

LG Chem, Ltd. and Subsidiaries

Consolidated Financial Statements

December 31, 2022 and 2021

LG Chem, Ltd. and Subsidiaries

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December 31, 2022 and 2021

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Independent Auditor's Report

(English Translation of a Report Originally Issued in Korean)

To the Shareholders and Board of Directors of
LG Chem, Ltd.

Opinion

We have audited the accompanying consolidated financial statements of LG Chem, Ltd. and its subsidiaries (collectively referred to as the "Group"), which comprise the consolidated statements of financial position as at December 31, 2022 and 2021, and consolidated statements of profit or loss, consolidated statements of comprehensive income, consolidated statements of changes in equity and consolidated statements of cash flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Group as at December 31, 2022 and 2021, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS).

Basis for Opinion

We conducted our audits in accordance with Korean Standards on Auditing. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Consolidated Financial Statements* section of our report. We are independent of the Group in accordance with the ethical requirements of the Republic of Korea that are relevant to our audit of the consolidated financial statements and we have fulfilled our other ethical responsibilities in accordance with the ethical requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Key Audit Matters

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

(1) Impairment assessment for Cash Generating Units to which goodwill has been allocated

Why this matter was determined to be a key audit matter

The Group annually performs impairment assessment on the goodwill. We focused on goodwill impairment assessment due to the significant size of goodwill balance (₩ 786,378 million as at December 31, 2022) and management's involvement in assumptions and judgments in the future results of the business, discount rate and adjustments arising from the perspective of market participants used in the measurement of the 'recoverable amount' of the Group's Cash Generating Units (CGUs). Details are described in Note 12.

In particular, we focused our audit effort on the goodwill recognized in relation to the Life Sciences CGU (₩ 391,311 million as at December 31, 2022) and the Separator CGU (₩ 178,191 million as at December 31, 2022) which are the significant elements among all relevant CGUs with goodwill. The Group management determined that there was a sufficient amount between the value in use and the underlying book value of those CGUs. Considering the size of the balance and impairment loss recognized on this goodwill as well as management's involvements in significant assumptions and judgments for the estimation of value-in-use, we have determined this matter as a key audit matter.

How this matter was addressed the in our audit

We involved our valuation specialists when performing audit procedures. Audit procedures we performed to address this key audit matter include:

- Obtained understanding, assessed and performed tests on the design and operating effectiveness of relevant internal controls in place in connection with impairment assessment of goodwill including review and approval by management of future cash flow forecasts and assumptions applied in the assessment.
- Assessed the valuation model used by management to estimate value-in-use.
- Assessed the competence and objectivity of the expert utilized by the management
- Compared the current year actual results with the prior year forecasts to assess whether management's forecasts include optimistic assumptions.
- Assessed the management's assumptions used to estimate value-in-use.
 - Compared the estimated revenue growth rate, operating margin rate and capital expenditures applied to estimate value-in-use with historical performances of the CGU and the current market condition to evaluate whether applied assumptions are consistent.
 - Assessed the long-term growth rate by considering economic and industry forecasts
 - Compared the discount rate used by the management with the discount rate independently

calculated by us using observable information in the market.

- Compared the future cash flow forecasts used to estimate value-in-use with the budgets approved by the management except for the cash flows relating to specific fixed assets adjusted from the perspective of market participants
- Assessed the CGUs identification and performed tests on book values allocated to CGUs
- Assessed the sensitivity analysis performed by management on the discount rate and terminal growth rate

(2) Warranty provision of LG Energy Solution, Ltd. for GM Bolt recall

Why this matter was determined to be a key audit matter

The group has recognized warranty provision for product, recall and others. Due to the significant size of the provisions (₩ 1,485,978 million as of December 31, 2022) and management's involvements in significant assumptions and judgments in relation to the historical experience rate and estimation of recall costs in measurement of warranty provision, we focused on the warranty provision. Details are described in Note 15 to the consolidated financial statements.

In particular, we focused our audit effort on the measurement of the warranty provision established for General Motors Company ("GM")'s voluntary recall decision. GM is a customer of LG Energy Solution. Due to the significant size of the related provision (₩ 236,883 million as of December 31, 2022) and management's involvements in significant assumptions and judgments in measurement of warranty provision, we have determined this matter as a key audit matter.

How this matter was addressed the in our audit

We have performed the following audit procedures to address this key audit matter, including the involvement of the independent auditors of LG Energy Solution.

- Obtained understanding of the Group's accounting policies and internal controls in place related to the warranty provision and evaluated the design and operating effectiveness of relevant internal controls.
- Performed the following procedures to assess whether the input data used by management for the estimation are appropriate.
 - Compared the data used by management for the estimation of warranty provision with internal and external information.
 - Assessed the competence and objectivity of the expert utilized by the management
 - Assessed whether the assumptions and input data used are reasonable by involving auditor's specialists.
- Mathematically recalculated the estimated warranty provision.

Other Matter

Auditing standards and their application in practice vary among countries. The procedures and practices used in the Republic of Korea to audit such financial statements may differ from those generally accepted and applied in other countries

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

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

In preparing the consolidated financial statements, management is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Group or to cease operations.

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

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements

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

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

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we

conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

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

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

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

The engagement partner on the audit resulting in this independent auditor's report is Seung-Hun Kim, Certified Public Accountant.

Seoul, Korea

March 9, 2023

This report is effective as of March 9, 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 consolidated financial statements and notes thereto. Accordingly, the readers of the audit report should understand that there is a possibility that the above audit report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2022 and 2021

<i>(in millions of Korean won)</i>	Notes	2022	2021
Assets			
Current assets			
Cash and cash equivalents	3, 5, 6	8,497,882	3,760,834
Trade receivables	3, 5, 7, 31	7,450,395	6,386,979
Other receivables	3, 5, 7, 31	742,431	1,048,549
Other current financial assets	3, 5, 8	9,167	23,289
Prepaid income taxes		52,920	156,299
Other current assets	13	1,013,463	749,032
Inventories	9	11,880,631	8,283,474
Assets held for sale	34	27,480	5,364
Total current assets		29,674,369	20,413,820
Non-current assets			
Trade receivables	3, 5, 7	120,698	67,055
Other receivables	3, 5, 7	617,444	713,166
Other non-current financial assets	3, 5, 8	1,237,167	506,022
Investments in associates and joint ventures	1, 10, 33	949,553	535,310
Deferred tax assets	28	2,165,557	1,905,149
Property, plant and equipment	11	29,662,743	24,378,259
Intangible assets	12	2,690,203	2,444,303
Investment properties	36	94,026	56,297
Other non-current assets	13, 16	762,063	115,921
Total non-current assets		38,299,454	30,721,482
Total assets		67,973,823	51,135,302
Liabilities			
Current liabilities			
Trade payables	3, 5, 31	4,756,246	3,742,132
Other payables	3, 5, 31	4,899,553	3,991,784
Borrowings	3, 5, 14	3,804,367	3,477,080
Other current financial liabilities	3, 5, 8	7,271	-
Provisions	15	1,026,446	1,572,755
Income tax payables		626,226	957,676
Other current liabilities	17, 35	1,339,454	1,320,669
Total current liabilities		16,459,563	15,062,096
Non-current liabilities			
Other payables	3, 5	43,708	15,623
Borrowings	3, 5, 14	12,160,152	11,288,654
Other non-current financial liabilities	3, 5, 8	33,319	126
Provisions	15	533,414	636,953
Net defined benefit liabilities	13, 16	19,470	18,122
Deferred tax liabilities	28	838,725	713,862
Other non-current liabilities	17, 35	404,345	189,878
Total non-current liabilities		14,033,133	12,863,218
Total liabilities		30,492,696	27,925,314

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2022 and 2021

<i>(in millions of Korean won)</i>	Notes	2022	2021
Equity			
Share capital	1, 19	391,406	391,406
Capital surplus	19	11,569,556	2,696,385
Other components of equity	21	(19,569)	(37,310)
Accumulated other comprehensive income		366,916	551,354
Retained earnings	20	<u>19,142,263</u>	<u>18,091,949</u>
Equity attributable to owners of the Parent Company		<u>31,450,572</u>	<u>21,693,784</u>
Non-controlling interests	1	6,030,555	1,516,204
Total equity		<u>37,481,127</u>	<u>23,209,988</u>
Total liabilities and equity		<u>67,973,823</u>	<u>51,135,302</u>

The above consolidated statements of financial position should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Profit or Loss
Years Ended December 31, 2022 and 2021

<i>(in millions of Korean won, except per share amounts)</i>	Notes	2022	2021
Revenue	31, 33, 35	51,864,888	42,599,284
Cost of sales	23, 31	<u>(41,878,426)</u>	<u>(31,384,656)</u>
Gross profit		9,986,462	11,214,628
Selling and administrative expenses	22, 23, 31	<u>(6,990,764)</u>	<u>(6,188,258)</u>
Operating profit		2,995,698	5,026,370
Finance income	25	940,788	686,598
Finance costs	25	(1,220,692)	(660,670)
Share of net loss of associates and joint ventures accounted for using the equity method	10	(46,215)	(6,609)
Other non-operating income	26	2,309,180	902,364
Other non-operating expenses	27	<u>(2,166,208)</u>	<u>(1,056,023)</u>
Profit before income tax	32	2,812,551	4,892,030
Income tax expense	28	<u>(641,482)</u>	<u>(1,235,779)</u>
Profit from continuing operations		<u>2,171,069</u>	<u>3,656,251</u>
Profit from discontinued operations	34	<u>24,449</u>	<u>297,653</u>
Profit for the year		<u>2,195,518</u>	<u>3,953,904</u>
Profit is attributable to:			
Owners of the Parent Company			
Profit from continuing operations		1,820,914	3,372,134
Profit from discontinued operations		<u>24,449</u>	<u>297,653</u>
		1,845,363	3,669,787
Non-controlling interests			
Profit from continuing operations		<u>350,155</u>	<u>284,117</u>
		350,155	284,117
Earnings per share for profit attributable to the equity holders of the Parent Company (in won)	29		
Basic earnings per ordinary share		23,670	47,108
Basic earnings per preferred share		23,720	47,158
Earnings per share for profit from continuing operations attributable to the equity holders of the Parent Company (in won)	29		
Basic earnings per ordinary share		23,357	43,287
Basic earnings per preferred share		23,407	43,337

The above consolidated statements of profit or loss should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Comprehensive Income
Years Ended December 31, 2022 and 2021

<i>(in millions of Korean won)</i>	Notes	2022	2021
Profit for the year		<u>2,195,518</u>	<u>3,953,904</u>
Other comprehensive income			
<i>Items that will not be reclassified to profit or loss</i>			
Remeasurements of net defined benefit liabilities	16	193,125	37,871
Gain (loss) on valuation of financial assets at fair value through other comprehensive income		(51,355)	15,990
Shares of remeasurements of net defined benefit liabilities of associates		(307)	(234)
Income tax relating to these items		(28,118)	(13,451)
<i>Items that may be subsequently reclassified to profit or loss</i>			
Exchange differences on translation of foreign operations		(159,601)	769,186
Cash flow hedge		6,021	(18,083)
Shares of other comprehensive income of associates and joint ventures		17,304	14,724
Income tax relating to these items		(38,003)	41,165
Other comprehensive income (loss) for the year, net of tax		<u>(60,934)</u>	<u>847,168</u>
Total comprehensive income for the year		<u>2,134,584</u>	<u>4,801,072</u>
Total comprehensive income for the year is attributable to:			
Owners of the Parent Company		1,800,935	4,413,552
Non-controlling interest		333,649	387,520

