilities:							
Measured at							
amortized cost	₩	(178,996)	-	-	-	-	-
Others		-	-	-	-	-	(9,279)

(*1) The amounts of gains and losses of foreign exchange and derivatives are excluded.

Gains or losses on translation or transaction of foreign currencies arising from foreign currency transactions except for derivative financial instruments have been mostly incurred from financial assets and liabilities measured at amortized cost.

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10. Financial instruments, Continued

2) Details of gains and losses on valuation and settlement of derivative financial instruments for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022		
		Gain or loss on valuation	Gain or loss on settlement	Other comprehensive income (loss) (*1)
Derivatives measured at FVTPL	₩	14,007	17,226	-
Derivatives for fair value hedge		(13,356)	-	-
Derivatives for cash flow hedge		(6,787)	(2,754)	2,057
Total	₩	(6,136)	14,472	2,057

(*1) Amounts in other comprehensive income or loss exclude deferred tax effect.

(In millions of won)

		2021		
		Gain or loss on valuation	Gain or loss on settlement	Other comprehensive income (loss) (*1)
Derivatives measured at FVTPL	₩	(19,205)	220,268	-
Derivatives for fair value hedge		(109,633)	-	-
Derivatives for cash flow hedge		(1,317)	(780)	12,430
Total	₩	(130,155)	219,488	12,430

(*1) Amounts in other comprehensive income or loss exclude deferred tax effect.

Above gains or losses of financial instruments for the years ended December 31, 2022 and 2021 include selling and administrative expenses, finance income or expenses, other non-operating income or expenses and other comprehensive income or loss from each financial instrument.

(5) Financial assets and financial liabilities subject to an enforceable master netting arrangement or similar agreement as of December 31, 2022 are as follows:

(In millions of won)

		Eligible for legal right to offset		
		Total assets (liabilities)	Offset amounts	Amounts after offset
Derivative financial assets	₩	86,613	(32,277)	54,336
Derivative financial liabilities		(124,593)	32,277	(92,316)

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11. Investments in subsidiaries, associates and joint ventures

(1) Details of share of investment in subsidiaries, associates and joint ventures as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	Location of incorporation	Percentage of ownership (%)	2022	2021
Subsidiaries:				
Doosan Fuel Cell Co., Ltd.(*2, 3)	Korea	30.33	₩ 892,730	1,262,549
Doosan Cuvex Co., Ltd.(*10)	Korea	100.00	358,263	93,781
Doosan Power Systems S.A. ("DPS S.A.")(*8)	Luxembourg	100.00	80,858	265,933
Doosan Water UK Ltd.(*1)	UK	100.00	-	4,951
Doosan Ukudu Power, LLC	USA	100.00	1	1
Doosan Enerbility Vietnam Co., Ltd.(*12)	Vietnam	100.00	203,038	203,038
Doosan Enerbility Japan Corp.(*13)	Japan	100.00	1,993	1,993
Doosan Enerbility America Holdings Inc.(*14)	USA	100.00	146,008	146,008
Doosan HF Controls Corp.	USA	100.00	5,642	5,642
Doosan Power Systems India Private Ltd.	India	99.90	-	-
Doosan Heavy Industries Muscat LLC(*17)	Oman	70.00	-	319
Doosan Power Systems Arabia Company Limited	Saudi Arabia	51.00	3,968	3,968
Doosan GridTech Inc.(*18)	USA	100.00	23,911	60,218
Azul Torre Construction Corporation(*4)	Philippines	40.00	-	-
Osung Power O&M Co., Ltd.	Korea	100.00	360	360
PT. Doosan Heavy Industries Indonesia	Indonesia	83.64	761	761
Doosan Heavy Industries Malaysia Sdn. Bhd	Malaysia	100.00	-	-
Doosan Mecatec Co., Ltd.(*16)	Korea	-	-	269,210
KDPP 5 th Co., Ltd.(*5)	Korea	-	-	-
Doosan Bobcat Inc.(*2)	Korea	51.07	2,435,990	2,435,990
D20 Capital, LLC	USA	100.00	63,596	63,596
Doosan Property Co., Ltd. (*15)	Korea	-	-	42,240
Subtotal			4,217,119	4,860,558
Associates:				
Doosan Engineering & Construction Co., Ltd. (*2,19)	Korea	46.35	173,702	317,666
Samcheok Blue Power Co., Ltd.(*6,7)	Korea	9.00	43,568	43,568
Daejung Offshore Wind Power Co., Ltd.	Korea	26.65	3,196	3,196
Hychangwon Co., Ltd.(*6,10)	Korea	25.74	7,000	5,000
Tuwaik Casting & Forging Company(*7,9)	Saudi Arabia	15.00	43,926	-
Multi-asset ESG Marine Wind Power Private Equity Fund 1 st (*9,20)	Korea	65.00	8,500	-
Subtotal			279,892	369,430
Joint ventures:				
The Zenith Holdings Ltd.(*11)	Korea	31.75	2,031	120,000
Total			₩ 4,499,042	5,349,988

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11. Investments in subsidiaries, associates and joint ventures, Continued

- (*1) The business name of the entity is changed from Doosan Enpure Ltd. to Doosan Water UK Ltd. As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 4,951 million as impairment loss (other non-operating expenses).
- (*2) As of December 31, 2022, it is provided as collateral for our debt (See Note 32).
- (*3) Although the Company's ownership interest in the investee is less than 50%, the Company assessed that it exercises control over the investee based on its holdings relative to the size and dispersion of ownership interests held by other equity holders and the voting patterns in previous shareholders' meetings. As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 369,819 million as impairment loss (other non-operating expenses).
- (*4) Although the Company's ownership interest in the investee is less than 50%, it is classified as a consolidated subsidiary since the Company is considered to have the voting rights in the board of directors, and others.
- (*5) The Company assessed that it has control over the special purpose entity as of December 31, 2021 since the entity's activities are substantively governed by the Company. In 2022, it was excluded from consolidation due to repayment of borrowing.
- (*6) Investments in the investee have been pledged as collateral for the Company's project financing (See Note 32).
- (*7) 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 and others.
- (*8) As of December 31, 2022, investments in the investee have been pledged as collateral for export bond insurance limit contract signed with Korea Export Insurance Corporation (See Note 32). As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 185,075 million as impairment loss (other non-operating expenses).
- (*9) Newly acquired in 2022.
- (*10) Additionally acquired in 2022.
- (*11) It is classified as a joint venture in accordance with agreement requiring consents from every parties holding the joint control over the entity when decision making in related activities. As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 117,969 million as impairment loss (other non-operating expenses).
- (*12) The business name of the entity is changed from Doosan Heavy Industries Vietnam Co., Ltd to Doosan Enerbility Vietnam Co., Ltd..
- (*13) The business name of the entity is changed from Doosan Heavy Industries Japan Corp. to Doosan Enerbility Japan Corp..
- (*14) The business name of the entity is changed from Doosan Heavy Industries America Holdings Inc. to Doosan Enerbility America Holdings Inc..
- (*15) The entity was additionally acquired in 2022 and was reclassified to a subsidiary from an associate. Subsequently, the entity was absorbed and merged with Doosan Cuvex Co., Ltd. and ceased to exist.
- (*16) Disposed in 2022.
- (*17) As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 319 million as impairment loss (other non-operating expenses).
- (*18) As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 36,307 million as impairment loss (other non-operating expenses).
- (*19) As of December 31, 2022, the carrying value exceeds its recoverable amount and recognized ₩ 143,964 million as impairment loss (other non-operating expenses).
- (*20) Although the Company's ownership interest in the investee is more than 50%, the Company assessed that it does not hold control over the decisions in relevant activities and classified as an associate.

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11. Investments in subsidiaries, associates and joint ventures, Continued

(2) Impairment on investment in subsidiaries, associates and joint ventures

1) Doosan Fuel Cell Co., Ltd.

The Company recognized an impairment loss (other non-operating expenses) of ₩ 369,819 million based on the impairment test of Doosan Fuel Cell Co., Ltd. for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of Doosan Fuel Cell Co., Ltd..

The recoverable amount of Doosan Fuel Cell Co., Ltd. is valued based on fair value less cost to sell calculated by the independent valuation expert in 2022. Fair value less costs to sell is calculated by deducting the cost of disposal after adding a management right premium to the share price.

2) DPS S.A.

The Company recognized an impairment loss (other non-operating expenses) of ₩ 185,075 million based on the impairment test of DPS S.A. for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of DPS S.A.

The recoverable amount of DPS S.A. is valued based on value-in-use calculated by the independent valuation expert in 2022. The value in use was computed based on expected future cash flow from impairment test date as of today and discount rate of 9.6~12.8%.

3) Doosan Water UK Ltd.

The Company recognized an impairment loss (other non-operating expenses) of ₩ 4,951 million based on the impairment test of Doosan Water UK Ltd. for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of Doosan Water UK Ltd..

The Company decided that the asset value appropriately reflects recoverable amount of Doosan Water UK Ltd. and assessed it as fair value less cost to sell. Net fair value is calculated as the value of financial assets and PP&E and others less cost to sell.

4) Doosan Heavy Industries Muscat LLC

The Company recognized an impairment loss (other non-operating expenses) of ₩ 319 million based on the impairment test of Doosan Heavy Industries Muscat LLC for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of Doosan Heavy Industries Muscat LLC..

The Company decided that the asset value appropriately reflects recoverable amount of Doosan Heavy Industries Muscat LLC and assessed it as fair value less cost to sell. Net fair value is calculated as the value of financial assets and PP&E and others less cost to sell.

5) Doosan GridTech Inc.

The Company recognized an impairment loss (other non-operating expenses) of ₩ 36,307 million based on the impairment test of Doosan GridTech Inc. for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of Doosan GridTech Inc..

The recoverable amount of Doosan GridTech Inc. is valued based on value-in-use calculated by the independent valuation expert in 2022. The value in use was computed based on expected future cash flow from impairment test date as of today and discount rate of 11.8%.

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11. Investments in subsidiaries, associates and joint ventures, Continued

6) Doosan Engineering & Construction Co., Ltd.

The Company recognized an impairment loss (other non-operating expenses) of ₩143,964 million based on the impairment test of Doosan Engineering & Construction Co., Ltd. for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of Doosan Engineering & Construction Co., Ltd..

The recoverable amount of Doosan Engineering & Construction Co., Ltd. is valued based on fair value less cost to sell calculated by the independent valuation expert in 2022. Net asset value assessment was applied to calculate fair value.

7) The Zenith Holdings Ltd.

The Company recognized an impairment loss (other non-operating expenses) of ₩117,969 million based on the impairment test of The Zenith Holdings Ltd. for the year ended December 31, 2022 as the carrying amount exceeds the aggregate recoverable amount of The Zenith Holdings Ltd..

The recoverable amount of The Zenith Holdings Ltd. is valued based on fair value less cost to sell calculated by the independent valuation expert in 2022. The market value approach was applied to calculate fair value.

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12. Property, plant and equipment

(1) Changes in property, plant and equipment for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022					
		Land	Buildings and structures	Machinery	Others	Construction in progress	Right-of-use assets
As of January 1, 2022	₩	2,613,833	216,224	219,090	22,802	88,363	149,183
Acquisition/ capital expenditure		1	15	713	556	53,975	10,039
Transfer(*1)		(36,133)	8,509	13,757	5,548	(81,468)	(13,842)
Disposals(*2)		(1,442)	(495)	(979)	(734)	(2,110)	(1,645)
Depreciation		-	(23,701)	(38,282)	(7,711)	-	(23,971)
Impairment		(1,803)	-	-	-	(15,952)	-
Others		(14)	(24)	-	-	(155)	-
As of December 31, 2022	₩	2,574,442	200,528	194,299	20,461	42,653	119,764
- Acquisition cost	₩	1,168,028	756,036	1,190,752	190,885	78,760	166,054
- Accumulated depreciation(*3)		-	(555,508)	(996,453)	(170,424)	(36,107)	(46,290)
- Revaluation surplus		1,406,414	-	-	-	-	-

(*1) Certain land, buildings, and construction in progress have been reclassified to investment properties (See Note 15).

(*2) Includes the amount due to contract cancelation of the right-of-use assets (See Note 14).

(*3) Includes the accumulated impairment losses.

As of December 31, 2022, certain property, plant and equipment and others have been pledged as collateral for borrowings (See Note 32).

(In millions of won)

		2021					
		Land	Buildings and structures	Machinery	Others	Construction in progress	Right-of-use assets
As of January 1, 2021	₩	2,407,605	234,059	244,748	23,027	65,209	21,325
Acquisition/ capital expenditure		1,889	435	2,300	776	47,077	156,152
Transfer(*1)		(29,418)	5,375	13,128	8,103	(36,847)	-
Disposals(*2)		(53,858)	(4,864)	(478)	(1,439)	-	(1,200)
Depreciation		-	(26,657)	(40,683)	(7,665)	-	(25,966)
Increase due to revaluation		190,924	-	-	-	-	-
Increase due to spin-off and merger		96,691	7,876	75	-	12,924	-
Others		-	-	-	-	-	(1,128)
As of December 31, 2021	₩	2,613,833	216,224	219,090	22,802	88,363	149,183
- Acquisition cost	₩	1,209,326	748,311	1,195,458	195,883	124,470	181,766
- Accumulated depreciation(*3)		-	(532,087)	(976,368)	(173,081)	(36,107)	(32,583)
- Revaluation surplus		1,404,507	-	-	-	-	-

(*1) In 2021, others were partially classified as assets held for sale (See Note 35).

(*2) Includes the amount due to contract cancelation of the right-of-use assets (See Note 14).

(*3) Includes the accumulated impairment losses.

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12. Property, plant and equipment, Continued

(2) Borrowing costs

Capitalized borrowing costs for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Capitalized borrowing costs	₩	605	636
Interest rate of borrowing costs		3.73%	3.42%

(3) Depreciation

Details of depreciation on property, plant and equipment for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Cost of sales	₩	75,031	82,750
Selling and administrative expenses		18,634	18,221
Total	₩	<u>93,665</u>	<u>100,971</u>

(4) Revaluation of land

The Company recognizes the subsequent measurement of the land using revaluation model. As of December 31, 2022 and 2021, the carrying amount of the land measured by applying the cost model is ₩ 1,168,028 million and ₩1,209,326 million, respectively. the fair value of the land as of December 31, 2022 is not significantly different from the fair value as of December 31, 2021.

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13. Intangible assets

(1) Changes in intangible assets for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

(In millions of won)	2022			
	Industrial property rights	Development costs	Other intangible assets	Total
As of January 1, 2022	₩ 3,279	905,133	66,178	974,590
Increase	4,971	138,491	15,050	158,512
Internal development	-	138,491	-	138,491
Individual acquisition	4,971	-	88	5,059
Transfer from other assets	-	-	14,962	14,962
Decrease	(1,009)	(83,021)	(46,411)	(130,441)
Amortization	(1,009)	(43,216)	(16,328)	(60,553)
Impairment loss	-	(34,922)	(29,760)	(64,682)
Disposal	-	-	(232)	(232)
Transfer to other assets	-	(2,591)	(91)	(2,682)
Transfer to other expenses	-	(2,292)	-	(2,292)
As of December 31, 2022	₩ 7,241	960,603	34,817	1,002,661

(In millions of won)

(In millions of won)	2021				
		Industrial	Development	Other	Total
	Goodwill(*1)	property rights	costs	intangible assets	
As of January 1, 2021	₩ 3,014	3,014	830,648	70,779	907,455
Increase	-	988	153,904	15,033	169,925
Internal development	-	-	153,904	-	153,904
Individual acquisition	-	988	-	288	1,276
Transfer from other assets	-	-	-	6,736	6,736
Increase due to spin-off and merger	-	-	-	8,009	8,009
Decrease	(3,014)	(723)	(79,419)	(19,634)	(102,790)
Amortization	-	(723)	(51,083)	(19,633)	(71,439)
Impairment loss	(3,014)	-	(23,537)	85	(26,466)
Disposal	-	-	-	(86)	(86)
Transfer to other assets	-	-	(4,799)	-	(4,799)
As of December 31, 2021	₩ -	3,279	905,133	66,178	974,590

(*1) In 2021, all related goodwill was recognized as impairment due to termination of the rental business in the Middle East and plan for the sale of construction equipment accordingly.

The carrying amounts of intangible assets with indefinite useful lives including membership and others as of December 31, 2022 and 2021 amounted to ₩16,630 million and ₩32,707 million, respectively.

(2) Research and development costs

Research and development costs expensed as incurred for the years ended December 31, 2022 and 2021 amounted to ₩25,029 million and ₩15,701 million, respectively.

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13. Intangible assets, Continued

(3) Recognition criteria of development cost

The new R&D project is approved by the new business technology committee semi-annually, considering the commercial feasibility and others and it is decided whether to continue or stop the R&D through reviewing the appropriateness of investment. After completion of technical development, the Company performs a final review of the appropriateness of development costs through commercial operation. The Company classifies the projects into research or technology development projects based on the capitalization criteria (technical feasibility, intention, future economic benefits). Expenditure on research project is recognized as an expense when it is incurred and expenditure on technology development project is recognized as an intangible asset.

(4) Details of development costs as of December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022		2021	
	Description	Book value	Remaining amortization period(*1)	Book value	Remaining amortization period(*1)
Development costs	Large-sized Gas Turbine	₩ 655,072	-	598,663	-
	Gas Turbine 7F Retrofit	51,635	-	43,967	-
	Mid-sized Gas Turbine				
	Development Phase 1	661	6.58 years	761	7.58 years
	Mid-sized Gas Turbine				
	Development Phase 2	37,777	-	30,081	-
	8MW Offshore Wind Power	45,023	-	34,666	-

(*1) Remaining amortization period is disclosed for assets which amortization has been initiated and disclosed as '-' for assets not yet amortized.

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13. Intangible assets, Continued

(5) Intangible assets for which an impairment loss has been recognized for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

Description	2022					
	Acquisition cost	Impairment loss		Accumulated amortization	Book value	Method used to assess recoverability
		Loss	Accumulated			
Development costs(*1)						
Development of boiler-USC element technology	₩ 4,503	3,644	3,644	859	-	Value in use
Development of boiler-USC element technology (I&C sector)	3,347	2,748	2,748	599	-	Value in use
Development of large-scale freshwater element technology	2,731	2,731	2,731	-	-	Value in use
Development ST-USC element technology	2,212	1,924	1,924	288	-	Value in use
Others	32,136	23,875	23,875	8,261	-	Value in use
Subtotal	44,929	34,922	34,922	10,007	-	
Other intangible assets						
Golf membership	14,424	5,097	8,766	-	5,658	Net fair value
Reclamation license and other	63,823	24,663	54,812	9,011	-	Value in use
Subtotal	78,247	29,760	63,578	9,011	5,658	
Total	₩ 123,176	64,682	98,500	19,018	5,658	

(*1) The carrying amount is recognized as an impairment loss, as the value in use decreased due to changes in industry environment.

(In millions of won)

Description	2021					
	Acquisition cost	Impairment loss		Accumulated amortization	Book value	Method used to assess recoverability
		Loss	Accumulated			
Development costs(*1)						
3MW Class model	₩ 5,675	4,162	4,162	1,513	-	Value in use
Wind Power up Solution (phase 1)	431	366	366	65	-	Value in use
5.5MW Offshore Wind Power	19,009	19,009	19,009	-	-	Value in use
Subtotal	25,115	23,537	23,537	1,578	-	
Goodwill						
Rental business in the Middle East	3,014	3,014	3,014	-	-	Value in use
Total	₩ 28,129	26,551	26,551	1,578	-	

(*1) The carrying amounts related to 3MW and 5.5MW wind power are recognized as an impairment loss, as the value in use decreased due to changes in industry environment.

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13. Intangible assets, Continued

(6) Reversal of impairment loss of intangible assets

Reversal of impairment loss of intangible assets for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

Description	Assets	2022		2021	
		Reversal of impairment loss	Method used to assess recoverability	Reversal of impairment loss	Method used to assess recoverability
Other intangible assets	Golf membership ₩	-	Net fair value	85	Net fair value

(7) Statement of income items included (reversal of) impairment loss

For the years ended December 31, 2022 and 2021, statement of profit (loss) items the Company recognized (reversal of) impairment loss are as follows:

(In millions of won)

	2022	2021
Other non-operating expenses	₩ 64,682	26,551
Other non-operating income	-	(85)
Total	₩ 64,682	26,466

(8) Capitalized borrowing costs for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Capitalized borrowing costs	₩ 22,907	26,510
Interest rate of borrowing costs	3.73%	3.42%

(9) Details of amortization of intangible assets for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Cost of sales	₩ 45,728	55,684
Selling and administrative expenses	14,825	15,755
Total	₩ 60,553	71,439

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13. Intangible assets, Continued

(10) Greenhouse gas emission permits and obligations

1) The emission permits that are received free of charge from the government as the 3rd planning period (from year 2021 to 2025) as of December 31, 2022 are as follows:

<i>(In tons (tCO₂-eq))</i>	2021	2022	2023	2024	2025	Total
Free emission permits	260,526	260,526	260,526	258,086	258,086	1,297,750

2) Changes in emission permits for the years ended December 31, 2022 and 2021 are as follows:

	2022					
<i>(In tons (tCO₂-eq))</i>	2021	2022	2023	2024	2025	Total
As of January 1, 2022	264,750	260,526	260,526	258,086	258,086	1,301,974
Succession of allowances received free of charge	210	210	210	208	208	1,046
Cancellation of free permits	(519)	-	-	-	-	(519)
Submission to the government	(200,301)	-	-	-	-	(200,301)
Sale of free permits	(22,000)	-	-	-	-	(22,000)
Carried forward	(42,140)	42,140	-	-	-	-
As of December 31, 2022	-	302,876	260,736	258,294	258,294	1,080,200

	2021						
(In tons (tCO2-eq))	2020	2021	2022	2023	2024	2025	Total
As of January 1, 2021	292,754	260,526	260,526	260,526	258,086	258,086	1,590,504
Cancellation of free permits	(4,211)	-	-	-	-	-	(4,211)
Submission to the government	(229,319)	-	-	-	-	-	(229,319)
Sale of free permits	(55,000)	-	-	-	-	-	(55,000)
Carried forward	(4,224)	4,224	-	-	-	-	-
As of December 31, 2021	-	264,750	260,526	260,526	258,086	258,086	1,301,974

As of Permit that are received free of charge from the government was measured at zero book value.

3) Details of emission permits held for short-term trading purpose for the year ended December 31, 2022 is as follows::

<i>(In tons (tCO₂-eq), in millions of won)</i>	Quantity	Book Value
Beginning balance	- ₩	-
Acquisition	55,248	1,657
Ending balance	55,248 ₩	1,657

4) The estimate of greenhouse gas emissions as of December 31, 2022 was 245,000 tons (tCO₂-eq) and no emission liabilities are recognized as it is not expected to exceed the free emission permits.

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14. Lease

(1) Changes in right-of-use assets for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022			
	Land	Buildings	Other tangible assets	Total
As of January 1, 2022	₩ 1,026	142,427	5,730	149,183
Acquisition	6	9,016	1,017	10,039
Depreciation	(657)	(19,987)	(3,327)	(23,971)
Contract cancellation	-	(1,411)	(234)	(1,645)
Transfer(*)	-	(13,842)	-	(13,842)
As of December 31, 2022	₩ 375	116,203	3,186	119,764
- Acquisition cost	₩ 1,327	154,812	9,915	166,054
- Accumulated depreciation	(952)	(38,609)	(6,729)	(46,290)

(*) Reclassified from right-of-use assets to investment properties due to the change in sub-lease ratio with BUNDANG DOOSAN TOWER in 2022.

(In millions of won)

	2021			
	Land	Buildings	Other tangible assets	Total
As of January 1, 2021	₩ -	16,810	4,515	21,325
Acquisition	1,321	148,394	6,437	156,152
Depreciation	(295)	(21,145)	(4,526)	(25,966)
Contract cancellation	-	(800)	(400)	(1,200)
Others	-	(832)	(296)	(1,128)
As of December 31, 2021	₩ 1,026	142,427	5,730	149,183
- Acquisition cost	₩ 1,321	168,485	11,960	181,766
- Accumulated depreciation	(295)	(26,058)	(6,230)	(32,583)

(2) Changes in the lease liabilities for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
As of January 1	₩ 183,629	28,113
Payment of lease	(30,843)	(33,810)
Acquisition of leased assets	10,039	180,289
Interest expense	11,064	10,687
Contract cancellation	(1,709)	(1,248)
Others	124	(402)
As of December 31	₩ 172,304	183,629

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14. Lease, Continued

(3) The details of depreciation of right-of-use assets for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		Depreciation of right-of-use assets	
		2022	2021
Cost of sales	₩	12,261	13,904
Selling and administrative expenses		11,710	12,062
Total	₩	23,971	25,966

(4) The maturity of lease receivables and liabilities as of December 31, 2022 are as follows:

(In millions of won)

		Contractual nominal cash flow				
		Total	Less than 1 year	1-2 years	2-5 years	More than 5 years
Lease receivables	₩	2,345	2,345	-	-	-
Lease liabilities		215,761	33,996	27,965	77,659	76,141

(5) Expenses incurred in short-term leases and low-value asset lease that are not included in the right-of-use assets for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022	2021
Cost of sales	₩	6,837	6,006
Selling and administrative expenses		156	1,171
Total	₩	6,993	7,177

The Company, as an intermediate lessor, recognized a lease income amounted to ₩ 2,456 million and ₩ 2,726 million from the sub-lease of right-of-use assets for the years ended December 31, 2022 and 2021, respectively.

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15. Investment Property

(1) Changes in the investment property for the years ended December 31, 2022 and 2021 are as follows:

		2022			
<i>(In millions of won)</i>		Land	Construction in progress	Buildings(*1)	Total
As of January 1, 2022	₩	44,130	-	35,404	79,534
Transfer		29,820	37,837	16,442	84,099
Depreciation		-	-	(3,935)	(3,935)
As of December 31, 2022	₩	<u>73,950</u>	<u>37,837</u>	<u>47,911</u>	<u>159,698</u>
- Acquisition cost	₩	75,753	53,790	55,172	184,715
- Accumulated depreciation(*2)		(1,803)	(15,953)	(7,261)	(25,017)

(*1) Including amount reclassified from right-of-use assets to investment properties due to the change in sub-lease ratio with BUNDANG DOOSAN TOWER in 2022.

(*2) Including accumulated impairment loss.

		2021		
<i>(In millions of won)</i>		Land	Buildings(*1)	Total
As of January 1, 2021	₩	24,372	-	24,372
Acquisition/ capital expenditure		332	37,233	37,565
Depreciation		-	(3,294)	(3,294)
Increase due to spin-off and merger		19,426	1,465	20,891
As of December 31, 2021	₩	<u>44,130</u>	<u>35,404</u>	<u>79,534</u>
- Acquisition cost	₩	44,130	38,698	82,828
- Accumulated depreciation		-	(3,294)	(3,294)

(*1) The sub-lease amount among the assets recognized according to the Bundang Doosan Tower contract signed with BUNDANG DOOSAN TOWER REIT Co., Ltd. is recognized as investment property.

(2) Rental income from investment properties for the years ended December 31, 2022 and 2021 are ₩9,670 million and ₩7,572 million, respectively.

(3) As of December 31, 2022, the fair value of land and buildings included in the investment property has no significant difference from the carrying amount.

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16. Bonds and borrowings

(1) Borrowings

1) Short-term borrowings as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Type of Borrowings	Lender	Annual interest rate (%) as of December 31, 2022		2022	2021
Denominated in KRW	Korean Development Bank ("KDB") and others(*1)	2.00 ~ 7.55	₩	948,250	3,128,420
Denominated in foreign currencies	Woori Bank and others	0.30 ~ 6.07		301,532	151,003
	Total		₩	1,249,782	3,279,423

(*1) The Company's PP&E and others have been pledged as collateral for borrowings (See Note 31 and 32).

2) Long-term borrowings as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Type of borrowings	Lender	Maturity	Annual interest rate (%) as of December 31, 2022		2022	2021
Denominated in KRW	NH investment and securities Co., Ltd. and others (*1)	2023.03.15~2025.04.29	1.10 ~ 6.72	₩	1,272,714	528,026
Denominated in foreign currencies	Korea EXIM Bank	-	-		-	28,595
	Subtotal				1,272,714	556,621
	Less: Current portion				(155,009)	(433,796)
	Less: Discount				(4,425)	(332)
	Total			₩	1,113,280	122,493

(*1) The Company's PP&E and others have been pledged as collateral for borrowings (See Note 31 and 32).

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16. Bonds and borrowings, Continued

(2) Bonds

1) Details of bonds as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Type	Series	Maturity	Annual interest rate (%) as of December 31, 2022	2022	2021
Public offering bond	73	2024.05.30	5.10	₩ 80,000	-
	74	2024.09.27	6.50	80,000	-
Public offering bond in foreign currencies(*1)	-	2023.07.21	1.00	380,190	355,650
	-	-	-	-	355,650
Privately placed bond(*1)	61	-	-	-	10,000
	62	-	-	-	12,000
	64	2023.01.30	4.30	15,000	15,000
	65	2023.02.06	4.30	14,000	14,000
	66	2023.02.17	4.30	14,500	14,500
	67	2023.02.28	4.30	10,000	10,000
	68	2023.03.24	4.30	5,000	5,000
	69	2023.05.17	4.30	10,000	10,000
	70	2023.06.09	4.30	5,000	5,000
	71	2023.07.10	4.30	10,000	-
	72	2024.03.25	4.80	100,000	-
Convertible bonds	59	2023.06.08	2.87	1,655	1,655
	60	2023.08.03	2.81	21,719	21,719
Bonds with stock warrants	-	-	-	-	14,607
Subtotal				747,064	844,781
Add: Redemption premium				1,604	2,370
Less: Conversion adjustment				(491)	(1,299)
Less: Warrants adjustment				-	(201)
Less: Current portion of long-term bonds				(486,658)	(416,401)
Less: Discount on bonds				(2,387)	(6,887)
Total				₩ 259,132	422,363

(*1) The ordinary shares of Doosan Bobcat Inc. and Doosan Fuel Cell. Co., Ltd. have been pledged as collateral for public offering bond in foreign currencies and privately placed bonds (See note 31 and 32).