The above consolidated statements of comprehensive income should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Changes in Equity
Years Ended December 31, 2022 and 2021

(in millions of Korean won)

Notes	Attributable to owners of the Parent Company						Non-controlling interests	Total equity
	Share capital	Capital surplus	Other components of equity	Accumulated other comprehensive income	Retained earnings	Total		
Balance at January 1, 2021	391,406	2,692,485	(54,998)	(165,076)	15,175,304	18,039,121	751,319	18,790,440
Comprehensive income								
Profit for the year	-	-	-	-	3,669,787	3,669,787	284,117	3,953,904
Remeasurements of net defined benefit liabilities	16	-	-	-	27,294	27,294	-	27,294
Exchange differences on translation of foreign operations	-	-	-	700,511	-	700,511	103,422	803,933
Gain on valuation of financial assets at fair value through other comprehensive income	8	-	-	13,115	-	13,115	-	13,115
Cash flow hedge	8	-	-	(11,605)	-	(11,605)	(19)	(11,624)
Others	-	-	-	14,684	(234)	14,450	-	14,450
Total comprehensive income for the year				716,705	3,696,847	4,413,552	387,520	4,801,072
Transactions with owners:								
Business combination	37	-	-	-	-	-	12,951	12,951
Disposal of treasury shares	19	-	32,088	17,688	-	49,776	-	49,776
Dividends	30	-	-	-	(778,383)	(778,383)	(91,334)	(869,717)
Changes in percentage of ownership in subsidiaries	-	(28,057)	-	-	-	(28,057)	(169,546)	(197,603)
Increase in paid-in capital of a subsidiary	-	(131)	-	-	-	(131)	626,882	626,751
Others	-	-	-	(275)	(1,819)	(2,094)	(1,588)	(3,682)
Total transactions with owners		3,900	17,688	(275)	(780,202)	(758,889)	377,365	(381,524)
Balance at December 31, 2021	391,406	2,696,385	(37,310)	551,354	18,091,949	21,693,784	1,516,204	23,209,988
Balance at January 1, 2022	391,406	2,696,385	(37,310)	551,354	18,091,949	21,693,784	1,516,204	23,209,988
Comprehensive income								
Profit for the year	-	-	-	-	1,845,363	1,845,363	350,155	2,195,518
Remeasurements of net defined benefit liabilities	16	-	-	-	140,317	140,317	9,015	149,332
Exchange differences on translation of foreign operations	-	-	-	(160,494)	-	(160,494)	(35,505)	(195,999)
Gain (loss) on valuation of financial assets at fair value through other comprehensive income	8	-	-	(42,478)	-	(42,478)	6,800	(35,678)
Cash flow hedge	8	-	-	3,913	-	3,913	502	4,415
Others	-	-	-	14,621	(307)	14,314	2,682	16,996
Total comprehensive income for the year				(184,438)	1,985,373	1,800,935	333,649	2,134,584
Transactions with owners:								
Disposal of treasury shares	19	-	192,119	17,741	-	209,860	-	209,860
Dividends	30	-	(30,428)	-	(935,275)	(965,703)	(155,964)	(1,121,667)
Changes in percentage of ownership in subsidiaries	19	-	8,711,480	-	-	8,711,480	3,297,254	12,008,734
Increase in paid-in capital of a subsidiary	-	-	-	-	-	-	1,039,821	1,039,821
Others	-	-	-	-	216	216	(409)	(193)
Total transactions with owners		8,873,171	17,741	-	(935,059)	7,955,853	4,180,702	12,136,555
Balance at December 31, 2022	391,406	11,569,556	(19,569)	366,916	19,142,263	31,450,572	6,030,555	37,481,127

The above consolidated statements of changes in equity should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Cash Flows
Years Ended December 31, 2022 and 2021

<i>(in millions of Korean won)</i>	Notes	2022	2021
Cash flows from operating activities			
Cash generated from operations	32	2,350,297	6,957,179
Interest received		225,469	44,792
Interest paid		(303,726)	(223,452)
Dividends received		5,289	13,093
Income taxes paid		(1,707,449)	(1,281,796)
Net cash inflow from operating activities		<u>569,880</u>	<u>5,509,816</u>
Cash flows from investing activities			
Decrease in other receivables		6,492,596	756,079
Proceeds from disposal of investments in associates		-	35,302
Proceeds from disposal of other financial instruments		40,245	22,202
Proceeds from disposal of property, plant and equipment		82,155	85,616
Proceeds from disposal of intangible assets		24,026	163
Government grants received		213,224	351,127
Net cash inflows from changes in scope of consolidation		49,780	-
Proceeds from disposal of assets held for sale		45,688	103,357
Proceeds from transfer of business		-	906,659
Increase in other receivables		(6,403,990)	(681,266)
Acquisition of investments in associates and joint ventures		(466,012)	(257,676)
Acquisition of other financial assets		(724,235)	(248,012)
Acquisition of property, plant and equipment		(8,406,288)	(5,773,593)
Acquisition of intangible assets		(167,420)	(128,939)
Cash outflows from transfer of business		(8,986)	(520,324)
Net cash outflow from investing activities		<u>(9,229,217)</u>	<u>(5,349,305)</u>
Cash flows from financing activities			
Proceeds from borrowings		5,321,709	5,661,093
Disposal of treasury shares		256,994	8,835
Capital contribution from non-controlling interests		13,660,077	626,883
Settlement of derivative instruments transactions		5,712	-
Repayments of borrowings and others		(4,821,727)	(5,105,821)
Dividends paid		(1,090,909)	(869,717)
Decrease in non-controlling interests		-	(197,603)
Net cash inflow from financing activities		<u>13,331,856</u>	<u>123,670</u>
Net increase in cash and cash equivalents			
Cash and cash equivalents at the beginning of the year		3,760,834	3,274,250
Effects of exchange rate changes on cash and cash equivalents		64,529	202,403
Cash and cash equivalents at the end of the year in the consolidated statement of financial position		<u>8,497,882</u>	<u>3,760,834</u>

The above consolidated statements of cash flows should be read in conjunction with the accompanying notes.

LG Chem, Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

December 31, 2022 and 2021

1. General Information

General information about LG Chem, Ltd. (the Parent Company) and its 62 subsidiaries (collectively referred to as "Group") is as follows:

1.1 The Parent Company

The Parent Company was spun off on April 1, 2001, from LG Chem Investment Ltd. (now LG Corp., formerly LG Chemical Ltd.).

As at December 31, 2022, the Group has its manufacturing facilities in Yeosu, Daesan, Ochang, Cheongju, Ulsan, Naju, Iksan, Paju, Osong, Onsan, Gimcheon and overseas sites.

The Parent Company is authorized to issue 292 million shares of ordinary shares with par value of ₩5,000 per share. As at December 31, 2022 the Parent Company has issued and outstanding 70,592,343 ordinary shares (₩391,406 million) and 7,688,800 preferred shares (₩38,444 million). The largest shareholder of the Parent Company is LG Corp., which owns 33.34% of the Parent Company's ordinary shares. Preferred shareholders have no voting rights but are entitled to receive dividends at a rate 1% more than those paid to ordinary shareholders.

1.2 Business Overview

The Group is engaged in Petrochemicals, Energy solutions, and Advanced materials business, and also engaged in Life Sciences business acquired through a merger with LG Life Sciences, Ltd. in January 2017. In addition, the Parent Company acquired 100% shares of FarmHannong Co., Ltd., in April 2016, which is engaged to manufacture crop protection products, seeds, fertilizers and others.

The Petrochemical business includes production of olefin petrochemicals, such as ethylene, propylene, butadiene from Naphtha, and aromatic petrochemicals such as benzene. It also includes production of synthetic resin and synthetic components from olefin, and aromatic petrochemicals. This business bears characteristics of a large-volume process industry. The Group's major products are PE, PP, BPA, ABS, EP, PVC, plasticizers, acrylic, SAP, synthetic rubber, a special resin, and others.

LG Energy Solution, Ltd. which was established through the split-off of Energy solution business from the Parent Company on December 1, 2020, and its subsidiaries mainly manufacture and supply batteries ranging from IT & New application batteries for mobile phones and laptop computers, to automotive batteries for electric vehicles and ESS (Energy Storage System) batteries. Demand of small-sized batteries for new applications such as electric tools and electric driving devices as well as traditional IT devices is increasing recently, and the automotive battery business is also expected to expand rapidly due to an increasing demand of the batteries in associated with enhanced environment regulation in developed countries. Demand for ESS is expanding with an increasing importance of efficient usage of electricity and generation of renewable energy.

The Advanced material business manufactures and supplies various kinds of IT materials such as automotive material, OLED film, semiconductor materials, OLED materials, battery materials and others and RO membranes, which will be the next growth engine for future.

The Life Sciences business manufactures and supplies pharmaceutical products, such as human growth hormone 'Eutropin', diabetes drug 'Zemiglo', bovine somatotropin 'Boostin', hyaluronic acid filler 'YVOIRE' and others, as well as fine chemical products, such as herbicide 'PYANCHOR' for rice farming and others.

LG Chem, Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

December 31, 2022 and 2021

FarmHannong Co., Ltd. and its subsidiaries which were acquired by the Group in 2016 manufacture and sell crop protection products, seeds, fertilizers and others. The crop protection business provides high value products such as environmentally friendly pesticide. The fertilizer business leads developing a next generation fertilizers such as eco-friendly organic and functional fertilizers, and potting soil. The seed business puts priority on retaining various genetic resources and developing rare breeds with high profit in order to remain competitive in a future food industry.

1.3 Consolidated Subsidiaries, Associates and Joint Ventures

	Percentage of controlling interests (%)		Business location	Closing month	Business activities
	December 31, 2022	December 31, 2021			
Consolidated subsidiaries					
LG Energy Solution, Ltd. ¹	82	100	Korea	December	Battery manufacturing and sales
Ningbo LG Yongxing Chemical Co., Ltd. ²	75	75	China	December	ABS/SBL manufacturing and sales
Ningbo Zhenhai LG Yongxing Trade Co., Ltd. ²	75	75	China	December	ABS sales
LG Chem America, Inc	100	100	USA	December	Sales and trading
LG Chemical India Pvt. Ltd. ^{3, 6}	100	100	India	December	Synthetic resin manufacturing and sales
LG Polymers India Pvt. Ltd. ^{3, 7}	100	100	India	December	PS manufacturing and sales
LG Chemical (Guangzhou) Engineering Plastics Co., Ltd.	100	100	China	December	EP manufacturing and sales
LG Chem (Taiwan), Ltd. ⁵	100	100	Taiwan	December	Polarizer manufacturing and sales
Tianjin LG Bohai Chemical Co., Ltd.	75	75	China	December	PVC, VCM, EDC manufacturing and sales
Tianjin LG BOTIAN Chemical Co., Ltd.	58	58	China	December	SBS manufacturing and sales
LG Chem (China) Investment Co., Ltd. ^{4, 8}	100	100	China	December	China holding company
LG Chem (Tianjin) Engineering Plastics Co., Ltd.	100	100	China	December	EP manufacturing and sales
LG Chem Europe GmbH	100	100	Germany	December	Sales and trading
LG Chem Poland Sp. z o.o.	100	100	Poland	December	EP manufacturing and sales
LGC Petrochemical India Private Ltd.	100	100	India	December	Synthetic resin manufacturing and sales
HAENGBOKNURI CO., LTD.	100	100	Korea	December	Facility management and general cleaning
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	100	100	Turkey	December	Sales and trading
LG Chem Japan Co., Ltd.	100	100	Japan	December	Sales and trading
LG NanoH2O, LLC	100	100	USA	December	Water processing membrane sales
LG Chem (Chongqing) Engineering Plastics Co., Ltd.	100	100	China	December	EP manufacturing and sales
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	70	70	China	December	ABS manufacturing and sales
LG Chem Life Sciences India Pvt. Ltd.	100	100	India	December	Pharmaceutical products sales
LG Jiansheng Chem Life Sciences (Beijing) Co., Ltd.	60	60	China	December	Pharmaceutical products sales
LG Chem Life Sciences (Thailand) Ltd.	100	100	Thailand	December	Pharmaceutical products sales
LG Chem Hai Phong Vietnam Co., Ltd.	100	100	Vietnam	December	Polarizer manufacturing and sales
LG Chem Mexico S.A. de C.V.	100	100	Mexico	December	Sales and trading
LG Chem Hai Phong engineering Plastics LLC.	100	100	Vietnam	December	EP manufacturing and sales
LG Chem (Guangzhou) Information & Electronics Materials Co., Ltd.	100	100	China	December	Polarizer manufacturing and sales
LEYOU NEW ENERGY MATERIALS(WUXI) Co., LTD.	51	51	China	December	Battery materials manufacturing and sales
LG Chem Fund I LLC ⁹	100	100	USA	December	Investments in venture companies
Uniseal, Inc.	100	100	USA	December	Adhesive manufacturing and sales
LG Chem Life Science Innovation Center, Inc.	100	100	USA	December	Pharmaceutical products research
LG Chem Asia Pte. Ltd.	100	100	Singapore	December	Asia BSC
LG Chem China Tech Center ⁴	100	100	China	December	Research on petrochemicals
Shanjin Optoelectronics (Taiwan) Co., Ltd. ¹⁰	-	100	Taiwan	December	Others