2) As of December 31, 2022, bonds with stock warrants are summarized as follows:

Issue date	Maturity date	Coupon rate	YTM	Exercise period	Exercise price (in won)	Issuance value
May 4, 2017	May 4, 2022	1.00%	2.00%	From one month after date of issue to one month before maturity	₩14,450/share	₩491,546 million (Par value : ₩500,000 million)

① Early redemption

The early redemption right is exercisable as a whole or in part against the par value of bond with stock warrants at the interest payment date in 3 years after the date of issuance of bonds. Meanwhile, according to the exercise of the early redemption right, ₩484,957 million was repaid on May 4, 2020, and the remaining unexercised portion will be repaid on the maturity date.

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16. Bonds and borrowings, Continued

② Redemption at maturity

The coupon rate for the bond is 1.00%. For bonds not converted until maturity, 105.2448% of the principal amount will be paid on May 4, 2022 with a yield to maturity rate of 2.00% compounded quarterly.

③ Calculation of exercise price

The exercise price is adjusted when there is an increase in paid-in capital through issuance of ordinary shares at a price lower than the market price, stock dividends, or capitalization of reserves, before exercising the stock warrants, or when there is an issuance of stock purchase warrants or debt securities with warrants.

Changes in the carrying amount of bonds with stock warrants for the years ended December 31, 2022 are as follows:

(In millions of won)

	January 1	Repayment	Exercise / Amortization	December 31
Bond with stock warrants	₩ 14,607	(13,991)	(616)	-
Redemption premium	766	(734)	(32)	-
Discount on bond	(19)	-	19	-
Warrants adjustment	(201)	-	201	-
Book value	₩ 15,153	(14,725)	(428)	-
Consideration for stock warrants rights (other capital surplus)	₩ 34,819	-	(34,819)	-

As of December 31, 2022, stock warrants were exercised in the amount pertaining to 98.93% of the principal amount of 48th bond with stock warrants and 0.21% of the principal amount was substituted. The number of shares issued as a result of the exercise of the stock warrants was 33,985,191 shares.

3) As of December 31, 2022, convertible bonds succeeded from spin-off and merger with Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) are summarized as follows:

No.	Issue date	Maturity date	Coupon rate	YTM	Exercise period	Exercise price (in won)	Issuance value
59th	July 1, 2021(*1)	June 8, 2023	2.87%	4.82%	2021.06.08~ 2023.05.08	₩8,907/ share	₩1,641 million (Par value: ₩1,655 million)
60th	July 1, 2021(*2)	August 3, 2023	2.81%	4.96%	2021.08.03~ 2023.07.03	₩10,506/ share	₩21,584 million (Par value: ₩21,719 million)

(*1) Among the 65th convertible bonds issued by Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) on June 8, 2020, it has been succeeded to the Company from spin-off and merger with Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) on July 1, 2021.

(*2) Among the 69th convertible bonds issued by Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) on August 3, 2020, it has been succeeded to the Company from spin-off and merger with Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) on July 1, 2021.

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16. Bonds and borrowings, Continued

① Early redemption

No.	Exercise Period of early redemption right
59th	The claimant of this bond may exercise early redemption right as a whole or in part against the face value of convertible bonds at the interest payment date after June 8, 2022.
60th	The claimant of this bond may exercise early redemption right as a whole or in part against the face value of convertible bonds at the interest payment date after August 3, 2022.

② Redemption at maturity

No.	Redemption at maturity
59th	On June 8 2023, the maturity date of the bond, 106.2537% of the remaining principal of the bond is to be paid in full.
60th	On August 3 2023, the maturity date of the bond, 106.9085% of the remaining principal of the bond is to be paid in full.

③ Calculation of exercise price

The exercise price is adjusted when there is an increase in paid-in capital through issuance of ordinary shares at a price lower than the market price, bonus issue, stock dividends, or capitalization of reserves, before exercising the stock warrants, or when there is an issuance of stock purchase warrants or debt securities with warrants.

Changes in convertible bonds for the years ended December 31, 2022 are as follows:

(In millions of won)

	January 1	Exercise/Amortization	December 31
Convertible bond	₩ 23,374	-	23,374
Redemption premium	1,604	-	1,604
Discount on bond	(82)	51	(31)
Conversion adjustment	(1,299)	808	(491)
Book value	₩ 23,597	859	24,456
Consideration for conversion right (other capital surplus)	₩ 760	-	760

(3) Asset-backed borrowings

The Company transferred revenue from construction contracts to a special purpose vehicle, and the special purpose vehicle issued asset-backed securities backed by transferred assets. Asset-backed borrowings as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Type	Maturity	Discount rate (%)	2022	2021
KDPP 5 th Co., Ltd.	-	-	₩ -	49,600
	Less: Current portion		-	(49,304)
	Less: Discounts		-	(296)
	Total		₩ -	-

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17. Defined benefit liabilities

The Company operates defined benefit plans, and the cost of providing benefit under the defined benefit plans is determined using the projected unit credit method on actuarial valuation of the present value of its defined benefit obligations.

(1) Details of defined benefit liabilities as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Present value of defined benefit obligations	₩ 347,206	345,652
Fair value of plan assets(*1)	(234,089)	(240,139)
Defined benefit liabilities	₩ 113,117	105,513

(*1) Include employer contributions of ₩567 million and ₩584 million to the National Pension Service as of December 31, 2022 and 2021, respectively.

(2) Expenses recognized in separate statements of income for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Current service cost	₩ 29,942	30,050
Net interest cost	4,588	2,502
Past service cost(*1)	16,575	-
Total	₩ 51,105	32,552

(*1) Changes in retirement benefit obligations due to the revision of the executive severance provision ₩16,575 million were recognized as past service costs in 2022.

(3) Classification of expenses related to the employee benefit liability for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Cost of sales	₩ 31,501	26,199
Selling and administrative expenses	19,604	6,353
Total	₩ 51,105	32,552

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17. Defined benefit liabilities, Continued

(4) Changes in the present value of the defined benefit obligations for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>	2022	2021
As of January 1	₩ 345,652	347,272
Current service costs	29,942	30,050
Transfer from related parties	1,103	1,148
Transfer to related parties	(329)	(739)
Interests	12,394	7,839
Remeasurement loss (gain) in OCI:		
Actuarial changes arising from changes in demographic assumptions	(42)	(34)
Actuarial changes arising from changes in financial assumptions	(66,835)	(10,046)
Others	29,279	(2,924)
Past service cost	16,575	-
Benefits paid	(20,533)	(26,914)
As of December 31	₩ 347,206	345,652

(5) Changes in the fair value of plan assets for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>	2022	2021
As of January 1	₩ 240,139	251,117
Expected return on plan assets	7,806	5,337
Transfer from related parties	608	966
Transfer to related parties	(83)	(115)
Remeasurement loss in OCI	(4,137)	(2,432)
Benefits paid	(10,226)	(14,713)
Transfer to national pension service	(18)	(21)
As of December 31	₩ 234,089	240,139

In relation to the defined benefit plans, the reasonable estimates of future employer contributions during the year 2023 amounts to ₩162,065 million. In addition, the actual return on plan assets for the years ended December 31, 2022 and 2021 amounts to ₩3,669 million and ₩2,904 million, respectively.

(6) The principal assumptions used in determining employee benefit obligation for the years ended December 31, 2022 and 2021 are as follows:

	2022	2021
Discount rate	5.40%	3.00%
Future salary increase rate	Technical employee 4.00% Office employee 4.00% Executive 1.50%	Technical employee 3.70% Office employee 3.00% Executive 0.80%

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17. Defined benefit liabilities, Continued

(7) Details of fair value of plan assets as of December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Insurance contracts	₩	104,893	108,528
Bank deposits		23,905	14,702
Trust funds and others		105,291	116,909
Total	₩	<u>234,089</u>	<u>240,139</u>

(8) Details of a sensitivity analysis on the defined benefit obligation for changes in the significant assumptions as of December 31, 2022 are as follows:

<i>(In millions of won)</i>		1%p increase	1%p decrease
Discount rate	₩	(26,145)	28,906
Future salary increase rate		21,482	(20,350)

(9) The weighted average maturity of defined benefit obligations is approximately 8.33 years as of December 31, 2022.

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18. Provision

Changes in significant provisions for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022						
	January 1	Arising during the year	Unused amounts reversed	utilized	Others	December 31	Less: Current	Non-current
Provisions for construction warranties	₩ 103,522	38,968	(708)	(17,877)	-	123,905	(18,864)	105,041
Provisions for construction losses	31,408	34,797	(7,827)	-	-	58,378	(58,378)	-
Others(*1)	149,822	1,964	(2,957)	(22,904)	(14,499)	111,426	(104,961)	6,465
Total	₩ 284,752	75,729	(11,492)	(40,781)	(14,499)	293,709	(182,203)	111,506

(*1) As of December 31, 2022, it includes ₩54,855 million in provisions related to guarantee the return of membership fees.

(In millions of won)

(In millions of won)		2021						
		January 1	Arising during the year	Unused amounts reversed	Utilized	December 31	Less: Current	Non-current
Provisions for construction warranties	₩	108,970	22,980	(10,793)	(17,635)	103,522	(15,186)	88,336
Provisions for construction losses		45,583	4,751	(18,926)	-	31,408	(31,408)	-
Others(*1)		212,561	16,424	(74,752)	(4,411)	149,822	(149,822)	-
Total	₩	367,114	44,155	(104,471)	(22,046)	284,752	(196,416)	88,336

(*1) As of December 31, 2021, it includes ₩54,855 million in provisions related to guarantee the return of membership fees.

The Company estimates expenses required to settle the Company's obligations on product warranties, refunds, maintenance and others based on the level of warranty period, historical experience and other considerations.

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19. Capital stock

The Company is authorized to issue 2,000,000,000 shares, with a par value of ₩5,000 per share and the number of ordinary shares issued as of December 31, 2022 and 2021 is 638,308,033 shares and 522,220,786 shares, respectively. The number of shares with limited voting rights under Korean Commercial Code as of December 31, 2022 and 2021 is 95,978 treasury shares.

On February 18, 2022, the Company issued ordinary shares of 82,872,900 shares through capital increase and issued ordinary shares of 33,214,347 shares by exercising of stock warrants.

Details in capital stock and paid-in capital in excess of par value as of December 31, 2022 and 2021 are as follows:

(In millions of won except for share, In shares)	Number of shares		Capital stock			Paid-in capital in excess of par value		
	Ordinary shares	Preference shares	Ordinary shares	Preference shares(*)	Total	Ordinary shares	Preference shares	Total
Balance at								
December 31, 2022	638,308,033	- ₩	3,191,539	64,522	3,256,061	2,362,505	-	2,362,505
Balance at								
December 31, 2021	522,220,786	-	2,611,103	64,522	2,675,625	1,234,457	-	1,234,457

(*) Redeemable convertible preference shares were purchased and retired using voluntary reserves before prior year, and there is no reduction in capital stock.

20. Capital surplus

Capital surplus as of December 31, 2022 and 2021 are summarized as follows:

(In millions of won)		2022	2021
Paid-in capital in excess of par value	₩	2,362,505	1,234,457
Other capital surplus		449,655	576,785
Total	₩	2,812,160	1,811,242

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21. Other components of equity

(1) Other components of equity as of December 31, 2022 and 2021 are summarized as follows:

(In millions of won)

		2022	2021
Stock options	₩	386	1,103
Treasury stock		(2,135)	(2,135)
Total	₩	(1,749)	(1,032)

(2) Stock option

The Company has granted stock options to its executives. The settlement method for stock options includes issuance of new shares, issuance of treasury shares or cash settlement. The type of settlement method chosen is determined based on the Board of Directors' decision at the time of exercise. These stock options require a vesting condition of a two-year continuous employment from the grant date.

1) The terms and conditions of stock options granted as of December 31, 2022 are summarized as follows:

(In won, shares)

Grant date	Number of shares to be issued	Exercise period	Exercise price	Estimated fair value as of the grant date
Mar 29 2013	9,800	Mar 29 2016 ~ Mar 28 2023	₩ 44,900	₩ 10,860
Mar 28 2014	20,800	Mar 28 2017 ~ Mar 27 2024	34,550	7,948
Mar 29 2013(*1)	4,765	Mar 29 2016 ~ Mar 28 2023	22,935	12,383
Mar 21 2014(*1)	5,851	Mar 21 2017 ~ Mar 20 2024	19,867	9,402
Total	41,216			

(*1) It has been succeeded from spin-off and merger with Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) during 2021.

2) Change in the stock options for the year ended December 31, 2022 is summarized as follows:

(In shares)

Grant date	Number of shares to be issued		
	January 1	Retired	December 31
Mar 30 2012	21,083	(21,083)	-
Mar 29 2013	29,657	(15,092)	14,565
Mar 21 2014	17,082	(11,231)	5,851
Mar 28 2014	29,600	(8,800)	20,800
Total	97,422	(56,206)	41,216

(In millions of won)

Grant date	Valuation		
	January 1	Retired	December 31
Mar 30 2012	₩ 362	(362)	-
Mar 29 2013	345	(180)	165
Mar 21 2014	161	(106)	55
Mar 28 2014	235	(69)	166
Total	₩ 1,103	(717)	386

No compensation expenses are recognized for the years ended December 31, 2022 and 2021 and are expected to be recognized in the future periods.

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21. Other components of equity, Continued

- 3) The estimated fair value was calculated using the modified fair value method and assumptions applied to this method are summarized as follows:

<u>Grant date</u>	<u>Risk free rate(*1)</u>	<u>Expected exercise period</u>	<u>Expected volatility</u>	<u>Expected dividend yield</u>
Mar 29 2013	2.45%	3 years	35.98%	15.00%
Mar 28 2014	2.88%	3 years	34.72%	15.00%
Mar 29 2013(*2)	2.57%	6.5 years	54.12%	0.21%
Mar 21 2014(*2)	3.27%	6.5 years	42.29%	0.00%

(*1) Based on a treasury bond yield rate following by the expected exercise period.

(*2) It has been succeeded from spin-off and merger with Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) during 2021.

22. Accumulated other comprehensive income

- (1) Accumulated other comprehensive income as of December 31, 2022 and 2021 are summarized as follows:

(In millions of won)

	<u>2022</u>	<u>2021</u>
Loss on valuation of FVOCI	₩ (9,254)	(9,134)
Gain (loss) on valuation of derivative financial instruments	1,056	(517)
Gain on revaluation of assets	1,080,126	1,064,616
Total	₩ 1,071,928	1,054,965

- (2) Details of income taxes on OCI items directly reflected in equity as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	<u>2022</u>		
	<u>Balance before tax</u>	<u>Tax effect</u>	<u>Balance after tax</u>
Loss on valuation of FVOCI	₩ (12,049)	2,795	(9,254)
Gain (loss) on valuation of derivative financial instruments	1,375	(319)	1,056
Gain (loss) on revaluation of assets	1,406,414	(326,288)	1,080,126
Total	₩ 1,395,740	(323,812)	1,071,928

(In millions of won)

	<u>2021</u>		
	<u>Balance before tax</u>	<u>Tax effect</u>	<u>Balance after tax</u>
Loss on valuation of FVOCI	₩ (12,050)	2,916	(9,134)
Gain (loss) on valuation of derivative financial instruments	(682)	165	(517)
Gain (loss) on revaluation of assets	1,404,507	(339,891)	1,064,616
Total	₩ 1,391,775	(336,810)	1,054,965

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23. Retained earnings (accumulated deficits)

(1) Retained earnings (accumulated deficits) as of December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Legal reserve	₩	82,966	82,966
Voluntary reserve		42,807	42,807
Unappropriated retained earnings (Undisposed accumulated deficit)		(1,150,542)	35,011
Total	₩	(1,024,769)	160,784

(2) Changes in accumulated earnings (deficits) for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Unappropriated retained earnings			
(Undisposed accumulated deficit)	₩	(1,150,542)	35,011
Unappropriated retained earnings at the beginning of the year		35,011	-
Profit (loss) for the period		(1,211,843)	26,601
Remeasurements of defined benefit liability		25,698	8,013
Gain on revaluation of lands		592	397
Voluntary reserve and others		-	-
Reserves for sinking Funds		-	-
Disposition of accumulated deficits		1,150,542	-
Paid-in capital in excess of par value		1,150,542	-
Unappropriated retained earnings at the end of the year	₩	-	35,011

The proposed date of disposition of accumulated deficits for 2022 will be March 29, 2023 and the approved date of appropriation of retained earnings for 2021 was March 29, 2022.

(3) There is no dividend for the years ended December 31, 2022 and 2021.

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24. Revenue

(1) Revenue for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Revenue from contracts with customers			
Sales of goods	₩	243,401	188,166
Construction contracts		5,043,962	3,462,112
Subtotal		5,287,363	3,650,278
Others			
Hedging losses		(125,414)	(65,576)
Dividend income		112,307	-
Others		10,183	8,180
Subtotal		(2,924)	(57,396)
Total	₩	5,284,439	3,592,882

(2) Revenue from contracts with customers for the years ended December 31, 2022 and 2021 are disaggregated as follows.

<i>(In millions of won)</i>		2022	2021
Primary geographical market			
Domestic	₩	2,714,593	2,373,786
Americas		178,133	19,252
Asia		1,484,237	858,450
Middle East		871,836	350,172
Europe		37,741	47,481
Others		823	1,137
Total	₩	5,287,363	3,650,278
Timing of revenue recognition			
At a point in time	₩	243,401	186,793
Over time		5,043,962	3,463,485
Total	₩	5,287,363	3,650,278

(3) Contract balances

The following table provides information about receivables, contract assets and contract liabilities from contracts with customers as of December 31, 2022 and 2021.

<i>(In millions of won)</i>		2022	2021
Receivables, which are included in 'trade and other receivables'			
	₩	518,848	245,723
Contract assets		1,072,966	1,399,956
Contract liabilities		1,464,165	1,161,077

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24. Revenue, Continued

The contract assets primarily relate to the Company's rights to consideration for work completed but not billed at the reporting date. The contract assets are transferred to receivables when the rights become unconditional.

The contract liabilities primarily relate to the advance consideration received from customers for construction, for which revenue is recognized over time. Of the contract liabilities as of December 31, 2021, the amount of recognized as revenue in 2022 is ₩ 924,677 million.

(4) Changes in transaction price for construction contract allocated to the performance obligations satisfied over time

Transaction prices allocated to the remaining performance obligations as of December 31, 2022 include contracts whose initial expected duration of performance obligations are less than one year old but not include contracts in which recognize the right to payment as revenue that corresponds directly with the value to the customer of the Company's performance completed to date.

Changes in transaction price for construction contract allocated to the performance obligations satisfied over time for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

		2022			
	Project name	January 1	Increase (Decrease)	Revenue recognized	December 31
VAPCO and others	Vung Ang II Power Project and others	₩ 11,173,049	6,330,803	5,043,962	12,459,890

(In millions of won)

		2021			
	Project name	January 1	Increase (Decrease)	Revenue recognized	December 31
VAPCO and others	Vung Ang II Power Project and others	₩ 10,171,355	4,465,179	3,463,485	11,173,049

(5) As of December 31, 2022 and 2021, the Company shall recognize as an asset for the incremental costs of obtaining a contract with a customer that is, agent fee if the Company expects to recover those costs.

(In millions of won)

	2022	2021
Incremental costs of obtaining a contract with a customer recognized as an asset	₩ 22,661	38,651
The amount of amortization recognized as cost of sales	24,180	12,512

An asset recognized in accordance with above shall be amortized on the same basis that revenue is recognized over time based on the percentage-of-completion of the specific contract concerned.

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24. Revenue, Continued

- (6) As of December 31, 2022 and 2021, the Company shall recognize an asset from the costs incurred to fulfill a contract if those costs relate directly to a contract or to an anticipated contract the Company can specifically identify. The Company believes that these costs generate or enhance resources of the Company that will be used in satisfying performance obligations in the future and are expected to be recovered.

<i>(In millions of won)</i>		2022	2021
Costs incurred to fulfill a contract recognized as an asset	₩	131,418	141,649
The amount of amortization recognized as cost of sales		77,737	22,405

An asset recognized in accordance with above shall be amortized on a systematic basis that is consistent with the transfer to the customer of the goods or services to which the asset relates.

- (7) Changes in profit or loss in current and future reporting periods and the book value of due from (to) customers for contracts work (excluding foreign currency translation effect) resulting from provision for construction loss, changes in total contract revenue and in total estimated contract costs for construction contracts in progress as of December 31, 2022 are as follows:

<i>(In millions of won)</i>		Provision for construction loss	Changes in total contract revenue	Changes in total contract cost	Effect on profit (loss) for the period	Effect on profit (loss) for the future	Changes in due from (to) customer for contract work
Vung Ang II Power Project and others	₩	58,378	710,712	626,604	135,254	(51,146)	135,254

Impacts on current and future profit (loss) were calculated based on total contract revenue and costs which were estimated based on the current circumstances as of December 31, 2022. Those estimations may change in the future.

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24. Revenue, Continued

(8) As of December 31, 2022, details of contracts that the revenue was recognized based on the percentage-of-completion measured by input method, and whose contract revenue is more than 5% of sales of the year ended December 31, 2021 are as follows. There is no contract that the Company decided not to disclose due to the prohibition by related regulations or contracts.

(In millions of won)

	Contract date	Due date / Delivery date (*1)	Percentage-of- completion (%)	Due from customers for contract work		Trade receivables (receivables from construction contract)	
				Gross amounts	Accumulated impairment losses	Gross amounts	Allowance for doubtful accounts
UAE BNPP #1,2 NSSS	Jun-30-10	Jul-31-22	97.16	₩ -	-	-	-
Saeul #3, 4 NSSS(*3)	Aug-28-14	Mar-31-25	89.06	73,922	569	-	-
Shinhanul #1,2 NSSS	Jul-31-09	Sep-30-23	97.55	-	-	-	-
Samcheok #1,2 EPC	Jul-24-18	Apr-30-24	81.98	99,544	766	-	-
UAE BNPP #3,4 NSSS	Jun-30-10	Jun-30-24	96.93	20,018	154	-	-
Vinh Tan 4 TPP	Feb-26-14	Oct-31-21	99.64	20,082	155	24,403	4,881
Jawa #9, 10	Mar-20-19	Feb-15-25	69.45	150,112	1,156	92	9
Yanbu ph.3 MSF	Dec-4-12	Dec-31-22	99.72	-	-	-	-
Song Hau1	Apr-10-15	Mar-31-22	96.20	-	-	-	-
Nghi Son 2	Dec-24-14	Jul-10-22	97.11	-	-	-	-
UAE BNPP #3, 4 T/G	Sep-27-11	Jun-30-24	93.01	506	4	-	-
UAE BNPP #1, 2 T/G	Jun-30-10	Mar-01-22	95.48	-	-	-	-
Vinh Tan 4 Extension	Mar-10-16	Aug-31-21	99.74	-	-	5,769	1,823
Shinboryung #1, 2 Boiler	Oct-22-13	Feb-28-22	100.00	-	-	-	-
Saeul #3, 4 main equipment construction (*3)	Jun-12-15	May-28-25	86.27	93,157	717	-	-
Suncheon Wangji 2	Apr-24-19	Jun-30-24	27.09	-	-	-	-
Saeul #1,2 main equipment construction (*3)	Mar-09-07	Dec-31-21	99.86	-	-	-	-
Van Phong 1	Aug-26-19	Dec-25-23	79.22	-	-	12,345	95
Gangneung Anin #1, 2 Boiler	Mar-31-15	Mar-15-23	93.57	-	-	-	-
Shoaiba RO Ph.4	Mar-29-17	Dec-03-21	96.14	58,532	451	17,820	137
Goseong Hai #1, 2 Boiler	Dec-27-16	Aug-15-22	98.53	-	-	370	3
Shinhanul #1, 2 T/G	Jun-23-09	Jul-31-23	98.25	-	-	-	-
Saeul #3, 4 T/G (*3)	Aug-28-14	Mar-31-25	94.61	14,643	113	-	-
Doha RO Stage-I	May-30-16	Dec-31-21	91.41	9,022	69	43,859	1,351
Whasung-Dongtan2 collective energy cyclor	Aug-11-14	Jun-30-21	100.00	-	-	-	-
Muara Tawar Add-On	Mar-29-17	Mar-28-23	93.44	40,693	313	2,901	22
Al Khalij Boiler Package(*2)	Nov-01-08	Dec-31-18	98.83	39,312	303	-	-
Vogtle #3,4 AP1000	May-08-08	Dec-31-22	99.93	11,558	89	-	-

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24. Revenue, Continued

(In millions of won)

	Contract date	Due date / Delivery date (*1)	Percentage-of- completion (%)	Due from customers for contract work		Trade receivables (receivables from construction contract)	
				Gross amounts	Accumulated impairment losses	Gross amounts	Allowance for doubtful accounts
Seoul Forest Trimage	Oct-21-13	Dec-31-21	99.99	-	-	359	359
Hanbit #5,6 RSG	Aug-31-16	Jul-31-21	100.00	-	-	-	-
Hanbit #3,4 RSG	Oct-31-14	Dec-31-22	99.47	-	-	-	-
Tripoli West(*2)	Dec-23-10	Apr-30-15	57.25	₩	-	-	-
Gimpo cogeneration powerblock EPC	Jun-17-20	Jul-30-23	81.97	15,973	123	39	4
Kudgi STPP	Oct-15-14	Dec-31-22	99.77	-	-	893	893
Yangsan Deokgye 3rd	Sep-05-20	Jun-30-24	27.81	-	-	-	-
IEC Orot Rabin FGD	Jun-30-10	Jul-01-22	93.91	3,259	25	142	142
Yanbu 4 IWP	Jan-22-21	Nov-01-23	59.17	-	-	29,589	228
Boryung 4 Eco-friendly equipment	Jun-23-20	Dec-15-22	91.51	-	-	1,454	11
Dangjin 1st phase # 1~4 storage tank	Jul-23-21	Dec-31-25	27.02	27,056	208	-	-
Vung Ang II Power Project	Oct-26-21	Oct-26-25	19.32	-	-	36,985	285
Shinboryung #1, 2 T/G	Oct-22-13	Jun-30-22	100.00	-	-	-	-
Nepal Upper Trishuli 1 HPP	Dec-31-21	Dec-31-26	12.39	-	-	30,993	450
Tuwaiq casting and forging project	Feb-20-22	Jan-15-25	12.82	-	-	32,430	250
Guam Ukudu CCPP	Dec-18-20	Oct-31-24	46.72	25,340	195	8,193	63
Shuaibah 3 IWP	Aug-19-22	May-20-25	4.02	-	-	9,488	73
El-Dabaa NPP	Nov-09-22	Apr-08-29	0.03	460	4	-	-

(*1) Date being negotiated to extend contract period with respective contract party or due date/delivery date in contract.

(*2) Construction was temporarily suspended due to civil war in Libya and others.

(*3) In 2022, ShinGori #3,4 project was renamed Saeul #1,2, and ShinGori #5,6 project was renamed Saeul #3,4.

(9) Customers accounting for 10% or more of the Company's revenue for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Company group A	₩ 1,498,658	1,169,855
Client B	657,399	342,401
Client C	416,708	529,661

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25. Expenses classified by nature

Expenses (cost of sales, selling and administrative expenses) classified by nature for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Changes in inventories	₩	34,749	(67,739)
Purchases of raw materials and goods		2,072,523	1,412,198
Salaries		637,643	485,678
Depreciation and amortization		158,153	175,704
Others		2,296,066	1,451,756
Total	₩	<u>5,199,134</u>	<u>3,457,597</u>

26. Selling and administrative expenses

Selling and administrative expenses for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Salaries	₩	116,469	94,958
Post-Employment benefits		19,543	3,647
Termination benefits		61	2,706
Employee welfare benefits		17,389	13,139
Travel		4,209	1,766
Training		6,455	995
Taxes and dues		1,971	2,056
Commissions		66,269	45,530
Bad debt expenses		37,075	83,703
Depreciation		18,634	18,221
Amortization		14,825	15,755
Insurance		4,728	4,288
Research		24,513	15,251
Expansion expenses of overseas market		13,070	9,437
Advertising		27,203	6,511
Warranty		23,865	1,418
Provision for loss compensation(reversal)		530	(62,225)
Others		21,167	19,254
Total	₩	<u>417,976</u>	<u>276,410</u>

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27. Finance income and expenses

(1) Finance income for the years ended December 31, 2022 and 2021 are summarized as follows:

<i>(In millions of won)</i>		2022	2021
Interest income	₩	24,900	12,137
Dividend income		2,056	1,313
Gain on foreign currency transaction		210,337	60,232
Gain on foreign currency translation		61,273	71,353
Gain on settlement of derivative financial instruments		115,380	245,673
Gain on valuation of derivative financial instruments		90,160	107,949
Gain on valuation of firm commitments		67,459	117,275
Gain on financial guarantee		1,231	927
Total	₩	<u>572,796</u>	<u>616,859</u>

(2) Finance expenses for the years ended December 31, 2022 and 2021 are summarized as follows:

<i>(In millions of won)</i>		2022	2021
Interest expenses	₩	141,735	178,996
Loss on foreign currency transaction		253,362	75,035
Loss on foreign currency translation		110,952	89,996
Loss on settlement of derivative financial instruments		100,908	26,185
Loss on valuation of derivative financial instruments		96,296	238,104
Loss on valuation of firm commitments		54,102	7,643
Loss on financial guarantee		1,632	9,279
Commission expenses		45,719	45,032
Total	₩	<u>804,706</u>	<u>670,270</u>

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28. Other non-operating income and expenses

(1) Other non-operating income for the years ended December 31, 2022 and 2021 are summarized as follows:

<i>(In millions of won)</i>		2022	2021
Commission income	₩	4,183	3,364
Gain on disposal of property, plant and equipment		1,539	2,164
Gain on disposal of investment in subsidiaries		-	59,523
Gain on valuation of long-term investment in securities		20,479	16,811
Reversal of impairment loss of intangible assets		-	85
Gain on disposal of long-term investment in securities		1,802	-
Miscellaneous gain and others		86,548	4,751
Total	₩	<u>114,551</u>	<u>86,698</u>