LG Chem, Ltd. and Subsidiaries

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LG PETRONAS CHEMICALS Malaysia Sdn.Bhd.	51	51	Malaysia	December	NBL manufacturing and sales
LG Chem Hangzhou Advanced Materials Co., Ltd.	70	70	China	December	Polarizer sheet manufacturing and sales
LG BCM	100	100	Korea	December	Battery materials manufacturing and sales
LG Chem Ohio Petrochemical, Inc.	100	100	USA	December	ABS manufacturing and sales
LG Chem VietNam Co.,Ltd. ¹¹	100	-	Vietnam	December	Sales and trading
LG Chem Malaysia SDN.BHD.	100	-	Malaysia	December	Sales and trading
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	100	-	Brazil	December	Sales and trading
FarmHannong Co., Ltd. ¹⁴	100	100	Korea	December	Agricultural pesticide manufacturing and sales
Farmhannong America, Inc. ¹⁴	100	100	USA	December	Agricultural pesticide sales
FarmHannong(Thailand) Ltd. ¹⁴	100	100	Thailand	December	Research and development on seeds
FARMHANNONG(MALAYSIA) SDN. BHD. ¹⁴	100	100	Malaysia	December	Agricultural pesticide licensing
PT FARM HANNONG INDONESIA ¹⁴	100	100	Indonesia	December	Agricultural pesticide licensing
FarmHannong do Brasil Limitada ¹⁴	100	100	Brazil	December	Agricultural pesticide sales
LG Energy Solution (Nanjing) Co., Ltd. ¹	82	100	China	December	Battery manufacturing and sales
LG Energy Solution Michigan Inc. ¹	82	100	USA	December	Automotive battery research and manufacturing
LG Energy Solution Battery (Nanjing) Co., Ltd. ¹	82	100	China	December	Automotive battery manufacturing and sales
LG Energy Solution Wroclaw sp. z o.o. ¹	82	100	Poland	December	Automotive battery manufacturing and sales
LG Energy Solution Australia Pty Ltd ¹	82	100	Australia	December	ESS sales
LG Energy Solution Technology (Nanjing) Co., Ltd. ¹	82	100	China	December	Battery manufacturing and sales
Ultium Cells Holdings LLC ^{1, 17}	41	-	USA	December	Holding company
Ultium Cells LLC ^{1, 17}	41	50	USA	December	Automotive battery manufacturing and sales
LG Energy Solution Europe GmbH ¹	82	100	Germany	December	Sales and trading
LG Energy Solution (Taiwan), Ltd. ¹	82	100	Taiwan	December	Sales and trading
Aremnuri. Co. Ltd ¹	82	100	Korea	December	Facility management and general cleaning
LG Energy Solution Fund I LLC ¹	82	100	USA	December	Investments in venture companies
LG Energy Solution Vertech Inc. ¹	82	-	USA	December	ESS installation service
ES America, LLC ¹	82	-	USA	December	Battery manufacturing and sales
Baterias De Castilla, S.L. ¹	82	-	Spain	December	Special purpose company
Associates					
TECHWIN Co., Ltd.	20	20	Korea	December	Environment solution and construction of chemical plant
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	-	100	Brazil	December	Sales and trading
LG Chem Malaysia SDN.BHD.	-	100	Malaysia	December	Sales and trading
LG Chem Life Sciences Poland Ltd. ¹⁶	100	100	Poland	December	Pharmaceutical products sales
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	49	49	China	December	Battery materials manufacturing and sales
TL Chemical CO., Ltd	40	40	Korea	December	AN manufacturing and sales
KOREA PRECURSOR CO.,LTD. ¹³	49	-	Korea	December	Battery materials manufacturing and sales
VINFAST LITHIUM BATTERY PACK LLC. ¹	29	35	Vietnam	December	Battery manufacturing and sales
Jiangxi VL Battery., Ltd. ¹	28	34	China	December	Battery manufacturing and sales
Joint ventures¹⁵					
VINA Plasticizers Chemical Co.,Ltd. ¹⁸	50	50	Vietnam	December	DOP production and sales
SEETEC Co., Ltd.	50	50	Korea	December	Plant utility and distribution, research assistance service
LG Toray Hungary Battery Separator Kft. ¹²	50	-	Hungary	December	Battery separator manufacturing and sales
PT.HLI Greenpower Co., Ltd. ¹	41	50	Indonesia	December	Automotive battery manufacturing and sales

LG Chem, Ltd. and Subsidiaries

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- ¹ During the year ended December 31, 2022, LG Energy Solution, Ltd. was listed on Korea Composite Stock Price Index (KOSPI) and its percentage of ownership to LG Energy Solution, Ltd. decreased since the Parent Company sold the shares of LG Energy Solution, Ltd. As at December 31, 2022, LG Energy Solution, Ltd. owns shares in subsidiaries, associates and joint ventures such as LG Energy Solution (Nanjing) Co., Ltd. and other.
- ² As at December 31, 2022, Ningbo LG Yongxing Chemical Co., Ltd. owns 100% of Ningbo Zhenhai LG Yongxing Trading Co., Ltd.'s shares.
- ³ As at December 31, 2022, LG Chemical India Pvt. Ltd. owns 100% of LG Polymers India Pvt. Ltd.'s shares.
- ⁴ As at December 31, 2022, LG Chem (China) Investment Co., Ltd. owns 100% of LG Chem China Tech Center's shares.
- ⁵ During the year ended December 31, 2022, LG Chem (Taiwan), Ltd. decreased its capital with consideration of ₩17 million.
- ⁶ During the year ended December 31, 2022, the Parent Company additionally acquired shares of LG Chemical India Pvt. Ltd. for ₩30,789 million.
- ⁷ During the year ended December 31, 2022, the Parent Company additionally acquired shares of LG Polymers India Pvt. Ltd. for ₩17,820 million.
- ⁸ During the year ended December 31, 2022, LG Chem (China) Investment Co., Ltd. decreased its capital with consideration of ₩240,480 million.
- ⁹ During the year ended December 31, 2022, the Parent Company additionally acquired shares of LG CHEM FUND I LLC for ₩21,117 million and decreased its capital with consideration of ₩8,245 million.
- ¹⁰ During the year ended December 31, 2022, the Parent Company disposed 100% shares of Shanjin Optoelectronics (Taiwan) Co., Ltd.
- ¹¹ LG Chem Vietnam Co., Ltd. was newly established during the year ended December 31, 2022, and the Parent Company newly acquired 100% shares of LG Chem Vietnam Co., Ltd. for ₩359 million.
- ¹² During the year ended December 31, 2022, the Parent Company additionally acquired 50% shares of LG Toray Hungary Battery Separator Kft and recognized as investments in joint ventures for ₩445,628 million
- ¹³ KOREA PRECURSOR CO.,LTD. was newly established during the year ended December 31, 2022, and the Parent Company newly acquired 49% shares of KOREA PRECURSOR CO.,LTD. for ₩20,384 million.
- ¹⁴ As at December 31, 2022, FarmHannong Co., Ltd. owns 100% of Farmhannong America, Inc., FarmHannong(Thailand) Ltd., FARMHANNONG(MALAYSIA) SDN.BHD., and PT FARM HANNONG INDONESIA's shares.
- ¹⁵ All joint arrangements over which the Group has joint control are classified as a joint venture since the joint arrangements are structured through a separate vehicle and the parties have rights to the net assets of the arrangement.
- ¹⁶ Classified as an investment in associate due to its small size.
- ¹⁷ During the year ended December 31, 2022, LG Energy Solution, Ltd. acquired 50% shares of Ultium Cells Holdings LLC through the investment in kind with 100% shares of Ultium Cells LLC. The Parent Company is considered to have the control over Ultium Cells LLC as LG Energy Solution, Ltd. can exercise the majority voting rights in its decision-making process and has the ability to use power to affect the returns of the investee through its involvement in the production and cost management and other activities in accordance with the shareholders' agreement.
- ¹⁸ During the year ended December 31, 2022, the Group reclassified the shares of VINA Plasticizers Chemical Co., Ltd. amounting to ₩16,822 million as assets held for sale.