(2) Other non-operating expenses for the years ended December 31, 2022 and 2021 are summarized as follows:

<i>(In millions of won)</i>		2022	2021
Commission fee	₩	34,573	12,814
Loss on disposal of trade receivables		2,886	988
Loss on disposal of property, plant and equipment		3,419	1,598
Loss on disposal of intangible assets		-	6
Donations		422	324
Impairment loss of property, plant and equipment		17,755	-
Impairment loss of intangible assets		64,682	26,551
Impairment loss of assets held for sale		-	1,786
Loss on valuation of short and long-term investment in securities		4,580	29,617
Loss on disposal of investment in subsidiaries		858,404	148,387
Loss on disposal of assets held for sale		157,935	1,682
Other bad debt expenses		-	1,090
Impairment loss of investment in subsidiaries		129,601	63,425
Depreciation expense of idle assets		-	2,524
Miscellaneous loss and others		14,180	12,470
Total	₩	<u>1,288,437</u>	<u>303,262</u>

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29. Income tax benefit

(1) The component of income tax benefit for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Current income tax expense	₩	42,238	6,951
Adjustments in respect of current income tax of prior year		-	(3,008)
Tax effect of temporary difference		(165,730)	(113,503)
Total income tax benefit		(123,492)	(109,560)
Current income tax related to items recognized in equity during the year		(193)	(127)
Deferred tax related to items recognized in equity during the year		15,038	(51,636)
Others		-	32
Income tax benefit	₩	(108,647)	(161,291)

(2) The component of income tax expense and deferred tax related to items recognized in equity for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Loss on revaluation of assets	₩	23,220	(46,196)
Gain on valuation of FVOCI		(121)	-
Gain on valuation of derivative financial instruments		(484)	(3,008)
Remeasurements of defined benefit liabilities		(7,763)	(2,558)
Other capital surplus		-	(1)
Others		(7)	-
Total	₩	14,845	(51,763)

(3) Changes in deferred tax assets (liabilities) for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	
	January 1	Change	December 31
Provision for retirement and severance benefits	₩	83,506	(3,086)
Allowance for doubtful accounts		300,226	8,419
Property, plant and equipment		10,911	2,577
Development costs		22,827	(4,429)
Derivative financial instruments (including firm commitments)		29,804	(42,380)
Foreign currency denominated assets (liabilities)		4,843	6,694
Gain on revaluation of assets		(521,711)	23,407
Others		249,595	174,528
Total	₩	180,001	165,730

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29. Income tax benefit, Continued

(In millions of won)

		2021	
	January 1	Change	December 31
Provision for retirement and severance benefits	₩ 83,893	(387)	83,506
Allowance for doubtful accounts	264,582	35,644	300,226
Property, plant and equipment	11,061	(150)	10,911
Development costs	29,208	(6,381)	22,827
Derivative financial instruments (including firm commitments)	(4,757)	34,561	29,804
Foreign currency denominated assets (liabilities)	1,024	3,819	4,843
Gain on revaluation of assets	(475,641)	(46,070)	(521,711)
Others	157,128	92,467	249,595
Total	₩ 66,498	113,503	180,001

(4) The amount of deductible temporary differences for which no deferred tax asset is recognized in the statements of financial position as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Deductible temporary differences	₩ 2,955,806	2,600,570
Tax credit carried forward	30,612	20,220

The probability of deferred tax assets being realized depends on the Company's ability to generate taxable income in future years over which temporary differences are expected to reverse depending on the economic situation, industry forecast and other various factors. The Company periodically reviews such matters.

(5) Temporary differences related to investments in subsidiaries, associates and joint ventures which are not recognized as deferred tax asset as of December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Investments in subsidiaries and others	₩ 2,655,443	2,115,185

(6) Reconciliation of loss before income tax at the statutory tax rate to income tax benefit at the effective income tax rate of the Company for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Loss before income tax	₩ (1,320,490)	(134,690)
Income tax benefit using statutory tax rate	(306,354)	(32,595)
Adjustments:		
Permanent differences	51,557	(94,256)
Unrecognized deferred tax related to temporary differences	170,504	32,913
Tax credit	28,721	2
Others	(53,075)	(67,355)
Income tax benefit	₩ (108,647)	(161,291)
Effective tax rate(*1)	-	-

(*1) Effective tax rate for the years ended December 31, 2022 and 2021 were not calculated due to loss before income tax.

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30. Earnings (loss) per share

(1) Basic earnings (loss) per share

1) Basic earnings (loss) per share for the years ended December 31, 2022 and 2021 are as follows:

<i>(In won, except for share)</i>	2022	2021
Profit (loss) for the period	₩ (1,211,843,374,713)	26,601,046,582
Weighted-average number of ordinary shares at the end of the period	618,313,654 shares	454,191,535 shares
Basic earnings (loss) per share	₩ (1,960)	59

2) Weighted-average number of ordinary shares outstanding for the years ended December 31, 2022 and 2021 are as follows:

<i>(In shares)</i>	2022	2021
Issued ordinary shares at the beginning of the period(*1)	522,124,808	374,622,926
Acquisition of treasury stock	-	(37,072)
Disposition of treasury stock	-	300
Issuance of ordinary shares	71,974,546	35,915,737
Exercise of bonds with stock warrants	24,214,300	6,217,021
Issuance of ordinary shares related to spin-off and merger	-	37,472,623
Weighted-average number of ordinary shares at the end of the period	618,313,654	454,191,535

(*1) The number of shares is net of treasury stocks.

(2) Diluted earnings (loss) per share

1) Diluted earnings (loss) per share for the years ended December 31, 2022 and 2021 are as follows:

<i>(In won, except for share)</i>	2022	2021
Profit (loss) for the period before adjustment	₩ (1,211,843,374,713)	26,601,046,582
Add: Interest expense on redemption premium	-	70,059,146
Profit (loss) for the period after adjustment	(1,211,843,374,713)	26,671,105,728
Weighted-average number of ordinary shares outstanding at the end of the period after adjustment	618,313,654 shares	462,933,245 shares
Diluted earnings (loss) per share	₩ (1,960)	58

2) Weighted-average number of ordinary shares after adjustment for diluted earnings (loss) for the years ended December 31, 2022 and 2021 are as follows:

<i>(In shares)</i>	2022	2021
Weighted-average number of ordinary shares at the end of the period before adjustment	618,313,654	454,191,535
Adjustment: bonds with stock warrants	-	6,110,110
Adjustment: stock warrants	-	2,160,125
Adjustment: convertible bonds	-	471,475
Weighted-average number of ordinary shares at the end of the period after adjustment	618,313,654	462,933,245

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30. Earnings (loss) per share, Continued

3) Details of potential ordinary shares that are potentially dilutive but were not included in the calculation of earnings (loss) per share, as there were no dilutive effects for the years ended December 31, 2022 and 2021 are as follows:

<i>(In shares)</i>	2022	2021
Stock option (Mar 30, 2012)	-	21,083
Stock option (Mar 29, 2013)	14,565	29,657
Stock option (Mar 21, 2014)	5,851	17,082
Stock option (Mar 28, 2014)	20,800	29,600
Bonds with stock warrants	2,253,113	-
Total	<u>2,294,329</u>	<u>97,422</u>

31. Commitments and contingencies

(1) Pledged check

As of December 31, 2022, 3 blank checks (regarding the ₩5,256 million funds replenishing requirement) have been provided as collateral to Gyeonggi East-West Beltway Co. in relation to Bongdam-Songsan Expressway construction project.

(2) Financial commitments

- 1) As of December 31, 2022, the Company has credit lines of borrowings, bank overdrafts and other financial needs from financial institutions up to ₩3,157,766 million and used ₩2,685,735 million, leaving unused credit lines amounting to ₩472,031 million as of December 31, 2022.
- 2) As of December 31, 2022, the Company has entered into a capital supplement agreement with Woori Bank of ₩84,638 million, equivalent to the amount of loan provided to Doosan Mecatec Co., Ltd., according to the terms and conditions of the Doosan Mecatec Co., Ltd. stock purchase agreement.
- 3) As of December 31, 2022, the Company issued foreign currency-denominated bond of USD 300,000 thousand. In accordance with the agreement for this bond, an early redemption clause exists for when the guarantor, KDB, is no longer controlled by Korean government. In addition, the Company has provided its 13,884,989 shares of Doosan Bobcat Inc. to lenders as collateral for the above bonds, respectively. And if the total value of the shares provided is less than the collateral standard price, additional shares or deposits equivalent to the difference amounts should be provided.
- 4) As of December 31, 2022, the Company has provided 2,954,548 shares of Doosan Bobcat Inc. as collateral for long-term borrowings of ₩55,000 million from KDB and 2 other financial institutions. In relation to the borrowings, if the ratio does not meet the certain collateral limit predetermined in the agreement, additional shares or deposits must be provided as collateral. In addition, if the Company receives a long-term credit rating of BB0 or lower from two or more than two of the domestic credit rating agencies (Nice Investors Service Co., Ltd., Korea Investors Service, Inc. and Korea Ratings Corporation), it will trigger the financial institutions to collect the loans before the maturity.

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31. Commitments and contingencies, Continued

- 5) As of December 31, 2022, the Company has provided 3,650,000 shares of Doosan Bobcat Inc. as collateral for loan facility of ₩100,000 million from SC Bank. In relation to the agreement, if the ratio does not meet the certain collateral limit predetermined in the agreement, either shares or deposits equivalent to the difference amounts must be provided as collateral or some loans must be redeemed early.
- 6) As of December 31, 2022, the 59th and 60th convertible bonds of ₩23,374 million issued by the Company include a clause to maintain the credit rating at BB0 or higher and the covenant constitutes reasons for the financial institutions to collect the loans before the maturity, if otherwise.
- 7) As of December 31, 2022, the Company has provided 5,500,000 shares of Doosan Bobcat Inc. and 20,780,229 shares of Doosan Fuel Cell Co., Ltd. as collateral for long-term borrowings of ₩500,000 million from NH Investment & Securities Co., Ltd. and others and 72nd privately placed bond of ₩100,000 million. In relation to the borrowings, if the ratio does not meet the certain collateral limit predetermined in the agreement, either shares or deposits equivalent to the difference amounts must be provided as collateral. In addition, if the Company receives a long-term credit rating of BB+ or lower or short-term credit rating of B+ or lower from one or more than one of the domestic credit rating agencies (Nice Investors Service Co., Ltd., Korea Investors Service, Inc. and Korea Ratings Corporation), an acceleration clause would be invoked for the immediate payment.
- 8) As of December 31, 2022, the 73rd public offering bond of ₩80,000 million and the 74th public offering bond of ₩80,000 million issued by the Company include the covenant requiring the Company to maintain a debt-to-equity ratio less than 700% and if the Company fails to meet the certain requirements, an acceleration clause would be invoked for immediate payment.
- 9) As of December 31, 2022, the Company has provided 4,800,000 shares of Doosan Bobcat Inc. as collateral for a loan facility of ₩80,000 million from Korea Securities Finance. According to the agreement, if the ratio does not meet the certain collateral limit predetermined in the agreement, either shares or deposits equivalent to the difference amounts must be provided as collateral or some loans must be redeemed early.
- 10) As of December 31, 2022, the Company has provided 600,000 shares of Doosan Bobcat Inc. as collateral for borrowings of ₩10,000 million from Shinhan Investment Corp. According to the borrowing covenant, if the ratio does not meet the certain collateral limit predetermined in the agreement, either shares or deposits equivalent to the difference amounts must be provided as collateral or some loans must be redeemed early.
- 11) As of December 31, 2022, the Company has provided 2,000,000 shares of Doosan Fuel Cell Co., Ltd. as collateral for loan facility of ₩50,000 million from SC Bank. According to the agreement, if the ratio does not meet the certain collateral limit predetermined in the agreement, either shares or deposits equivalent to the difference amounts must be provided as collateral or some loans must be redeemed early.
- 12) As of December 31, 2022, the Company has provided 11,100,000 shares of Doosan Bobcat Inc. as collateral for long-term borrowings of ₩250,000 million from KDB and 3 other financial institution. In relation to the borrowings, if the ratio does not meet the certain collateral limit predetermined in the agreement, additional shares or deposits must be provided as collateral. In addition, in case the Company receives a long-term credit rating of BB0 or lower from two or more than two of the domestic credit rating agencies (Nice Investors Service Co., Ltd., Korea Investors Service, Inc. and Korea Ratings Corporation), it will trigger the financial institutions to collect the loans before the maturity.

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31. Commitments and contingencies

(3) Pending litigations and others

As of December 31, 2022, the Company is involved in pending lawsuits as a defendant with total claims against the Company amounting to approximately ₩ 79,271 million and the outcome is currently unpredictable.

(In millions of won)

		Claim amount
Arbitration	₩	33,766
Litigation		45,505
Total	₩	<u>79,271</u>

(4) Technical contract

As of December 31, 2022, the Company has entered into 21 technical contracts with Mitsubishi Hitachi Power System, Ltd. and others, which have been effective from April 12, 2007 to September 24, 2035. For the years ended December 31, 2022 and 2021, royalty payments amounted to ₩ 15,229 million and ₩ 10,322 million, respectively.

(5) Guarantees of payment provided by third parties

As of December 31, 2022, the Company has been provided with guarantees of ₩ 7,776,168 million from financial institutions in connection with domestic and overseas construction and ₩ 384,467million from financial institutions related with foreign bonds held by the Company.

(6) Guarantees of payment provided to the third parties

1) As of December 31, 2022, the Company provides payment guarantees and joint guarantees amounting to ₩112,190 million and ₩ 91,000 million, respectively, to subcontractors and customers for domestic and overseas business purposes.

2) As of December 31, 2022, the Company has provided a guarantee of payments amounting to ₩16,987 million, to Employee Stock Ownership Association for the purpose of member loan guarantee.

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31. Commitments and contingencies, Continued

(7) Guarantees of payment and collateral provided to the related party

As of December 31, 2022, details of guarantees provided by the Company for the related party are as follows:

(In millions of won, in thousands of foreign currency)

Guarantee	Currency	Guarantee amount	Translated in KRW	Guarantee plan	Beneficiary
Doosan Water UK Ltd.	GBP	70,180 ₩	107,212	Construction guarantee	Northumbrian Water and others
Doosan Power Systems S.A.	GBP	24,794	37,877	Debt guarantee	Woori Bank and others
	GBP	21,000	32,082	Others(*1)	Corum XL
DPS S.A. and DPS UK Pension Company Ltd.	GBP	85,000	129,852	Others(*2)	DPS Pension Trustee Company
Doosan GridTech Inc.	USD	6,893	8,735	Construction guarantee	Construction guarantee cooperative and others
	AUD	146,018	125,344	Construction guarantee	Wandoo BESS Project Co Pty Ltd and others
Doosan Enerbility America LLC	USD	4,200	5,323	Debt guarantee	Woori Bank
PT. Doosan Heavy Industries Indonesia	IDR	997,545,695	80,701	Construction guarantee	Construction guarantee cooperative and others
Doosan Enerbility Japan Corp.	JPY	220,000	2,097	Debt guarantee	KDB
Doosan Heavy Industries Muscat LLC	OMR	650	2,139	Construction guarantee	Arab Bank
	USD	142,523	180,620	Construction guarantee	AL ASILAH DESALINATION COMPANY SA.O.C and others
Doosan Enerbility Vietnam Co., Ltd.	USD	65,316	82,775	Debt guarantee	SC Bank and others
	VND	1,105,371,560	59,358	Construction guarantee	Construction guarantee cooperative
	VND	1,000,000,000	53,700	Debt guarantee	Techcom Bank
Doosan Lentjes GmbH	EUR	234,392	316,711	Construction guarantee	Construction guarantee cooperative and others
Doosan Power Systems Arabia Company Limited	SAR	10,000	3,371	Debt guarantee	Woori Bank
	SAR	6,000	2,022	Construction guarantee	Machinery Financial Cooperative
Doosan Power Systems India Private Ltd.	EUR	9,671	13,068	Construction guarantee	Axis Bank and others
	INR	44,670,544	683,906	Construction guarantee	Construction guarantee cooperative and others
	INR	1,615,000	24,726	Debt guarantee	SC Bank and others
	JPY	298,093	2,841	Construction guarantee	Seoul guarantee insurance and others
Doosan Power Systems India Private Ltd.	USD	83,804	106,204	Construction guarantee	Construction guarantee cooperative and others
Doosan Ukudu Power, LLC	USD	49,956	63,309	Construction guarantee	Construction guarantee cooperative
Doosan Engineering & Construction Co., Ltd.	EUR	7,404	10,005	Construction guarantee	Korea EXIM Bank
	USD	358	454	Construction guarantee	Seoul guarantee insurance
Total			₩ 2,134,432		

(*1) DPS S.A. is obligated to lease the office building in use until September 2033, and the Company provides payment guarantees in relation to the lease.

(*2) The Company provides payment guarantee for DPS UK Pension Company Ltd. regarding monthly pension payment obligations and total pension payments to guarantee creditors in case of bankruptcy.

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31. Commitments and contingencies, Continued

(8) Other commitments and contingencies

- 1) As of December 31, 2022, the Company has entered into contracts to assume a liability (limit: ₩ 296,475 million) if it fails to complete construction of 3rd apartment units in Yangsan Deokgye, 5th apartment units in Yangsan Deokgye, Suncheon city development project, Dapsimni officetel development project and Suwon Mangpo knowledge industry center.
- 2) The Company signed a new lease contract with BUNDANG DOOSAN TOWER REIT Co., Ltd. for 5 years on January 8, 2021 in conjunction with Doosan Corp., Doosan Bobcat Korea Co., Ltd. and Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.). As Hyundai Doosan Infracore Co., Ltd. withdrew from the lease agreement on December 31, 2022, the Company took over the related status and rights and obligations. In accordance with above contracts, the Company jointly has lease obligations. If certain condition of the lease contract is not met, the contract will be extended once for 5 years under the same conditions.

In addition, the sublease of the real estate is jointly performed by parties including the Company, Doosan Corp. and Doosan Bobcat Korea Co., Ltd. and each party has the right to the rental income to the extent applicable excluding the self-lease and related expenses.

- 3) The Company accounts for the above-mentioned 2) joint lease contract as joint operation in which the parties jointly control the lease arrangement also have the right to assets and liabilities of the leased asset in accordance to K-IFRS No. 1111 'Joint Arrangements.' As of December 31, 2022, the Company's participating rate is 83.6%.
- 4) Before prior year, the Company and financial investors, NuScale Korea and others, acquired preferred shares of NuScale Power LLC. As of December 31, 2022, the Company has provided a put option contract that could only be exercised under the certain conditions of non-compliance in relation to the preferred shares (USD 12,605 thousand) acquired by NuScale Korea and others.
- 5) As of December 31, 2022, the Company is an investor of Samcheok Blue Power Co., Ltd. which is responsible for the EPC construction project of Samcheok #1, 2 TPP, and obligated to make an additional investment of ₩77,740 million in September 2023 in accordance with the investor agreement. To fulfill this obligation, the Company agreed to deposit a certain percentage of the construction collection amount into Samcheok Blue Power Co., Ltd.'s account from November 2020 to June 2022. Meanwhile, the deposit has been refunded as of the end of December 31, 2022, because the Company granted a credit rating of BBB0 (Stable) by two or more credit rating agencies, and reason for exemption of the reserve obligation occurred.
- 6) During 2019, the Company sold the Doosan R&D center located in Seongbokdong, Sujigu, Yongin, Gyeonggi-do and has lease obligations for five years after the sale.
- 7) The Company compensates for the shortfall to the extent of the recoverable amount from Doosan Engineering & Construction Co., Ltd. stock (ownership 46.35%) if final distribution amount of the sales price of Doosan Engineering & Construction Co., Ltd. stock (ownership 53.65%) held by The Zenith Holdings Ltd. has not met the investment capital of the investors (excluding 2018 QCP No. 13 Private Equity Joint venture, the representative PEF).

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32. Assets pledged as collateral

- (1) As of December 31, 2022, assets that have been pledged as collateral for the Company's borrowings and others are as follows:

(In millions of won)

Collateralized asset	Collateralized amount	Amount of borrowings and others	Pledgee
Land, buildings, equipment and others(*1) ₩	1,115,509	942,383	KDB, Korea EXIM Bank, SC Bank
Ordinary shares of Doosan Bobcat Inc. and others(*1)	2,100,943	1,375,190	KDB and others
Ordinary shares of Doosan Engineering & Construction Co., Ltd. (*2)	186,964	288,438	Woori Bank
Equity shares of Construction Guarantee Cooperative and others(*3)	112,130	69,913	Construction Guarantee Cooperative and others
Total ₩	3,515,546	2,675,924	

(*1) As of December 31, 2022, in accordance with bond, borrowing, and borrowing covenant held by the Company, 42,489,537 shares of Doosan Bobcat Inc., a subsidiary of the Company, and 22,780,229 shares of Doosan Fuel Cell Co., Ltd., a subsidiary of the Company, land, and others have been provided as collateral (See Note 31).

(*2) As of December 31, 2022, in relation to guarantee payment of the Company, 50,000,000 shares of Doosan Engineering & Construction Co., Ltd., an associate of the Company, have been provided as collateral.

(*3) As of December 31, 2022, in relation to the company's debts, 53,159 shares of investment in Construction Guarantee Cooperative, 8,767 shares of investment in Engineering Guarantee Insurance, 14,657 shares of investment in CI Guarantee, 35,000 shares of investment in Machinery Financial Cooperative, 800 shares of investment in Electric Contractors' Financial Cooperative and others are provided as collateral.

- (2) As of December 31, 2022, among the long-term investment in securities of the Company, the shares of Gyeonggi East-West Beltway Co. with the book value of ₩1,424 million have been provided as collateral for the project financing of the entity and established the right of pledge to Kookmin Bank (PF syndicate) and others.

Meanwhile, as of December 31, 2022, the Company has entered into a contract of completion guarantee regarding the Changwon hydrogen liquefaction plant and provided 1,400,000 shares of Hychangwon Co., Ltd. with the book value of ₩7,000 million as collateral for the project financing of the entity and established the right of pledge to Kyongnam Bank (PF syndicate).

- (3) As of December 31, 2022, the Company has entered into a contract of completion guarantee regarding the EPC construction project of Samcheok #1,2 TPP and provided 1,193,066 shares (the book value of ₩43,568 million) of Samcheok Blue Power Co., Ltd. as collateral.

As of December 31, 2022, the Company has signed the export bond insurance limit contract (₩459,000 million) with Korea Trade Insurance Corporation and provided part of the land, buildings, and machinery of the Changwon Plant (Collateralized amount: ₩420,000 million) and all shares of DPS S.A. held by the Company (Collateralized amount: GBP 293 million) as collateral.

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32. Assets pledged as collateral, Continued

- (4) As of December 31, 2022, the Company has provided 3,400,000 shares of Doosan Bobcat Inc., equivalent to the amount of Doosan Mecatec Co., Ltd.'s loan (~~₩~~20,116 million), to Korea Development Bank as collateral in accordance with the terms of the Doosan Mecatec Co., Ltd. stock purchase agreement.
- (5) As of December 31, 2022, the Company has provided ~~₩~~8,043 million of deposits to Korea Securities Finance Corp. as collateral regarding supplement member loan for stock acquisition of Employee Stock Ownership Association.

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33. Related party transactions

(1) The related parties of the Company and nature of their relationship with the Company as of December 31, 2022 and 2021 are as follows:

1) As of December 31, 2022, the Company's ultimate parent company is Doosan Corp. (equity ownership: 30.51%).

2) As of December 31, 2022 and 2021, the details of the Company's subsidiaries are as follows:

Related party	Equity ownership (%)(*1)	
	2022	2021
Doosan Enerbility Vietnam Co., Ltd.	100.00	100.00
Doosan HF Controls Corp.	100.00	100.00
Doosan HF Controls Asia Co., Ltd.	100.00	100.00
PT. Doosan Heavy Industries Indonesia	83.64	83.64
Doosan Heavy Industries Malaysia Sdn. Bhd	100.00	100.00
Doosan Enerbility Japan Corp.	100.00	100.00
Doosan Water UK Ltd.	100.00	100.00
Doosan Power Systems India Private Ltd.	100.00	100.00
Doosan Heavy Industries Muscat LLC	70.00	70.00
Doosan Power Systems Arabia Company Limited	51.00	51.00
Azul Torre Construction Corporation	40.00	40.00
Doosan Enerbility America Holdings Inc.	100.00	100.00
Doosan Enerbility America LLC(*2)	100.00	100.00
Doosan ATS America, LLC	100.00	100.00
Doosan Power Service America, LLC	100.00	100.00
Doosan Turbomachinery Services Holding, Inc.	100.00	100.00
Doosan Turbomachinery Services Inc.	100.00	100.00
Doosan GridTech Inc.	100.00	100.00
Doosan GridTech LLC	100.00	100.00
Doosan GridTech CA LLC	100.00	100.00
Doosan GridTech EPC LLC	100.00	100.00
Doosan GridTech C&I LLC	100.00	100.00
Continuity Energy LLC	100.00	100.00
Doosan Skoda Power s.r.o	100.00	100.00
Skoda Power Private Ltd.	100.00	100.00
DPS UK Pension Company Ltd.(*4)	100.00	-
Doosan Power Systems Pension Trustee Co., Ltd.	100.00	100.00
Doosan Power Systems Overseas Investments Ltd. (*5)	-	100.00
Doosan Babcock Ltd. (*5)	-	100.00
Doosan Power Systems Americas LLC (*5)	-	100.00
Doosan Lentjes GmbH	100.00	100.00
DPS S.A.	100.00	100.00
Doosan Babcock Energy Services (Overseas) Ltd. (*5)	-	100.00
Doosan Babcock Energy Polska S.A. (*5)	-	98.91
Doosan Babcock Energy Germany GmbH (*5)	-	100.00
Doosan Lentjes Czech s.r.o	100.00	100.00
Doosan Babcock General Maintenance Services LLC (*5)	-	49.00
Doosan Babcock W.L.L.(*3,5)	-	49.00
Doosan Ukudu Power, LLC	100.00	100.00
Osung Power O&M Co., Ltd.	100.00	100.00
Doosan Mecatec Co., Ltd. and the subsidiaries (*5)	-	100.00
KDPP 5 th Co., Ltd. (*9)	-	-
Doosan Cuvex Co., Ltd. (*6,8)	100.00	56.60
Doosan Property Co., Ltd. (*7,8)	-	27.01
Doosan Bobcat Inc. and the subsidiaries	51.07	51.05
Doosan Fuel Cell Co., Ltd.	30.33	30.33
D20 Capital, LLC and the subsidiaries	100.00	100.00

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33. Related party transactions, Continued

- (*1) The ownership represents addition of the investment owned by the Company and its subsidiaries.
(*2) In 2022, the business name of the entity is changed from Doosan Heavy Industries America LLC to Doosan Enerbility America LLC.
(*3) In 2022, the business name of the entity is changed from Doosan Babcock BlackCat W.L.L to Doosan Babcock W.L.L.
(*4) Newly established in 2022.
(*5) Disposed in 2022.
(*6) Additionally acquired in 2022.
(*7) The entity was additionally acquired in 2022, and was reclassified to a subsidiary from an associate.
(*8) In 2022, Doosan Property Co., Ltd. was absorbed and merged with Doosan Cuvex Co., Ltd. and ceased to exist.
(*9) In 2022, the Company loses its control over the entity due to repayment of borrowings.

- 3) The associates and joint ventures and other related parties of the Company and nature of their relationship with the Company as of December 31, 2022 are as follows:

Control relationship	Related party
Associates and joint ventures (*4,5)	Samcheok Blue Power Co., Ltd., Daejung Offshore Wind Power Co., Ltd., Hychangwon Co., Ltd., The Zenith Holdings Ltd., Doosan Engineering & Construction Co., Ltd. and the subsidiaries, Tuwaiq Casting & Forging Company(*1), Multi-asset ESG Marine Wind Power Private Equity Fund 1 st (*1)
Related parties:	
Subsidiaries of the parent company(*2)	Oricom Inc., Hancom Co., Ltd., Doosan Bears Inc., Doosan Business Research Institute, Doosan Robotics Co., Ltd., Doosan Mobility Innovation Co., Ltd., Doosan Logistics Solutions Co., Ltd, DPAY 2 nd Co., Ltd., Doosan 2 nd Real Estate Securitization Specialty Co., Ltd., Doosan Mobility Innovation (Shen Zhen) Co., Ltd., Doosan Electro-Materials Singapore Pte. Ltd., Doosan Ltd., Doosan Electro-Materials (Shen Zhen) Limited., Doosan Shanghai Chemical Materials Co., Ltd., Doosan Electro-Materials (Changshu) Co., Ltd., Doosan Digital Innovation America LLC., Doosan Digital Innovation China LLC, Doosan Digital Innovation Europe Limited, Doosan Electro-Materials America, LLC, HyAxiom, Inc.(*3), Doosan Energy Solutions America, Inc., DESA Service, LLC, Doosan Electro-Materials Vietnam Company Limited, Doosan H2 Innovation Co., Ltd., Doosan Investment Co., Ltd.(*6), D-Pay 3 rd Co., Ltd.(*6), Doosan Tesna Inc.(*6), HyAxiom Motors Co., Ltd.(*6), NewstarBears Co., Ltd.(*6), Doosan Robotics Americas, LLC(*6)
Associates and joint ventures of the parent company	KDDI Korea Corporation, Wise-fashion Co., Ltd., Protera SAS, Sichuan Kelun-Doosan Biotechnology Company Limited, PT. SEGARA AKASA, Stathera IP Holding Inc., Mastern Professional Investment Type Private Security Investment Trust No.98, SiO2 Medical Products, Inc., Versogen Inc.(*6) and others
Others(*4,7,9)	Doosan Credit Union, Doosan Yonkang Foundation, Chung-Ang University, Chung-Ang University Hospital, Prestolite Asia Ltd., ReCarbon, Inc., Daesan Green Energy Co., Ltd., Ainstein AI, Inc, Folletto Robotics Co.,Ltd.(*6), Won Sang Co., Ltd.(*6), BUNDANG DOOSAN TOWER REIT Co., Ltd.(*8), The Weve Holdings Ltd.(*8) and others

- (*1) Newly acquired in 2022.
(*2) In 2022, Sunny Russel 8th Co., Ltd., was liquidated.
(*3) In 2022, the business name of the entity is changed from Doosan Fuel Cell America, Inc. to HyAxiom, Inc.
(*4) In 2022, Doosan Babcock W.L.L was disposed, and Doosan Property Co., Ltd. was absorbed and merged with Doosan Cuvex Co., Ltd. and ceased to exist.
(*5) In 2022, The HS-City Expressway has been disposed and excluded from scope of the associates.
(*6) In 2022, the entity is classified as other related party.
(*7) In 2022, THE PATH WITH YOU FOUNDATION has been excluded from scope of the other related party.
(*8) In 2022, the entities are reclassified from associates of parent company to associates of subsidiary, as Doosan Property Co., Ltd. is newly included in consolidation.
(*9) In 2022, ReCarbon Inc. has been excluded from the associates due to the disposal of Doosan Mecatec Co., Ltd.