LG Chem, Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

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1.4 Summarized Financial Information of Subsidiaries, Associates and Joint Ventures

Summarized financial information (before elimination of intercompany transactions and adjustments for differences in accounting policies) of subsidiaries, associates and joint ventures is as follows:

	December 31, 2022			2022	
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the year
Subsidiaries					
LG Energy Solution, Ltd. and its subsidiaries ¹	38,299,445	17,705,683	20,593,762	25,598,609	779,826
Ningbo LG Yongxing Chemical Co., Ltd.	977,939	216,923	761,016	2,251,738	145,923
Ningbo Zhenhai LG Yongxing Trade Co., Ltd.	6,547	208	6,339	26,604	468
LG Chem America, Inc.	364,217	315,018	49,199	1,322,816	4,068
LG Chemical India Pvt. Ltd.	63,069	76	62,993	-	(106)
LG Polymers India Pvt. Ltd.	56,108	36,817	19,291	2,111	(5,526)
LG Chemical (Guangzhou) Engineering Plastics Co.,Ltd.	103,121	31,869	71,252	219,333	3,696
LG Chem (Taiwan), Ltd. ⁴	66,276	16,344	49,932	46,234	38,101
Tianjin LG Bohai Chemical Co., Ltd.	506,683	91,577	415,106	650,225	62,608
Tianjin LG BOTIAN Chemical Co., Ltd.	52,147	21,909	30,238	166,797	4,523
LG Chem (China) Investment Co., Ltd.	965,394	595,580	369,814	84,078	15,145
LG Chem (Tianjin) Engineering Plastics Co., Ltd.	54,521	7,617	46,904	79,150	4,902
LG Chem Europe GmbH	416,423	327,179	89,244	1,046,360	19,292
LG Chem Poland Sp. z o.o.	251,051	156,649	94,402	361,120	7,378
LGC Petrochemical India Private Ltd.	5,708	1,208	4,500	6,528	777
HAENGBOKNURI CO., LTD.	4,484	1,588	2,896	9,318	(223)
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	10,320	9,973	347	86,557	342
LG Chem Japan Co., Ltd.	5,074	1,012	4,062	5,599	649
LG NanoH2O, LLC	59,062	20,546	38,516	70,338	7,046
LG Chem (Chongqing) Engineering Plastics Co., Ltd.	45,022	9,280	35,742	72,183	2,883
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	545,010	116,473	428,537	976,950	20,502
LG Chem Life Sciences India Pvt. Ltd.	2,015	1,034	981	5,749	64
LG Jiansheng Life Sciences (Beijing) Co., Ltd.	16,953	17,949	(996)	37,635	(6,227)
LG Chem Life Sciences (Thailand) Ltd.	31,712	15,120	16,592	43,675	1,313
LG Chem Hai Phong Vietnam Company Ltd.	16,224	4,505	11,719	20,058	1,392
LG Chem Mexico S.A. de C.V.	3,811	1,877	1,934	3,422	503
LG Chem Hai Phong Engineering Plastics Ltd.	33,254	15,968	17,286	36,492	1,023
LG Chem (Guangzhou) Information & Electronics Materials Co.,Ltd.	281,292	72,768	208,524	194,938	5,480
LEYOU NEW ENERGY MATERIALS(WUXI) Co., LTD.	1,308,350	640,026	668,324	2,173,454	325,087
LG Chem Fund I LLC	77,965	20	77,945	-	(3,228)
Uniseal, Inc.	47,936	9,428	38,508	94,377	4,901
LG Chem Life Science Innovation Center, Inc.	21,438	1,477	19,961	8,906	1,054
LG Chem Asia Pte. Ltd.	47,745	46,430	1,315	4,259	415
LG Chem China Tech Center	37,725	3,941	33,784	5,727	763
Shanjin Optoelectronics (Taiwan) Co., Ltd. ^{3,4}	-	-	-	-	56
LG PETRONAS CHEMICALS Malaysia Sdn.Bhd.	204,444	134,990	69,454	-	(3,899)
LG Chem Hangzhou Advanced Materials Co., Ltd.	46,375	15,645	30,730	78,097	(2,446)
LG BCM	175,519	125,909	49,610	-	(3,203)
LG Chem Ohio Petrochemical, Inc.	23,842	15	23,827	-	(307)
LG Chem VietNam Co., Ltd	747	291	456	1,058	96
LG Chem Malaysia SDN.BHD.	1,043	399	644	1,916	120

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LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	1,287	107	1,180	2,844	510
FarmHannong Co., Ltd. and its subsidiaries ¹	1,120,997	682,253	438,744	792,708	46,626

Associates

TECHWIN Co., Ltd.	137,123	58,470	78,653	90,965	(12,247)
LG Life Sciences Poland Ltd.	235	69	166	171	50
KOREA PRECURSOR CO.,LTD. ²	47,838	7,352	40,486	-	(901)
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	459,440	292,204	167,236	608,925	(16,553)
TL Chemical CO., Ltd	118,942	155	118,787	-	(2,350)
VINFAST LITHIUM BATTERY PACK LLC.	13,297	5,888	7,409	11,072	(3,809)
Jiangxi VL Battery., Ltd.	82,311	43,170	39,141	2,670	(19,851)

Joint ventures

Vina Plasticizer Chemical Co.,Ltd. ⁵	88,554	57,091	31,463	99,578	3,882
SEETEC Co., Ltd.	338,100	61,274	276,826	713,347	9,866
LG Toray Hungary Battery Separator Kft. ²	751,781	2,472	749,309	44	(8,600)
PT.HLI Green Power	667,930	227,304	440,626	-	(10,855)

(in millions of Korean won)

	December 31, 2021			2021	
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the period
Subsidiaries					
LG Energy Solution, Ltd. and its subsidiaries ^{1,4}	23,764,139	15,021,765	8,742,374	17,851,906	929,868
Ningbo LG Yongxing Chemical Co., Ltd.	1,394,894	258,879	1,136,015	2,554,653	522,512
Ningbo Zhenhai LG Yongxing Trade Co., Ltd.	6,787	735	6,052	26,411	536
LG Chem America, Inc.	408,469	366,034	42,435	1,022,813	8,780
LG Chemical India Pvt. Ltd.	32,799	35	32,764	-	16
LG Polymers India Pvt. Ltd.	44,118	36,206	7,912	12,966	(9,182)
LG Chemical (Guangzhou) Engineering Plastics Co., Ltd.	119,231	42,590	76,641	273,693	7,344
LG Chem (Taiwan), Ltd. ⁴	109,772	35,905	73,867	43,589	1,761
LG Chem Display Materials (Beijing) Co.,Ltd. ^{3,4}	-	-	-	-	276
Tianjin LG Bohai Chemical Co., Ltd.	530,055	127,935	402,120	679,667	144,004
Tianjin LG BOTIAN Chemical Co., Ltd.	46,289	19,597	26,692	132,087	1,387
LG Chem (China) Investment Co., Ltd.	1,371,751	679,206	692,545	66,547	167,628
LG Chem (Tianjin) Engineering Plastics Co., Ltd.	56,898	12,011	44,887	82,162	1,462
LG Chem Europe GmbH	358,459	288,909	69,550	671,000	11,127
LG Chem Poland Sp. z o.o.	222,263	133,527	88,736	175,045	20,748
LGC Petrochemical India Private Ltd.	4,918	988	3,930	4,596	556
HAENGBOKNURI CO., LTD.	4,503	1,385	3,118	9,146	703
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	10,416	10,685	(269)	44,209	(1,296)
LG Chem Japan Co., Ltd.	5,109	1,391	3,718	6,063	(1,207)
LG NanoH2O, LLC	44,449	14,978	29,471	57,106	5,274
LG Chem (Chongqing) Engineering Plastics Co., Ltd.	49,879	15,955	33,924	83,530	2,852
LG Chem(HUIZHOU) Petrochemical Co., Ltd.	574,744	155,233	419,511	1,056,809	194,111
LG Chem Life Sciences India Pvt. Ltd.	3,191	2,242	949	5,802	443
LG Jiansheng Life Sciences (Beijing) Co., Ltd.	11,742	6,854	4,888	7,536	(1,462)
LG Chem Life Sciences (Thailand) Ltd.	25,708	10,875	14,833	38,141	2,004
LG Chem Hai Phong Vietnam Company Ltd.	14,571	4,458	10,113	25,833	1,750
LG Chem Mexico S.A. de C.V.	1,619	267	1,352	2,191	329
LG Chem Hai Phong Engineering Plastics Ltd.	31,476	15,698	15,778	35,442	2,744
LG Chem (Guangzhou) Information & Electronics Materials Co.,Ltd. ⁴	317,592	109,131	208,461	176,337	(12,007)
LEYOU NEW ENERGY MATERIALS(WUXI)	608,961	172,607	436,354	655,602	62,083

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Co.,LTD					
LG Chem Fund I LLC	45,922	9	45,913	-	(2,084)
Ugimag Korea Co., Ltd. ^{3,4}	-	-	-	11,512	(3,838)
Uniseal, Inc.	38,635	6,932	31,703	66,388	217
LG Chem Life Science Innovation Center, Inc.	3,446	1,153	2,293	5,303	703
LG Chem Asia Pte. Ltd.	2,927	2,079	848	1,932	(27)
LG Chem China Tech Center	34,327	390	33,937	647	189
Shanjin Optoelectronics (Taiwan) Co., Ltd. ⁴	59,149	5	59,144	-	30
LG PETRONAS CHEMICALS Malaysia Sdn.Bhd.	123,502	50,961	72,541	-	(2,762)
LG Chem Hangzhou Advanced Materials Co., Ltd.	112,892	78,981	33,911	45,440	1,736
LG BCM	54,412	1,599	52,813	-	(435)
LG Chem Ohio Petrochemical, Inc.	24,132	1,578	22,554	-	-
FarmHannong Co., Ltd. and its subsidiaries ¹	1,047,277	657,687	389,590	671,460	14,282
Associates					
TECHWIN Co., Ltd.	142,066	51,893	90,173	78,907	568
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	729	91	638	1,659	182
LG Chem Malaysia SDN.BHD.	525	2	523	687	82
FJ Composite Material Co., Ltd.	-	-	-	1,441	265
WUXI CL New Energy Technology Ltd. ³	-	-	-	-	(86)
LG Chem Life Sciences Poland Ltd.	188	70	118	183	5
Combustion Synthesis Co., Ltd. ³	-	-	-	75	(218)
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	422,366	229,745	192,621	157,173	(10,180)
TL Chemical CO., Ltd	121,551	369	121,182	-	(178)
VINFAST LITHIUM BATTERY PACK LLC.	17,496	6,295	11,201	13,590	(1,570)
Jiangxi VL Battery.,Ltd	76,495	16,799	59,696	17,836	(10,245)
Joint ventures					
VINA Plasticizer Chemical Co., Ltd.	64,237	39,721	24,516	185,736	15,460
SEETEC Co., Ltd.	328,396	52,384	276,012	569,215	9,454
HL Greenpower Co., Ltd. ³	-	-	-	537,684	1,374
PT.HLI Green Power	404,131	1,156	402,975	-	(18,402)

¹ Presented on the basis of the consolidated financial information.

² Revenue and profit or loss for the year presented are the financial performances after the acquisition of shares.

³ The entities were disposed during the years ended December 31, 2022 and 2021, and the information of revenue and profit or loss for the year represents the financial performance before the disposal.

⁴ LCD polarizer business, etc. of these entities was classified as discontinued operations and profit or loss from the business was included in profit from discontinued operations.

⁵ Reclassified to the assets held for sale during the year ended December 31, 2022, and revenue and profit or loss for the year presented are the financial performances before the reclassification.

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1.5 Information of Non-Controlling Interests that are Material to the Group

(a) LG Energy Solution and its subsidiaries

- Percentage of ownership held by non-controlling interests and accumulated non-controlling interests

<i>(in millions of Korean won)</i>	2022
Percentage of ownership held by non-controlling interests	18.2%
Accumulated non-controlling interests	5,263,729

- Profit and dividends attributable to non-controlling interests for the year ended December 31, 2022, are as follows:

<i>(in millions of Korean won)</i>	2022
Profit allocated to non-controlling interests	150,935
Dividends paid to non-controlling interests	-

Summarized consolidated statements of financial positions of subsidiaries with material non-controlling interests, are as follows (before elimination of intercompany transaction):

<i>(in millions of Korean won)</i>	2022
Current assets	18,804,269
Non-current assets	19,495,176
Total assets	38,299,445
Current liabilities	11,444,923
Non-current liabilities	6,260,760
Total liabilities	17,705,683
Total equity	20,593,762

Summarized consolidated statements of comprehensive income of subsidiaries with material non-controlling interests for the year ended December 31, 2022, are as follows (before elimination of intercompany transaction):

<i>(in millions of Korean won)</i>	2022
Revenue	25,598,609
Profit for the year	779,826
Total comprehensive income	752,377

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Summarized consolidated statements of cash flows of subsidiaries with material non-controlling interests for the year ended December 31, 2022, are as follows (before elimination of intercompany transaction):

<i>(in millions of Korean won)</i>	2022
Cash flows from operating activities	(579,807)
Cash flows from investing activities	(6,259,356)
Cash flows from financing activities	11,414,617
Net increase in cash and cash equivalents	<u>4,575,454</u>
Cash and cash equivalents at beginning of the period	<u>1,282,880</u>
Effects of exchange rate changes on cash and cash equivalents	<u>79,633</u>
Cash and cash equivalents at end of the period	<u>5,937,967</u>

1.6 Changes in Scope for Consolidation

Subsidiaries newly included in the consolidation for the year ended December 31, 2022, are as follows:

Subsidiary	Reason
LG Energy Solution Vertech Inc.	Newly acquired
LG Chem VietNam Co.,Ltd	Newly established
ES America, LLC	Newly established
Baterias De Castilla, S.L.	Newly acquired
Ultium Cells Holdings LLC	Newly acquired

Subsidiary excluded from the consolidation for the year ended December 31, 2022, is as follows:

Subsidiary	Reason
Shanjin Optoelectronics (Taiwan) Co., Ltd.	Disposed

2. Summary of Significant Accounting Policies

The principal accounting policies applied in the preparation of these consolidated financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

2.1 Basis of Preparation

The Group maintains its accounting records in Korean won and prepares statutory financial statements in the Korean language (Hangul) in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS). The accompanying consolidated financial statements have been condensed, restructured and translated into English from the Korean language financial statements.

Certain information attached to the Korean language financial statements, but not required for a fair presentation of the Group's financial position, financial performance or cash flows, is not presented in the accompanying consolidated financial statements.

The consolidated financial statements of the Group have been prepared in accordance with Korean IFRS. These are the standards, subsequent amendments and related interpretations

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issued by the International Accounting Standards Board (IASB) that have been adopted by the Republic of Korea.

The financial statements have been prepared on a historical cost basis, except for the following:

- Certain financial assets and liabilities (including derivative instruments), certain classes of property, plant and equipment and investment property – measured at fair value
- Assets held for sale – measured at fair value less costs to sell, and
- Defined benefit pension plans – plan assets measured at fair value

The preparation of financial statements requires the use of critical accounting estimates. Management also needs to exercise judgement in applying the Group's accounting policies. The areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to the consolidated financial statements are disclosed in Note 4.

2.2 Changes in Accounting Policies and Disclosures

(a) New and amended standard adopted by the Group

The Group has applied the following standards and amendments for the first time for their annual reporting period commencing January 1, 2022.

- Amendment to Korean IFRS 1116 Leases - Covid-19 - Related Rent Concessions beyond June 30, 2021

The application of the practical expedient, a lessee may elect not to assess whether a rent concession occurring as a direct consequence of the COVID-19 pandemic is a lease modification, is extended to lease payments originally due on or before December 31, 2022. A lessee shall apply the practical expedient consistently to eligible contracts with similar characteristics and in similar circumstances. The amendment does not have a significant impact on the consolidated financial statements.

- Amendments to Korean IFRS 1103 Business Combination – Reference to the Conceptual Framework

The amendments update a reference of definition of assets and liabilities to be recognized in a business combination in revised Conceptual Framework for Financial Reporting. However, the amendments add an exception for the recognition of liabilities and contingent liabilities within the scope of Korea IFRS 1037 *Provisions, Contingent Liabilities and Contingent Assets*, and Korean IFRS 2121 *Levies*. The amendments also clarify that contingent assets should not be recognized at the acquisition date. The amendment does not have a significant impact on the consolidated financial statements.

- Amendments to Korean IFRS 1016 Property, Plant and Equipment - Proceeds before intended use

The amendments prohibit an entity from deducting from the cost of an item of property, plant and equipment any proceeds from selling items produced while the entity is preparing the asset for its intended use. Instead, the entity will recognize the proceeds from selling such items, and the costs of producing those items, in profit or loss. The amendment does not have a significant impact on the consolidated financial statements.

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- Amendments to Korean IFRS 1037 Provisions, Contingent Liabilities and Contingent Assets - Onerous Contracts : Cost of Fulfilling a Contract

The amendments clarify that the direct costs of fulfilling a contract include both the incremental costs of fulfilling the contract and an allocation of other costs directly related to fulfilling contracts when assessing whether the contract is onerous. The amendment does not have a significant impact on the consolidated financial statements.

- Annual improvements to Korean IFRS 2018-2020

Annual improvements of Korean IFRS 2018-2020 Cycle should be applied for annual periods beginning on or after January 1, 2022, and earlier application is permitted. The amendment does not have a significant impact on the consolidated financial statements.

- Korean IFRS 1101 *First time Adoption of Korean International Financial Reporting Standards* – Subsidiaries that are first-time adopters
- Korean IFRS 1109 *Financial Instruments* – Fees related to the 10% test for derecognition of financial liabilities
- Korean IFRS 1041 *Agriculture* – Measuring fair value

(b) New standards and interpretations not yet adopted by the Group

The following new accounting standards and interpretations have been published that are not mandatory for December 31, 2022 reporting periods and have not been early adopted by the Group.

- Amendments to Korean IFRS 1001 Presentation of Financial Statements - Classification of Liabilities as Current or Non-current

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. Classification is unaffected by the likelihood that an entity will exercise right to defer settlement of the liability or the management's expectation. Also, the settlement of liability includes the transfer of the entity's own equity instruments, however, it would be excluded if an option to settle them by the entity's own equity instruments if compound financial instruments meet the definition of equity instruments and recognized separately from the liability. The amendments should be applied for annual periods beginning on or after January 1, 2024, and earlier application is permitted. The Group is in review for the impact of these amendments on the consolidated financial statements.

- Korean IFRS 1001 Presentation of Financial Statements - Disclosure of Accounting Policies

The amendments to Korean IFRS 1001 define and require entities to disclose their material accounting policies. The amendments should be applied for annual periods beginning on or after January 1, 2023, and earlier application is permitted. The Group is in review for the impact of these amendments on the consolidated financial statements.

- Korean IFRS 1008 Accounting policies, changes in accounting estimates and errors - Definition of Accounting Estimates

The amendments define accounting estimates and clarify how to distinguish them from changes in accounting policies. The amendments should be applied for annual periods beginning on or after

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January 1, 2023, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the consolidated financial statements.

- Korean IFRS 1012 Income Taxes - Deferred Tax related to Assets and Liabilities arising from a Single Transaction

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. The amendments should be applied for annual periods beginning on or after January 1, 2023, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the consolidated financial statements.

- New Standard: Korean IFRS 1117 Insurance Contract

Korean IFRS 1117 *Insurance Contracts* replaces Korean IFRS 1104 *Insurance Contracts*. This 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 entity recognizes insurance revenue on an accrual basis including services (insurance coverage) provided to the policyholder by each annual period. In addition, investment components (Refunds due to termination/maturity) repaid to a policyholder even if an insured event does not occur, are excluded from insurance revenue, and insurance financial income or expense and the investment income or expense are presented separately to enable users of the information to understand the sources of income or expenses. This Standard should be applied for annual periods beginning on or after January 1, 2023, and earlier application is permitted for entities that applied Korean IFRS 1109 *Financial Instruments*. The Group does not expect that these amendments have a significant impact on the consolidated financial statements.

Further amendments made in December 2021 added a transition option that permits an entity to apply an optional classification overlay in the comparative period(s) presented on initial application of Korean IFRS 1117. The classification overlay applies to all financial assets, including those held in respect of activities not connected to contracts within the scope of Korean IFRS 1117. It allows those assets to be classified in the comparative period(s) in a way that aligns with how the entity expects those assets to be classified on initial application of Korean IFRS 1109. The classification can be applied on an instrument-by-instrument basis.

- Korean IFRS 1001 Presentation of Financial Statements - Disclosure of gain or loss on valuation of financial liabilities subject to adjustment of exercise price

If the entire or a part of financial instrument, whose exercise price is subject to change due to the issuer's share price, is classified as a financial liability, the carrying amount of the financial liability and related gains and losses shall be disclosed. The amendments should be applied for annual periods beginning on or after January 1, 2023, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the consolidated financial statements.

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2.3 Consolidation

The Group has prepared the consolidated financial statements in accordance with Korean IFRS 1110 *Consolidated Financial Statements*.

(a) Subsidiaries

Subsidiaries are all entities over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power to direct the activities of the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Group. They are deconsolidated from the date that control ceases.

The acquisition method of accounting is used to account for business combinations by the Group. The consideration transferred is measured at the fair values of the assets transferred, and identifiable assets acquired and liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date. The Group recognizes any non-controlling interest in the acquired entity on an acquisition-by-acquisition basis either at fair value or at the non-controlling interest's proportionate share of the acquired entity's net identifiable assets. All other non-controlling interests are measured at fair values, unless otherwise required by other standards. Acquisition-related costs are expensed as incurred.

The excess of consideration transferred, amount of any non-controlling interest in the acquired entity and acquisition-date fair value of any previous equity interest in the acquired entity over the fair value of the net identifiable assets acquired is recoded as goodwill. If those amounts are less than the fair value of the net identifiable assets of the business acquired, the difference is recognized directly in the profit or loss as a bargain purchase.

Intercompany transactions, balances and unrealized gains on transactions between group companies are eliminated. If a member of the Group uses accounting policies other than those adopted in the consolidated financial statements for like transactions and events in similar circumstances, appropriate adjustments are made to that group member's financial statements in preparing the consolidated financial statements to ensure conformity with the group's accounting policies.

For transactions with non-controlling interests that do not result in a loss of control, any difference between the amount by which the non-controlling interests are adjusted and the fair value of the consideration paid or received is recognized in equity attributable to the owners of the Parent.

When the Group loses a control in a subsidiary, any retained interest in the subsidiary is remeasured at its fair value and resulting gain or loss is recognized in profit or loss.

(b) Associates

Associates are entities over which the Group has significant influence but not control or joint control. Investments in associates are accounted for using the equity method of accounting, after initially being recognized at cost. Unrealized gains on transactions between the Group and its associates are eliminated to the extent of the Group's interest in the associates. If the Group's share of losses of an associate equals or exceeds its interest in the associate (including long-term interests that, in substance, form part of the Group's net investment in the associate), the Group discontinues recognizing its share of further losses. After the Group's interest is reduced to zero, additional losses are provided for, and a liability is recognized, only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate. If there

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is objective evidence of impairment for the investment in the associate, the Group recognizes the difference between the recoverable amount of the associate and its book amount as impairment loss. If an associate uses accounting policies other than those of the Group for like transactions and events in similar circumstances, if necessary, adjustments shall be made to make the associate's accounting policies conform to those of the Group when the associate's financial statements are used by the Group in applying the equity method.

(c) Joint Arrangements

A joint arrangement, wherein two or more parties have joint control, is classified as either a joint operation or a joint venture. A joint operator recognizes its direct right to the assets, liabilities, revenues and expenses of joint operations and its share of any jointly held or incurred assets, liabilities, revenues and expenses. Interests in joint ventures are accounted for using the equity method, after initially being recognized at cost in the consolidated statement of financial position.

2.4 Foreign Currency Translation

(a) Functional and presentation currency

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which each entity operates (the "functional currency"). The consolidated financial statements are presented in Korean won, which is the Parent Company's functional and presentation currency.

(b) Transactions and balances

Foreign currency transactions are translated into the functional currency using the exchange rates at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies at year end exchange rates, such as borrowings and others, are generally recognized in profit or loss. They are recognized in other comprehensive income if they relate to qualifying cash flow hedges, qualifying effective portion of net investment hedges, or are attributable to monetary part of the net investment in a foreign operation.