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33. Related party transactions, Continued

(2) Significant transactions between the Company and related parties

Significant transactions (excluding financial and investment) with related parties for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

Related party	2022				
	Sales and others		Purchases and others		
	Sales	Other revenue	Purchase	Acquisition of PP&E and intangible assets	Other expense
Parent:					
Doosan Corp.	₩ -	308	24,778	-	41,351
Subsidiaries:					
Doosan Cuvex Co., Ltd.	23	19	10,766	-	527
Osung Power O&M Co., Ltd.(*1)	1,002	4	5,207	-	-
KDPP 5 th Co., Ltd.(*4)	-	-	-	-	1,382
Doosan Power Systems Arabia Company Limited	-	343	11,349	-	-
Doosan Power Systems India Private Ltd.	15,452	5,603	-	-	-
Doosan Lentjes GmbH	-	461	5,159	-	-
Doosan Enerbility Vietnam Co., Ltd.	8	1,015	255,567	-	-
Doosan ATS America, LLC	-	-	3,808	-	-
Doosan Babcock Ltd.(*2)	-	3,674	870	4,015	-
Doosan Skoda Power s.r.o	127	-	6,439	-	-
DPS S.A.	-	10,302	-	-	-
Doosan Bobcat Inc.(*1)	92,117	-	-	-	-
D20 Capital, LLC(*1)	19,190	-	-	-	-
Others	883	1,817	12,181	-	1,157
Subtotal	128,802	23,238	311,346	4,015	3,066
Associates and joint ventures:					
Doosan Engineering & Construction Co., Ltd.	-	133	35	101	1,329
Samcheok Blue Power Co., Ltd.	416,708	-	-	-	-
The HS-City Expressway(*3)	9	-	-	-	-
Hychangwon Co., Ltd.	53,696	-	-	-	-
Tuwaik Casting & Forging Company	137,852	-	-	-	-
Subtotal	608,265	133	35	101	1,329
Others:					
Oricom Inc.	-	-	46	-	10,905
Doosan Bears Inc.	-	-	505	-	10,006
Doosan Business Research Institute	305	20	-	-	7,120
BUNDANG DOOSAN TOWER REIT Co., Ltd.	-	-	-	-	16,801
Others	-	1	880	-	378
Subtotal	305	21	1,431	-	45,210
Total	₩ 737,372	23,700	337,590	4,116	90,956

(*1) Includes ₩ 112,307 million of dividend income from Doosan Bobcat Inc., a subsidiary of the Company, and others.

(*2) Includes transactions before the sale of Doosan Babcock Ltd.

(*3) Includes transactions before the sale of The HS-City Expressway.

(*4) Includes transactions before the loss of control over KDPP 5th Co., Ltd.

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33. Related party transactions, Continued

(In millions of won)

Related party	2021						
	Sales and others			Purchases and others			
	Sales	Sale of PP&E and intangible assets	Other revenue	Purchase	Acquisition of PP&E and intangible assets	Acquisition of right-of-use asset	Other expense
Parent:							
Doosan Corp.	₩ -	-	318	27,471	-	-	36,336
Subsidiaries:							
Doosan Cuvex Co., Ltd.	42	-	-	7,116	-	-	3,787
Osung Power O&M Co., Ltd.	-	-	4	5,739	-	-	-
KDPP 5 th Co., Ltd.	-	-	-	-	-	-	4,584
Doosan Heavy Industries Vietnam Co., Ltd.	2,263	-	780	173,821	-	-	-
Doosan Power Systems India Private Ltd.	23,006	-	3,536	-	-	-	-
Doosan Power Systems Arabia Company Limited	-	-	50	10,440	-	-	-
Doosan ATS America, LLC	-	-	-	4,223	-	-	-
Doosan Babcock Ltd.	371	-	3,414	2,098	-	-	-
Doosan Skoda Power s.r.o	100	-	-	4,594	-	-	-
U-best 5 th Co., Ltd.	-	-	-	-	-	-	1,414
Doosan Industrial Vehicle Co., Ltd.	130	58,410	-	-	-	-	-
Others(*1)	734	-	3,004	14,838	628	-	807
Subtotal	26,646	58,410	10,788	222,869	628	-	10,592
Associates and joint ventures:							
Doosan Engineering & Construction Co., Ltd.	-	-	75	-	976	-	767
Samcheok Blue Power Co., Ltd.	529,661	-	-	-	-	-	-
The HS-City Expressway	16	-	-	-	-	-	-
Hychangwon Co., Ltd.	9,766	-	-	-	-	-	-
Subtotal	539,443	-	75	-	976	-	767
Others:							
Oricom Inc.	-	-	-	-	-	-	2,341
BUNDANG DOOSAN TOWER REIT Co., Ltd.	-	-	-	-	37,145	144,727	15,958
Others	-	-	153	567	48	-	1,329
Subtotal	-	-	153	567	37,193	144,727	19,628
Total	₩ 566,089	58,410	11,334	250,907	38,797	144,727	67,323

(*1) Includes transactions prior to the merger of Hyundai Doosan InfraCore Co., Ltd. (formerly known as Doosan InfraCore Co., Ltd.)

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33. Related party transactions, Continued

(3) Significant balances related to the transactions between the Company and related parties

The outstanding receivables and payables arising from the transactions with related parties (excluding dividend and investment) as of December 31, 2022 and 2021 are as follows:

(In millions of won)

Related party		2022						
		Receivables			Payables			
		Trade receivables	Loans receivables	Other receivables	Trade payables	Borrowings	Other payables	Lease liabilities
Parent:								
Doosan Corp.	₩	-	-	681	11,431	-	2,184	-
Subsidiaries:								
Doosan Cuvex Co., Ltd.		-	-	5,343	616	-	26	-
Doosan Enerbility Vietnam Co., Ltd.		-	-	11,102	203,482	-	30,511	-
Doosan Enerbility America LLC		-	-	30	6,753	-	-	-
Doosan Enerbility Japan Corp.		-	-	163	3,040	-	321	-
Doosan Heavy Industries Muscat LLC(*5)		26,722	-	4,528	-	-	5,919	-
Doosan Power Systems India Private Ltd.(*1)		218,940	127,636	99,690	1	-	689	-
Doosan Water UK Ltd.(*2)		4,103	35,136	2,914	16	-	-	-
Azul Torre Construction Corporation(*3)		-	3,623	4,987	-	-	-	-
DPS S.A.		-	272,431	36,179	7,445	-	-	-
Doosan Skoda Power s.r.o		-	-	225	7,599	-	-	-
Doosan GridTech Inc.		-	6,337	29,920	-	-	-	-
Doosan Power Systems Arabia Company Limited		-	10,138	974	1,384	-	-	-
Others		-	-	4,727	10,063	-	-	-
Subtotal		249,765	455,301	200,782	240,399	-	37,466	-
Associates:								
Samcheok Blue Power Co., Ltd.(*4)		-	-	99,581	-	-	-	-
Doosan Engineering & Construction Co., Ltd.		-	-	11,422	122	-	9,757	-
Hychangwon Co., Ltd.		4,070	-	-	-	-	9,312	-
Tuwaik Casting & Forging Company(*6)		32,430	-	-	-	-	201,223	-
Subtotal		36,500	-	111,003	122	-	220,292	-
Related Parties:								
Oricom Inc.		-	-	-	1,944	-	-	-
BUNDANG DOOSAN TOWER REIT Co., Ltd.		-	-	17,499	-	-	-	154,164
Others		-	-	30	849	-	15	-
Subtotal		-	-	17,529	2,793	-	15	154,164
Total	₩	286,265	455,301	329,995	254,745	-	259,957	154,164

(*1) As of December 31, 2022, the Company has set an allowance for doubtful accounts of ₩ 446,266 million for receivables of Doosan Power Systems India Private Ltd., and the ₩ 97,475 million was recognized as bad debt expenses in 2022.

(*2) As of December 31, 2022, the Company has set an allowance for doubtful accounts of ₩ 42,153 million for receivables of Doosan Water UK Ltd. and the same amount was recognized as bad debt expenses in 2022.

(*3) As of December 31, 2022, the Company has set an allowance for doubtful accounts of ₩ 8,610 million for receivables of Azul Torre Construction Corporation and the ₩ 281 million was recognized as bad debt expenses in 2022.

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33. Related party transactions, Continued

- (*4) As of December 31, 2022, the Company has set an allowance for doubtful accounts of ₩ 766 million for receivables of Samcheok Blue Power Co., Ltd. and the ₩951 million was recognized as reversal of allowance for doubtful accounts in 2022.
- (*5) As of December 31, 2022, the Company has set an allowance for doubtful accounts of ₩ 20,595 million for receivables of Doosan Heavy Industries Muscat LLC and the same amount was recognized as bad debt expenses in 2022.
- (*6) As of December 31, 2022, the Company has set an allowance for doubtful accounts of ₩ 250 million for receivables of Tuwaiq Casting & Forging Company and the same amount was recognized as bad debt expenses in 2022.

(In millions of won)

Related party	2021						
	Receivables			Payables			
	Trade receivables	Loans receivables	Other receivables	Trade payables	Borrowings	Other payables	Lease liabilities
Parent:							
Doosan Corp.	₩ -	-	1,381	50,960	-	51,430	-
Subsidiaries:							
Doosan Cuvex Co., Ltd.	-	-	5,333	574	-	26	-
KDPP 5 th Co., Ltd.	-	-	-	-	49,600	-	-
Doosan Heavy Industries Vietnam Co., Ltd.	2,230	-	1,033	194,436	-	29,375	-
Doosan Heavy Industries America LLC	-	-	27	8,322	-	-	-
Doosan Heavy Industries Japan Corp.	-	-	36	1,169	-	402	-
Doosan Power Systems India Private Ltd.(*1)	179,562	66,809	102,421	12	-	-	-
Doosan Enpure Ltd.	3,880	-	1,904	540	-	-	-
Azul Torre Construction Corporation(*2)	-	3,707	4,622	-	-	-	-
Doosan Heavy Industries America Holdings Inc.	-	-	-	-	-	-	-
DPS S.A.	-	12,082	5,894	-	-	-	-
Doosan Babcock Ltd.	-	69,611	18,915	6,306	-	-	-
Doosan Skoda Power s.r.o	-	-	531	7,332	-	-	-
Doosan GridTech Inc.	-	5,928	1,068	-	-	-	-
Doosan Power Systems Arabia Company Limited	507	-	82	1,489	-	1	-
Others	-	236	13,172	13,840	-	-	-
Subtotal	186,179	158,373	155,038	234,020	49,600	29,804	-
Associates:							
Samcheok Blue Power Co., Ltd.(*3)	-	-	317,889	-	-	-	-
Doosan Engineering & Construction Co., Ltd.	-	-	11,133	122	-	16,992	-
Hychangwon Co., Ltd.	12,210	-	-	-	-	46,428	-
Subtotal	12,210	-	329,022	122	-	63,420	-
Related Parties:							
Oricom Inc.	-	-	-	-	-	2,235	-
BUNDANG DOOSAN TOWER REIT Co., Ltd.	-	-	17,499	-	-	-	161,693
Others	-	-	28	84	-	-	-
Subtotal	-	-	17,527	84	-	2,235	161,693
Total	₩ 198,389	158,373	502,968	285,186	49,600	146,889	161,693

- (*1) As of December 31, 2021, the Company has set an allowance for doubtful accounts of ₩348,792 million for receivables of Doosan Power Systems India Private Ltd., and the ₩129,365 million was recognized as bad debt expenses in 2021.

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33. Related party transactions, Continued

(*2) As of December 31, 2021, the Company has set an allowance for doubtful accounts of ₩8,329 million for receivables of Azul Torre Construction Corporation and the same amount was recognized as bad debt expenses in 2021.

(*3) As of December 31, 2021, the Company has set an allowance for doubtful accounts of ₩1,717 million for receivables of Samcheok Blue Power Co., Ltd. and the same amount was recognized as bad debt expenses in 2021.