Foreign exchange gains and losses related to borrowings are presented as finance cost in the statement of profit or loss.

Non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined. Translation differences on assets and liabilities carried at fair value are reported as part of the fair value gain or loss. For example, translation differences on non-monetary assets and liabilities such as equities held at fair value through profit or loss are recognized in profit or loss as part of the fair value gain or loss and translation differences on non-monetary assets such as equities held at fair value through other comprehensive income are recognized in other comprehensive income.

(c) Translation into the presentation currency

The results and financial position of foreign operations that have a functional currency different from the presentation currency are translated into the presentation currency as follows:

- i) assets and liabilities for each statement of financial position presented are translated at the closing rate at the end of the reporting period;
- ii) income and expenses for each statement of income are translated at monthly average exchange rates; and

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- iii) equity is translated at the historical exchange rate; and
- iv) all resulting exchange differences are recognized in other comprehensive income.

Goodwill and fair value adjustments to the carrying amounts of assets and liabilities arising on the acquisition of a foreign operation are treated as assets and liabilities of the foreign operation and translated at the closing rate at the end of the reporting period.

2.5 Cash and Cash Equivalents

Cash and cash equivalents include cash in hand, deposits held at call with banks, other short-term highly liquid investments with original maturities of three months or less.

2.6 Financial Assets

(a) Classification

The Group classifies its financial assets in the following measurement categories:

- those to be measured at fair value through profit or loss
- those to be measured at fair value through other comprehensive income, and
- those to be measured at amortized cost

Financial assets are classified on the basis of the Group's business model for managing the financial assets and the contractual cash flow characteristics of the financial assets.

Gains and losses on financial assets measured at fair value are recognized either in profit or loss or other comprehensive income. For investments in debt instruments, this will depend on the business model in which the investment is held. The Group reclassifies debt investments when, and only when its business model for managing those assets changes.

For investments in equity instruments that are not held for trading, this will depend on whether the Group may make an irrevocable election at the time of initial recognition to account for the equity investment at fair value through other comprehensive income. Changes in fair value of non-designated equity investment are recognized in profit or loss.

(b) Measurement

At initial recognition, the Group measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed in profit or loss. Financial assets with embedded derivatives are considered in their entirety when determining whether their cash flows are solely payment of principal and interest.

A. Debt instruments

Subsequent measurement of debt instruments depends on the Group's business model for managing the asset and the cash flow characteristics of the asset. The Group classifies its debt instruments into one of the following three measurement categories:

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- **Amortized cost:**
Assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest are measured at amortized cost. A gain or loss on a debt investment that is subsequently measured at amortized cost and is not part of a hedging relationship is recognized in profit or loss when the asset is derecognized or impaired. Interest income from these financial assets is included in 'finance income' using the effective interest rate method.
- **Fair value through other comprehensive income:**
Assets that are held for collection of contractual cash flows and for selling the financial assets, where the assets' cash flows represent solely payments of principal and interest, are measured at fair value through other comprehensive income. Movements in the carrying amount are taken through other comprehensive income, except for the recognition of impairment loss (reversal of impairment loss), interest income and foreign exchange gains and losses which are recognized in profit or loss. When the financial asset is derecognized, the cumulative gain or loss previously recognized in other comprehensive income is reclassified from equity to profit or loss. Interest income from these financial assets is included in 'finance income' using the effective interest rate method. Foreign exchange gains and losses are presented in 'finance income / costs or other non-operating income / expenses' and impairment losses are presented in 'other non-operating expenses'.
- **Fair value through profit or loss:**
Assets that do not meet the criteria for amortized cost or fair value through other comprehensive income are measured at fair value through profit or loss. Changes in the fair value of financial assets at fair value through profit or loss are recognized in 'finance income / costs' in the statement of profit or loss as applicable and are not part of a hedging relationship.

B. Equity instruments

The Group subsequently measures all equity investments at fair value. Where the Group's management has elected to present fair value gains and losses on equity investments, which held for long-term investment or strategic purpose, in other comprehensive income, there is no subsequent reclassification of fair value gains and losses to profit or loss following the derecognition of the investment. Dividend income from such investments continue to be recognized in profit or loss as 'finance income' when the right to receive payments is established.

Changes in the fair value of financial assets at fair value through profit or loss are recognized in 'finance income / costs' in the statement of profit or loss as applicable. Impairment loss (reversal of impairment loss) on equity investments measured at fair value through other comprehensive income are not reported separately from other changes in fair value.

(c) Impairment

The Group assesses on a forward-looking basis the expected credit losses associated with its debt instruments carried at amortized cost and fair value through other comprehensive income. The impairment methodology applied depends on whether there has been a significant increase in credit risk. For trade receivables, the Group applies the simplified approach, which requires expected lifetime credit losses to be recognized from initial recognition of the receivables.

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(d) Recognition and Derecognition

Regular way purchases and sales of financial assets are recognized or derecognized on trade-date, the date on which the Group commits to purchase or sell the asset. Financial assets are derecognized when the rights to receive cash flows from the financial assets have expired or have been transferred and the Group has transferred substantially all the risks and rewards of ownership.

If a transfer does not result in derecognition because the Group has retained substantially all the risks and rewards of ownership of the transferred asset, the Group continues to recognize the transferred asset in its entirety and recognizes a financial liability for the consideration received. The Group classified the financial liability as 'borrowings' in the statement of financial position.

2.7 Derivative Financial Instruments

Derivatives are initially recognized at fair value on the date a derivative contract is entered into and are subsequently remeasured to their fair value at the end of each reporting period. The accounting for subsequent changes in fair value depends on whether the derivative is designated as a hedging instrument, and if so, the nature of the item being hedged. Derivatives that do not qualify for hedge accounting are classified for trading purpose, and the changes in the fair value of the derivatives are recognized in profit or loss within 'finance income (costs)' based on the nature of transactions. In addition, the Group designates derivatives contracted for risk hedging purposes as hedging instruments for the following risk hedging relationships.

- hedges of the fair value of recognized assets or liabilities or a firm commitment (fair value hedges)
- hedges of a particular risk associated with the cash flows of recognized assets and liabilities and highly probable forecast transactions (cash flow hedges), or
- hedges of a net investment in a foreign operation (net investment hedges)

At inception of the hedge relationship, the Group documents the economic relationship between hedging instruments and hedged items including whether changes in the cash flows of the hedging instruments are expected to offset changes in the cash flows of hedged items.

The full fair value of a hedging derivative is classified as a non-current asset or liability when the remaining maturity of the hedged item is more than 12 months; it is classified as a current asset or liability when the remaining maturity of the hedged item is less than 12 months. A non-derivative financial asset and a non-derivative financial liability is classified as a current or non-current based on its expected maturity and its settlement, respectively.

Cash flow hedge

The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognized in the cash flow hedge reserve within equity, limited to the cumulative change in fair value (present value) of the hedged item (the present value of the cumulative change in the future expected cash flows of the hedged item) from the inception of the hedge. The ineffective portion is recognized in finance income (costs).

When option contracts are used to hedge forecast transactions, the Group designates only the intrinsic value of the option contract as the hedging instrument. Gains or losses relating to the effective portion of the change in intrinsic value of the option contracts are recognized in the cash flow hedge reserve within equity. The changes in the time value of the option contracts that relate to the hedged item ('aligned time value') are recognized within the costs of hedging in other comprehensive income within equity.

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When forward contracts are used to hedge forecast transactions, the Group generally designates only the change in fair value of the forward contract related to the spot element as the hedging instrument. Gains or losses relating to the effective portion of the change in the spot element of the forward contracts are recognized in the cash flow hedge reserve within equity. The change in the forward element of the contract that relates to the hedged item is recognized within other comprehensive income within equity. In some cases, the Group may designate the full change in fair value of the forward contract (including forward points) as the hedging instrument. In such cases, the gains or losses relating to the effective portion of the change in fair value of the entire forward contract are recognized in the cash flow hedge reserve within equity.

Amounts accumulated in equity are reclassified in the periods when the hedged item affects profit or loss, as follows:

- Where the hedged item subsequently results in the recognition of a non-financial asset (such as inventory), both the deferred hedging gains and losses and the deferred time value of the option contracts or deferred forward points, if any, are included within the initial cost of the asset. The deferred amounts are ultimately recognized in profit or loss as the hedged item affects profit or loss (for example through cost of sales).
- The gain or loss relating to the effective portion of the interest rate swaps hedging variable rate borrowings is recognized in profit or loss within 'finance cost' at the same time as the interest expense on the hedged borrowings.

When a hedging instrument expires, or is sold, terminated, exercised, or when a hedge no longer meets the criteria for hedge accounting, any accumulated cash flow hedge reserve at that time remains in equity until the forecast transaction occurs, resulting in the recognition of a non-financial asset such as inventory. When the forecast transaction is no longer expected to occur, the cash flow hedge reserve and deferred costs of hedging that were reported in equity are immediately reclassified to profit or loss.

Changes in the fair value of any derivative instrument that does not qualify for hedge accounting are recognized immediately in profit or loss within 'other non-operating income (expenses)' or 'finance income (costs)' based on the nature of transactions.

2.8 Trade Receivables

At initial recognition, trade receivables are measured at the amount of unconditional consideration, unless the trade receivables contain a significant financing component, or are measured at fair value if the trade receivables contain a significant financing component. Trade receivables are subsequently measured at amortized cost using the effective interest method, less loss allowance.

2.9 Inventories

Inventories are stated at the lower of cost and net realizable value. Cost is determined using monthly average cost method, except for goods in transit which is determined using the specific identification method.

2.10 Assets Held for sale

Assets are classified as held for sale when their carrying amount will be recovered principally through a sale transaction rather than through continuing use and a sale is considered highly probable. The assets are measured at the lower amount between their carrying amount and the fair value less costs to sell.

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2.11 Property, Plant and Equipment

Property, plant and equipment are stated at historical cost less accumulated depreciation and accumulated impairment losses. Historical cost includes expenditure that is directly attributable to the acquisition of the items.

Depreciation of all property, plant and equipment, except for land, is calculated using the straight-line method to allocate their cost or revalued amounts, net of their residual values, over their estimated useful lives as follows:

	Useful lives
Buildings	25 - 50 years
Structures	15 - 50 years
Machinery	4 - 15 years
Others	1 - 15 years

The assets' depreciation method, residual values and useful lives are reviewed, and adjusted if appropriate, at the end of each reporting period.

2.12 Investment Property

Investment property is property held to earn rentals or for capital appreciation or both. An investment property is measured initially at its cost. An investment property is measured after initial measurement at depreciated cost (less any accumulated impairment losses). The Group depreciates investment properties, except for land, using the straight-line method over their useful lives of 20 ~ 50 years.

2.13 Borrowing Costs

General and specific borrowing costs that are directly attributable to the acquisition, construction or production of a qualifying asset are capitalized during the period of time that is required to complete and prepare the asset for its intended use or sale. Investment income earned on the temporary investment of specific borrowings on qualifying assets is deducted from the borrowing costs eligible for capitalization. Other borrowing costs are expensed in the period in which they are incurred.

2.14 Government Grants

Grants from the government are recognized at their fair value where there is a reasonable assurance that the grant will be received and the Group will comply with all attached conditions. Government grants related to assets are presented in the statement of financial position by deducting the grant in arriving at the carrying amount of the asset, and government grants related to income are deferred and later deducted from the related expense.