(4) Financial transactions between the Company and related parties

Financial transactions (including investment) with related parties for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

Related party	2022									
	Loans		Borrowings			Dividend		Investments		Shares
	Lending	Collection	Borrowed	Repaid	Lease liability paid	Income	Payout	Received	Provided	Acquisition
Parent:										
Doosan Corp.	₩ -	-	-	-	-	-	-	252,375	-	152,691
Subsidiaries:										
KDPP 5th Co., Ltd.	-	-	-	49,600	-	-	-	-	-	-
DPS S.A.	204,992	-	-	-	-	-	-	-	-	-
Doosan Ukudu Power, LLC.	-	257	-	-	-	-	-	-	-	-
Doosan Power Systems India Private Ltd.	67,862	-	-	-	-	-	-	-	-	-
Doosan GridTech Inc.	11,057	11,057	-	-	-	-	-	-	-	-
Doosan Power Systems Arabia Company Limited	9,891	-	-	-	-	-	-	-	-	-
D20 Capital, LLC	-	-	-	-	-	19,190	-	-	-	-
Doosan Bobcat Inc.	-	-	-	-	-	92,117	-	-	-	47,084
Doosan Water UK Ltd.	36,119	-	-	-	-	-	-	-	-	-
Osung Power O&M Co., Ltd.	-	-	-	-	-	1,000	-	-	-	-
Subtotal	329,921	11,314	-	49,600	-	112,307	-	-	-	47,084
Associates:										
Hychangwon Co., Ltd.	-	-	-	-	-	-	-	-	2,000	-
Tuwaiq Casting & Forging Company	-	-	-	-	-	-	-	-	43,926	-
Multi-asset ESG Marine Wind Power Private Equity Fund 1 st	-	-	-	-	-	-	-	-	8,500	-
Subtotal	-	-	-	-	-	-	-	-	54,426	-
Others:										
BUNDANG DOOSAN TOWER REIT Co., Ltd.	-	-	-	-	17,095	-	-	-	-	-
KDDI Korea Corporation	-	-	-	-	-	89	-	-	-	-
Oricom Inc.	-	-	-	-	-	-	-	-	-	7,495
Hancom Inc.	-	-	-	-	-	-	-	-	-	14,972
Subtotal	-	-	-	-	17,095	89	-	-	-	22,467
Total	₩ 329,921	11,314	-	49,600	17,095	112,396	-	252,375	54,426	222,242

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33. Related party transactions, Continued

(In millions of won)

Related party	2021										
	Loans		Borrowings			Dividend		Investments		Shares	
	Lending	Collection	Borrowed	Repaid	Lease liability paid	Income	Payout	Received	Provided	Acquisition	Disposal
Parent:											
Doosan Corp.	₩ -	-	-	-	-	-	-	605,226	-	-	-
Subsidiaries:											
KDPP 5 th Co., Ltd.	-	-	-	77,600	-	-	-	-	-	-	-
DPS S.A.	11,273	-	-	-	-	-	-	-	-	-	-
Doosan Ukudu Power, LLC.	225	-	-	-	-	-	-	-	1	-	-
Doosan Power Systems India Private Ltd.	29,054	-	-	-	-	-	-	-	-	-	-
U-best 5th Co., Ltd.	-	-	-	80,000	-	-	-	-	-	-	-
Doosan Fuel Cell Co., Ltd.	-	-	-	-	-	-	-	-	-	605,226	-
Doosan Heavy Industries America Holdings Inc.	-	30,875	-	-	-	-	-	-	-	44,572	-
D20 Capital, LLC	-	-	-	-	-	-	-	-	-	63,595	-
Doosan Bobcat Inc.	-	-	-	-	-	-	-	-	-	2,435,990	-
Doosan Cuvex Co., Ltd.	-	-	-	-	-	-	-	-	-	53,642	-
Subtotal	40,552	30,875	-	157,600	-	-	-	-	1	3,203,025	-
Associates:											
Hychangwon Co., Ltd.	-	-	-	-	-	-	-	-	2,000	-	-
Doosan Property Co., Ltd.	-	-	-	-	-	-	-	-	-	42,240	-
The Zenith Holdings Ltd.	-	-	-	-	-	-	-	-	120,000	-	-
Doosan Engineering & Construction Co., Ltd.	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	122,000	42,240	-
Others:											
BUNDANG DOOSAN TOWER REIT Co., Ltd.	-	-	-	-	15,439	-	-	-	-	-	-
KDDI Korea Corporation	-	-	-	-	-	273	-	-	-	-	-
Subtotal	-	-	-	-	15,439	273	-	-	-	-	-
Total	₩ 40,552	30,875	-	157,600	15,439	273	-	605,226	122,001	3,245,265	-

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33. Related party transactions, Continued

(5) Guarantees of payment and collateral provided by and to the related party

The Company provides or receives payment guarantees and collateral with regard to the related party as of December 31, 2022 (See Notes 31 and 32).

(6) Key management compensation

Key management personnel are standing directors who have authorities and responsibilities for planning, operation and control of the business of the Company. Compensation for key management personnel for the years ended December 31, 2022 and 2021 consists of following:

<i>(In millions of won)</i>		2022	2021
Short-term employee benefits	₩	26,421	6,544
Severance and retirement benefits (*1)		19,868	933
Share-based payments (*2)		1,611	-
Total	₩	47,900	7,477

(*1) Includes past service cost ₩ 16,575 million due to the change of defined benefit plan.

(*2) Expenses under the cash-settled performance-linked stock compensation system granted to management during the current period. After the 3 years of vesting period beginning from the commencement date of the business year to which the grant date(May 9, 2022) belongs, the compensation amount will be paid in cash to at the end of February.

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34. Separate statements of cash flows

(1) Details of cash generated from operation for the years ended December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>	2022	2021
Profit (loss) for the period	₩ (1,211,843)	26,601
Adjustments:		
Interest expenses	141,735	178,996
Loss on foreign currency translation	110,952	89,996
Bad debt expenses	37,075	83,703
Other bad debt expenses	129,601	63,425
Loss on valuation of derivative financial instruments	96,296	238,104
Loss on settlement of derivative financial instruments	28,480	2,992
Loss on valuation of firm commitments	54,102	7,643
Provision for loss compensation	530	10,970
Provisions for construction losses	34,797	4,751
Provision for warranty expenses	38,968	22,980
Depreciation	97,600	104,265
Amortization	60,553	71,439
Income tax benefit	(108,647)	(161,291)
Cost of stock options	1,611	-
Severance and retirement benefits	51,105	32,552
Loss on valuation of inventory	4,726	14,771
Loss on disposal of property, plant and equipment	3,419	1,598
Impairment loss on intangible assets	64,682	26,551
Loss on disposal of intangible assets	-	6
Impairment loss on property, plant and equipment	17,755	-
Impairment loss of assets held for sale	-	1,786
Loss on disposal of assets held for sale	-	1,090
Impairment loss on investments in subsidiaries	858,404	148,387
Loss on disposal of investments in subsidiaries	157,935	1,682
Loss on valuation of long-term investment securities	4,580	29,617
Loss on disposal of long-term investment securities	530	-
Interest income	(24,900)	(12,137)
Dividend income	(114,363)	(1,313)
Gain on foreign currency translation	(61,273)	(71,353)
Gain on valuation of derivatives financial instruments	(90,160)	(107,949)
Gain on valuation of firm commitments	(67,459)	(117,275)
Gain on disposal of property, plant and equipment	(1,539)	(2,164)
Gain on disposal of intangible assets	(118)	-
Reversal of impairment loss of intangible assets	-	(85)
Gain on valuation of long-term investment securities	(20,479)	(16,811)
Gain on disposal of long-term investment securities	(1,802)	-
Gain on disposal of investments in subsidiaries	-	(59,523)
Reversal of provision for loss compensation	-	(73,195)
Reversal of provision for construction warranties	(7,827)	(18,926)
Reversal of provision for warranty expenses	(708)	(10,793)
Others	12,238	12,265
Subtotal	₩ 1,508,399	496,754

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34. Separate statements of cash flows, Continued

(In millions of won)

	2022	2021
Changes in operating assets and liabilities:		
Trade receivables	₩ (387,691)	111,313
Due from customers for contract work	301,309	(162,705)
Other receivables	(42,387)	(37,280)
Prepayments	(144,039)	(101,742)
Inventories	30,024	(86,330)
Derivative financial assets and liabilities	(57,417)	43,801
Firm commitments assets and liabilities	(8,183)	34,048
Trade payables	138,484	455,528
Other payables	(132,668)	(91,965)
Advanced receipts	(6,380)	(5,864)
Due to customers for contract work	305,875	120,454
Accrued expenses	37,031	10,165
Severance payments paid	(20,533)	(26,914)
Plan assets	10,244	14,734
Others	17,486	(64,450)
Subtotal	₩ 41,155	212,793
Cash generated from operations	₩ 337,711	736,148

(2) Significant non-cash transactions for the years ended December 31, 2022 and 2021 are as follows:

(In millions of won)

	2022	2021
Transfer to current portion of bonds, borrowings and others	₩ 611,963	1,391,966
Transfer from construction-in-progress to other assets	81,468	36,847
Acquisition of investment in subsidiaries through investment in kind	-	605,226
Transfer from long-term investment in securities to investment in subsidiaries	-	657,323
Write-off of trade and other receivables	41,007	-
Transfer to assets held for sale	-	47,302
Changes in other payables through acquisition of property, plant and equipment	-	3,973
Acquisition of right-of-use assets	10,039	156,152
Acquisition of investment properties	83,558	37,145
Net increase(decrease) from spin-off and merger	-	953,042
Transfer from investment in subsidiaries to investment in associates	-	317,666
Acquisition of investment in joint ventures through investment in kind	-	120,000

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34. Separate statements of cash flows, Continued

(3) Changes of liability in financing activities for the years ended December 31, 2022 and 2021 are summarized as follows:

(In millions of won)

	2022						
	Balance as of January 1	Cash flows from financing activities, net	Non-cash changes				Balance as of December 31
			Current portion of long-term debt	Changes in foreign currency translation	Interest expenses amortization	Others(*1)	
Short-term borrowings	₩ 3,279,423	(2,024,348)	-	(5,293)	-	-	1,249,782
Current portion of							
long-term debt	899,500	(917,843)	588,481	66,571	5,602	(643)	641,668
Current financial lease liabilities	26,141	(19,779)	23,482	-	-	-	29,844
Bonds	422,363	270,000	(433,430)	-	198	-	259,131
Long-term borrowings	122,493	1,144,345	(155,051)	-	1,493	-	1,113,280
Non-current lease liabilities	157,488	-	(23,482)	124	-	8,330	142,460
Total	₩ 4,907,408	(1,547,625)	-	61,402	7,293	7,687	3,436,165

(*1) Non-cash changes such as account transfer are included.

(In millions of won)

	2021						
	Balance as of January 1	Cash flows from financing activities, net	Non-cash changes				Balance as of December 31
			Current portion of long-term debt	Changes in foreign currency translation	Interest expenses amortization	Changes due to spin-off and merger	
Short-term borrowings	₩ 4,031,380	(855,834)	-	3,877	-	100,000	3,279,423
Current portion of							
long-term debt	462,970	(1,046,290)	1,358,669	19,150	565	104,647	899,500
Current lease liabilities	15,967	(23,123)	33,297	-	-	-	26,141
Bonds	14,735	93,392	(399,489)	16,800	3,078	693,858	422,363
Long-term borrowings	309,109	667,663	(909,058)	-	88	54,691	122,493
Long-term asset-backed							
borrowings	49,103	-	(50,122)	-	1,019	-	-
Non-current lease liabilities	12,146	-	(33,297)	(174)	-	-	157,488
Total	₩ 4,895,410	(1,164,192)	-	39,653	4,750	953,196	4,907,408

(*1) Non-cash changes such as loss on debt redemption and account transfer are included.

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35. Assets held for sale

Details of assets held for sale as of December 31, 2022 and 2021 are as follows:

<i>(In millions of won)</i>		2022	2021
Investment in associates(*1)	₩	-	9,578
Property, plant and equipment(*2,3)		2,813	34,777
Subtotal		2,813	44,355
Accumulated impairment loss(*2,3)		(846)	(1,786)
Total	₩	1,967	42,569

(*1) In 2021, the Company classified the holding shares of HS-City Expressway as assets held-for-sale. The transaction of sales has completed during 2022.

(*2) In 2021, the Company classified the construction equipment related with rental business as assets held-for-sale. During 2022, the sale of certain construction equipment has been completed.

(*3) In 2021, the Company classified land, buildings and others in Songlimdong, Incheon as assets held-for-sale. The transaction of sales has completed during 2022.

Assets held-for-sale are measured at the lower of their previous carrying amount and fair value less costs to sell and the impairment loss, the difference between the carrying amount and the fair value, is recognized as other non-operating expense.

36. Termination of the financial structure improvement plan

The Company received financial support (approximately ₩3 trillion) from KDB and Korea EXIM Bank ("State-owned Banks") in the first half of 2020, in order to respond to short-term liquidity risks. In order to implement the financial structure improvement plan, the Company raised fund through issuance of ordinary shares in December 2020, sales on business segments other than investment division of Hyundai Doosan Infracore Co., Ltd. (formerly, Doosan Infracore Co., Ltd.) in August 2021, and another issuance of ordinary shares in February 2022 to repay the debts of State-owned Banks. The Company fully repaid the borrowings from State-Owned Banks as of February 28, 2022 and the covenant related with the financial improvement plan has been terminated.

37. Effect of coronavirus disease-19 ("COVID-19")

The World Health Organization declared a global pandemic against COVID-19 on March 11, 2020, and the Company believes that the spread and persistence of COVID-19 will have a negative impact on the Company's business and financial environment. However, as of December 31, 2021, the Company cannot reasonably estimate the effects of COVID-19, the effects are not reflected in the separate financial statements.

38. Approval of financial statements

The separate financial statements for 2022 were authorized for issue by the Board of Directors on February 9, 2023 and will get final approval during the shareholders' meeting on March 29, 2023.

Independent Auditors' Report on Internal Control over Financial Reporting

Based on a report originally issued in Korean

To the Shareholders and Board of Directors of

Doosan Enerbility Co., Ltd. (formerly, Doosan Heavy Industries & Construction Co., Ltd.):

Opinion on Internal Control over Financial Reporting

We have audited Doosan Enerbility Co., Ltd.'s ("the Company") internal control over financial reporting ("ICFR") as of December 31, 2022 based on the criteria established in the Conceptual Framework for Designing and Operating ICFR ("ICFR Design and Operation Framework") issued by the Operating Committee of Internal Control over Financial Reporting in the Republic of Korea (the "ICFR Committee").

In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on ICFR Design and Operation Concept Framework.

We also have audited, in accordance with Korean Standards on Auditing ("KSAs"), the separate financial statements of the Company, which comprise the separate statements of financial position as of December 31, 2022 and 2021, the separate statements of profit or loss and comprehensive profit or loss, changes in equity and cash flows for the years then ended, and notes, comprising significant accounting policies and other explanatory information, and our report dated March 21, 2023 expressed an unmodified opinion on those separate financial statements.

Basis for Opinion

We conducted our audit in accordance with KSAs. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Internal Control over Financial Reporting section of our report. We are independent of the Company in accordance with the ethical requirements that are relevant to our audit of the internal control over financial reporting in Republic of Korea, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Internal Control over Financial Reporting

The Company's management is responsible for designing, operating and maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Report on the Operational Status of Internal Control over Financial Reporting.

Those charged with governance are responsible for overseeing the Company's internal control over financial reporting.

Auditors' Responsibilities for the Audit of the Internal Control over Financial Reporting

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



Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting 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. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

The engagement partner on the audit resulting in this independent auditors' report is Hyun Joong Kim.

KPMG Samjory Accounting Corp.

Seoul, Korea
March 21, 2023

This report is effective as of March 21, 2023, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the internal control over financial reporting. Accordingly, the readers of the audit report should understand that the above audit report has not been updated to reflect the impact of such subsequent events or circumstances, if any.

Report on the Operational Status of Internal Control over Financial Reporting ("ICFR")

English Translation of a Report Originally Issued in Korean

To the Shareholders, Board of Directors and Audit Committee of Doosan Enerbility Co., Ltd.

We, as the CEO and Internal Accounting Control Officer ("IACO") of Doosan Enerbility Co., Ltd. ("the Company"), assessed the status of the design and operation of the Company's ICFR for the year ended December 31, 2022.

The Company's management including CEO and IACO are responsible for designing and operating ICFR. We, as the CEO and IACO, assessed whether the ICFR has been appropriately designed and is effectively operating to prevent and detect any error or fraud which may cause any misstatement of the financial statements, for the purpose of preparing and disclosing reliable financial statement.

We, as the CEO and IACO, adopted the 'ICFR Design and Operation Concept Framework' established by the Operating Committee of Internal Control over Financial Reporting for the design and operation of the ICFR. Also applied the 'ICFR Assessment and Reporting Standards' established by the Operating Committee of Internal Control over Financial Reporting for the assessment of design and operation of the ICFR.

Based on assessment of the ICFR, the Company's ICFR has been appropriately designed and is operating effectively as of December 31, 2022, in all material respect, in accordance with the ICFR Design and Operation Concept Framework.

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

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

6 February 2023

Chief Executive Officer


SANGHYUN PARK

Internal Accounting Control Officer KIGON SEOL