2.15 Intangible Assets

Goodwill is recognized as the excess of the sum of the consideration transferred, amount of non-controlling interests in the acquired entity previously held by acquiring entity, and amount of acquisition-date fair value of any previous equity interest in the acquired entity over the net identifiable assets acquired. Goodwill is carried at its cost less accumulated impairment losses. Impairment losses on goodwill are not reversed.

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Intangible assets, except for goodwill, are initially recognized at its historical cost and carried at its cost less accumulated amortization and accumulated impairment losses.

Development costs that are directly attributable to internally generated by the Group are recognized when the criteria; such as, technically feasible, generate probable future economic benefits and other, are met. Membership rights that have an indefinite useful life are not subject to amortization because there is no foreseeable limit to the period over which the assets are expected to be utilized. The Group amortizes intangible assets with a limited useful life using the straight-line method over the following periods:

	Useful lives
Software	3 - 15 years
Development costs	3 - 15 years
Industrial property rights	5 - 15 years
Others	6 - 20 years

2.16 Research and Development

Costs associated with research are recognized as an expense as incurred. Costs that are identifiable, controllable and directly attributable to development projects are recognized as intangible asset when the following criteria are met:

- It is technically feasible to complete the development project so that it will be available for use;
- Management intends to complete the development project for its own use or selling;
- There is an ability to use or sell the development project;
- It can be demonstrated how the development project will generate probable future economic benefits;
- Adequate technical, financial resources and other resources to complete the development and to use or sell the development project are available; and
- The expenditure attributable to the development project during its development can be reliably measured.

Generally, internally generated development projects have the following stages; formulation and selection of a project, verification of idea and technology, development and testing, decision of commercialization, test of final application. Expenditures can be capitalized as intangible assets only after the decision of commercialization. Expenditures incurred in other stages are recognized as expenses on the research phase.

Internally generated development projects in the Life Sciences business have the following stages; formulation of potential candidates, preclinical research, clinical researches such as phase 1, 2 and 3 trials, approval of regulatory body and new product launch. Expenditures incurred from new drug development project are recognized as expensed on the research phase. However, expenditures incurred during clinical phase 1~3 trials from development projects for generic drugs or biosimilars are recognized as intangible assets depending on the nature of the products.

Expenditures incurred from technology license agreement with the third parties are recognized as intangible assets.

Development costs previously recognized as an expense are not recognized as an asset in a subsequent period. Capitalized development costs that are recognized as intangible assets are amortized using the straight-line method over their estimated useful lives when the assets are available for use and are tested for impairment.

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2.17 Impairment of Non-financial Assets

Goodwill and intangible assets with indefinite useful life are tested annually for impairment, or more frequently if events or changes in circumstances indicate that they might be impaired. Other assets that are subject to amortization are tested for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognized for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. Non-financial assets other than goodwill that suffered an impairment are reviewed for possible reversal of the impairment at the end of each reporting period.

2.18 Trade and Other Payables

These amounts represent liabilities for goods and services provided to the Group prior to the end of reporting period which are unpaid. Trade and other payables are presented as current liabilities, unless payment is not due within 12 months after the reporting period. They are recognized initially at their fair value and subsequently measured at amortized cost using the effective interest method.

2.19 Financial Liabilities

(a) Classification and measurement

The Group's financial liabilities at fair value through profit or loss are financial instruments held for trading. A financial liability is held for trading if it is incurred principally for the purpose of repurchasing in the near term. A derivative that is not a designated as hedging instruments and an embedded derivative that is separated are also classified as held for trading.

The Group classifies non-derivative financial liabilities, except for financial liabilities at fair value through profit or loss, financial guarantee contracts and financial liabilities that arise when a transfer of financial assets does not qualify for derecognition, as financial liabilities carried at amortized cost and present as 'trade payables', 'borrowings', and 'other payables' in the statement of financial position.

Borrowings are initially recognized at fair value, net of transaction costs incurred. Borrowings are subsequently measured at amortized cost. Any difference between the proceeds (net of transaction costs) and the redemption amount is recognized in profit or loss over the period of the borrowings using the effective interest method. Fees paid on the establishment of loan facilities are recognized as transaction costs of the loan to the extent that it is probable that some or all of the facility will be drawn down. In this case, the fee is deferred until the draw-down occurs. To the extent there is no evidence that it is probable that some or all of the facility will be drawn down, the fee is capitalized as a prepayment for liquidity services and amortized over the period of the facility to which it relates.

Borrowings are classified as current liabilities unless the Group has an unconditional right to defer settlement of the liability for at least 12 months after the reporting period.

(b) Derecognition

Financial liabilities are removed from the statement of financial position when it is extinguished; for example, when the obligation specified in the contract is discharged or cancelled or expired or when the terms of an existing financial liability are substantially modified. The difference between the carrying amount of a financial liability extinguished or transferred to another party and the consideration paid (including any non-cash assets transferred or liabilities assumed) is recognized in profit or loss.

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2.20 Financial Guarantee Contracts

Financial guarantee contract is recognized as a financial liability at the time the guarantee is issued. The liability is initially measured at fair value, subsequently at the higher of following and recognized in the statement of financial position within 'other financial liabilities'.

- the amount determined in accordance with the expected credit loss model under Korean IFRS 1109 *Financial Instruments* and
- the amount initially recognized less, where appropriate, the cumulative amount of income recognized in accordance with Korean IFRS 1115 *Revenue from Contracts with Customers*

2.21 Current and Deferred Tax

The tax expense for the period consists of current and deferred tax. Current and deferred tax is recognized in profit or loss, except to the extent that it relates to items recognized in other comprehensive income or directly in equity. In this case, the tax is also recognized in other comprehensive income or directly in equity, respectively.

The current income tax expense is measured at the amount expected to be paid to the taxation authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation, and considers whether it is probable that a taxation authority will accept an uncertain tax treatment. The Group measures its tax balances either based on the most likely amount or the expected value, depending on which method provides a better prediction of the resolution of the uncertainty.

Deferred income tax is provided in full, using the liability method, on temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the consolidated financial statements. However, deferred income tax is not accounted for if it arises from initial recognition of an asset or liability in a transaction other than a business combination that at the time of the transaction affects neither accounting nor taxable profit or loss.

Deferred tax assets are recognized only if it is probable that future taxable amounts will be available to utilize those temporary differences and losses.

The Group recognizes a deferred tax liability all taxable temporary differences associated with investments in subsidiaries, associates, and interests in joint arrangements, except to the extent that the Group is able to control the timing of the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. In addition, The Group recognizes a deferred tax asset for all deductible temporary differences arising from such investments to the extent that it is probable the temporary difference will reverse in the foreseeable future and taxable profit will be available against which the temporary difference can be utilized.

Deferred tax assets and liabilities are offset when there is a legally enforceable right to offset current tax assets and liabilities and when the deferred tax balances relate to the same taxation authority. Current tax assets and tax liabilities are offset when the Group has a legally enforceable right to offset and intends either to settle on a net basis, or to realize the assets and settle the liability simultaneously.

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2.22 Provisions

Provisions for service warranties, make good obligation, and legal claims are recognized when the Group has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources will be required to settle the obligation and the amount can be reliably estimated. Provisions are measured at the present value of management's best estimate of the expenditure required to settle the present obligation at the end of the reporting period, and the increase in the provision due to the passage of time is recognized as interest expense.

2.23 Greenhouse Gas Emissions Permits and Obligations

With enforcement of *The Act on the Allocation and Trading of Greenhouse Gas Emission Permits*, the permits that are received free of charge from the government are measured at zero while permits purchased are measured at acquisition cost and stated net of accumulated impairment loss. Emissions obligations are measured as the sum of the carrying amount of the allocated permits that will be submitted to the government and the best estimate of expenditure required to settle the obligation at the end of reporting period for any excess emission. The permits and emissions obligations are classified as intangible assets and provisions, respectively, in the consolidated statement of financial position.

2.24 Employee Benefits

(a) Post-employment benefits

The Group operates both defined contribution and defined benefit pension plans. For defined contribution plans, the Group pays contribution to publicly or privately administered pension insurance plans on mandatory, contractual or voluntary basis. The Group has no further payment obligation once the contribution has been paid. The contribution is recognized as employee benefit expense when they are due. A defined benefit plan is a pension plan that is not a defined contribution plan.

Generally, post-employment benefits are payable after the completion of employment, and the benefit amount depended on the employee's age, periods of service or salary levels. The liability recognized in the statement of financial position in respect of defined benefit pension plans is the present value of the defined benefit obligation at the end of the reporting period less the fair value of plan assets. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds that are denominated in the currency in which the benefits will be paid, and that have terms approximating to the terms of the related obligation. Remeasurement gains and losses arising from experience adjustments and changes in actuarial assumptions are recognized in the period in which they occur, directly in other comprehensive income.

Changes in the present value of the defined benefit obligation resulting from plan amendments or curtailments are recognized immediately in profit or loss as past service costs.

(b) Other long-term employee benefits

Certain entities within the Group provide long-term employee benefits that are entitled to employees with service period for ten years and above. The expected costs of these benefits are accrued over the period of employment using the same accounting methodology as used for defined benefit pension plans. The Group recognizes service cost, net interest on other long-term employee benefits and remeasurements as profit or loss for the year. These liabilities are valued annually by an independent qualified actuary.

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2.25 Revenue Recognition

(a) Identify performance obligation

With regard to the contract of selling products to the customer, the Group identifies the services provided separately to the customer as a different performance obligation. When the Group makes a sales contract with the customer, the standard warranty period for each product and customer is set up considering the legal warranty period. Even though the standard warranty period has been expired, the warranties are recognized as a revenue and is identified as a separate performance obligation when the Group provides additional warranties for the quality of product or when the customer has an option to purchase additional warranties separately.

(b) A performance obligation satisfied at a point in time

The revenue from the sale of goods is recognized at the time they are delivered to the customer. Delivery occurs when the products have been shipped to the specific location, the risks of obsolescence and loss have been transferred to the customer, and either the customer has accepted the products in accordance with the sales contract, the acceptance provisions have lapsed, or the group has objective evidence that all criteria for acceptance have been satisfied.

The goods are often sold with volume discounts, and it is the group's policy to sell its products to the customer with a right of return. Accumulated experience is used to estimate for the discounts and the refund, and the volume discounts is calculated based on the periodical forecast sales. The warranty provision for the sales and refund is reasonably estimated and recognized properly.

(c) Sales return

A gross contract liability for the expected refunds to customers is recognized as adjustment to revenue, and the Group has a right to recover the product from the customer where the customer exercises his right of return and recognizes an asset and a corresponding adjustment to cost of sales. A right to recover the products is measured at former carrying amount of the product less the costs to recover the products.

(d) Significant financing component

As a practical expedient, the Group need not adjust the promised amount of consideration for the effects of a significant financing component as the period between when the entity transfers a promised good or service to a customer and when the customer pays for that good or service is generally one year or less.

2.26 Lease

(a) Lessor

Lease income from operating leases where the Group is a lessor is recognized in income on a straight-line basis over the lease term. Initial direct costs incurred in obtaining an operating lease are added to the carrying amount of the underlying asset and recognized as expense over the lease term on the same basis as lease income. The respective leased assets are included in the statement of financial position based on their nature.

(b) Lessee

The Group leases various machinery, real estate and cars. Lease contracts are typically made for fixed periods, but may have extension options. Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions. The lease agreements do not impose

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any covenants, but leased assets may not be used as security for borrowing purposes.

Contracts may contain both lease and non-lease components. The Group allocates the consideration in the contract to the lease and non-lease components based on their relative stand-alone prices. However, for leases of real estate for which the Group is lessee, the Group applies the practical expedient which has elected not to separate lease and non-lease components and instead accounts for these as a single lease component.

Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions. The lease agreements do not impose any covenants, but leased assets may not be used as security for borrowing purposes.

The Group determines the lease term as the non-cancellable period of a lease, together with both (a) periods covered by an option to extend the lease if the lessee is reasonably certain to exercise that option; and (b) periods covered by an option to terminate the lease if the lessee is reasonably certain not to exercise that option. When the lessee and the lessor each has the right to terminate the lease without permission from the other party, the Group should consider a termination penalty in determining the period for which the contract is enforceable.

Assets and liabilities arising from a lease are initially measured on a present value basis. Lease liabilities include the net present value of the following lease payments:

- Fixed payments (including in-substance fixed payments), less any lease incentives receivable
- Variable lease payment that are based on an index or a rate, initially measured using the index or rate as at the commencement date
- Amounts expected to be payable by the Group (the lessee) under residual value guarantees
- The exercise price of a purchase option if the Group (the lessee) is reasonably certain to exercise that option, and
- Payments of penalties for terminating the lease, if the lease term reflects the Group (the lessee) exercising that option

Measurement of lease liability also includes payments to be made in optional periods if the lessee is reasonably certain to exercise an option to extend the lease.

The lease payments are discounted using the interest rate implicit in the lease. If that rate cannot be determined, the lessee's incremental borrowing rate is used, being the rate that the lessee would have to pay to borrow the funds necessary to obtain an asset of similar value in a similar economic environment with similar terms and conditions.

To determine the incremental borrowing rate, the Group:

- where possible, uses recent third-party financing received by the individual lessee as a starting point, adjusted to reflect changes in financing conditions since third party financing was received
- makes adjustments specific to the lease, for example term, country, currency and security.

If a readily observable amortizing loan rate is available to the individual lessee (through recent financing or market data) which has a similar payment profile to the lease, then the Group uses

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that rate as a starting point to determine the incremental borrowing rate.

The Group is exposed to potential future increases in variable lease payments based on an index or rate, which are not included in the lease liability until they take effect. When adjustments to lease payments based on an index or rate take effect, the lease liability is reassessed and adjusted against the right-of-use asset.

Each lease payment is allocated between the liability and finance cost. The finance cost is charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period.

Right-of-use assets are measured at cost comprising the following:

- the amount of the initial measurement of lease liability
- any lease payments made at or before the commencement date less any lease incentives received
- any initial direct costs, and
- restoration costs

The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. If the Group is reasonably certain to exercise a purchase option, the right-of-use asset is depreciated over the underlying asset's useful life.

Payments associated with short-term leases of equipment and vehicles and leases of low-value assets are recognized on a straight-line basis as an expense in profit or loss. Short-term leases are leases with a lease term of 12 months or less without a purchase option. Low-value assets comprise IT-equipment and small items of office furniture.

(c) Extension and termination options

Extension and termination options are included in a number of leases across the Group. These terms are used to maximize operational flexibility in terms of managing contracts.

The majority of extension and termination options held are exercisable only by the Group and not by the respective lessor.

2.28 Segment Reporting

Information of each operating segment is reported in a manner consistent with the business segment reporting provided to the chief operating decision-maker. (Note 33) The chief operating decision-maker is responsible for allocating resources and assessing performance of the operating segments and the Group has identified the Board of Directors as the chief operating decision-maker.

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3. Financial Risk Management

3.1 Financial Risk Factors

The Group's activities expose it to a variety of financial risks: market risk, credit risk and liquidity risk. The Group's overall risk management program focuses on the unpredictability of financial markets and seeks to minimize potential adverse effects on the financial performance of the Group. The Group uses derivative financial instruments to hedge certain risk exposures.

Risk management is carried out by the Group's finance team under policies approved by the Corporate Management Committee. The finance team identifies, evaluates and hedges financial risks in close co-operation with the Group's operating units. The Corporate Management Committee reviews and approves written principles for overall risk management, as well as written policies covering specific areas, such as foreign exchange risk, interest rate risk, and credit risk, use of derivative financial instruments and non-derivative financial instruments, investment of excess liquidity.

(1) Market risk

1) Foreign exchange risk

The Group operates internationally and is exposed to foreign exchange risk arising from foreign currency exposures, primarily with respect to the US dollar. Foreign exchange risk arises from future commercial transactions, recognized assets and liabilities.

Management has set up a policy to require group companies to manage their foreign exchange risk against their functional currency. The Group manages maximum loss for currency risk exposures within acceptable range by using currency risk management model and hires employees who are exclusively responsible for currency risk management.

As at December 31, 2022 and 2021, the Group's monetary assets and liabilities denominated in currencies other than its functional currency, are as follows:

<i>(in millions of Korean won)</i>	2022		2021	
	Assets	Liabilities	Assets	Liabilities
USD	5,518,144	8,164,815	5,708,219	6,488,454
EUR	478,624	5,044,754	441,123	4,937,370
JPY	17,686	145,211	18,315	96,238
CNY and others	230,763	11,419	523,907	4,131

As at December 31, 2022 and 2021, if the Group's functional currency had weakened / strengthened by 10% against the US dollar with all other variables held constant, profit before income tax would have been affected as follows:

<i>(in millions of Korean won)</i>	2022		2021	
	10% Increase	10% Decrease	10% Increase	10% Decrease
USD	(75,555)	75,555	(42,976)	42,976
EUR	(418,930)	418,930	(426,735)	426,735

The above sensitivity analysis has been performed for monetary assets and liabilities denominated in foreign currencies other than the Group's functional currency at the reporting date.

As at December 31, 2022 and 2021, the Group entered into foreign currency forward contracts to

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manage risk from changes in exchange rates as follows:

(in millions of Korean won and in millions of US dollars)

		2022				Book amount	
		Contract amount	Contract exchange rate	Contract inception date	Contract maturity	Assets	Liabilities
Currency Forward	Citi	USD 105	1,234.60	2022.4.22	2023.2.1	-	3,348
	Industrial and Commercial Bank of China	USD 158	1,218.70	2022.4.22	2024.2.1	-	4,364
	Shinhan Bank	USD 500	1,135.60	2020.10.14	2024.10.15	47,695	-
	KB Kookmin Bank	USD 500	1,102.83	2020.11.24	2029.04.16	41,780	-
Currency swap	ING	EUR 100	4.7800 ¹	2022.1.5	2023.1.5	-	2,522
	SMBC	USD 200	1,118.00	2021.5.28	2024.05.28	22,974	-
	KDB Bank	USD 130	1,135.60	2021.6.24	2025.06.24	26,317	-
	KDB Bank	USD 35	1,135.60	2021.6.24	2026.06.24	7,898	-
	Shinhan Bank	USD 300	1,131.80	2021.7.7	2026.7.7	26,599	-
	Woori Bank	USD 100	1,131.80	2021.7.7	2026.7.7	9,067	-
	Industrial and Commercial Bank of China	USD 100	1,131.80	2021.7.7	2026.7.7	9,175	-
	Shinhan Bank	USD 100	1,131.80	2021.7.7	2031.7.7	6,192	-
	Woori Bank	USD 200	1,131.80	2021.7.7	2031.7.7	12,852	-
	KDB Bank	USD 200	1,131.80	2021.7.7	2031.7.7	12,926	-
	KDB Bank	USD 250	1,289.70	2022.6.15	2025.6.15	-	3,374
	Shinhan Bank	USD 110	1,289.70	2022.6.15	2027.6.15	-	1,700
	The Export-Import Bank of Korea	USD 200	1,305.90	2022.7.14	2025.7.14	-	10,360
	Shinhan Bank	USD 100	1,305.90	2022.7.14	2025.7.14	-	5,003

(in millions of Korean won and in millions of US dollars)

		2021				Book amount	
		Contract amount	Contract exchange rate	Contract inception date	Contract maturity	Assets	Liabilities
Currency Forward	KDB Bank	USD 35	1,135.60	2021.6.24	2022.6.24	1,789	-
	Shinhan Bank	USD 500	1,135.60	2020.10.14	2024.10.15	24,687	-
	KB Kookmin Bank	USD 500	1,102.83	2020.11.24	2029.4.16	30,232	-
	Citi	EUR 150	4.5900 ¹	2021.5.12	2022.4.29	2,881	-
	SC	EUR 250	4.5861 ¹	2021.5.14	2022.4.29	4,703	-
	CACIB	EUR 100	4.6055 ¹	2021.8.5	2022.8.4	2,964	-
	KDB Bank	EUR 165	4.6036 ¹	2021.8.5	2022.8.4	4,925	-

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Currency swap	ING	EUR 100	4,7120 ¹	2021.10.22	2022.10.21	1,420	-
	SMBC	USD 200	1,118.00	2021.5.28	2024.5.28	13,556	-
	KDB Bank	USD 130	1,135.60	2021.6.24	2025.6.24	8,817	-
	KDB Bank	USD 35	1,135.60	2021.6.24	2026.6.24	2,319	-
	Shinhan Bank	USD 300	1,131.80	2021.7.7	2026.7.7	12,196	-
	Woori Bank	USD 100	1,131.80	2021.7.7	2026.7.7	4,380	-
	Industrial and Commercial Bank of China	USD 100	1,131.80	2021.7.7	2026.7.7	4,653	-
	Shinhan Bank	USD 100	1,131.80	2021.7.7	2031.7.7	4,804	-
	Woori Bank	USD 200	1,131.80	2021.7.7	2031.7.7	10,032	-
	KDB Bank	USD 200	1,131.80	2021.7.7	2031.7.7	10,429	-

¹ Cross exchange rate between PLN and EUR.

2) Price risk

The Group is exposed to equity securities price risk arises from investments held by the Group and classified in the consolidated statement of financial position as non-current financial assets. The Group's equity investments are publicly traded and are related to the NASDAQ (National Association of Securities Dealers Automated Quotations), NYSE (New York Stock Exchange), SZSE (Shenzhen Stock Exchange), HSI (Hang Seng Index), ASX (Australian Stock Exchange) and KOSPI index.

The table below summarizes the impact of increases/decreases of the listed stock price index on the Group's equity before tax effects as at December 31, 2022 and 2021. The analysis is based on the assumption that the equity index has increased/decreased by 10% with all other variables held constant, and that all the Group's equity instruments moved in line with the index.

<i>(in millions of Korean won)</i>	2022		2021	
	10% Increase	10% Decrease	10% Increase	10% Decrease
NASDAQ	2,561	(2,561)	909	(909)
ASX	1,167	(1,167)	676	(676)
NYSE	4,416	(4,416)	-	-
SZSE	3,747	(3,747)	-	-
HSI	8,349	(8,349)	-	-
KOSPI	17,667	(17,667)	-	-
Total	37,907	(37,907)	1,585	(1,585)

3) Interest rate risk

Interest rate risk is defined as the risk that the interest income or expenses arising from deposits and borrowings will fluctuate because of changes in future market interest rate. The interest rate risk mainly arises through floating rate deposits and borrowings. The objective of interest rate risk management lies in maximizing corporate value by minimizing uncertainty in interest rates fluctuations and net interest expense.

The Group adequately minimizes risks from interest rate fluctuations through various policies, such as sharing excess cash within the Group (internal cash sharing) to minimize external borrowings, avoiding high rate borrowings, reforming capital structure, managing an appropriate ratio of fixed

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rate borrowings and floating rate borrowings, monitoring a fluctuation of domestic and foreign interest rates daily, weekly and monthly, establishing alternatives, and balancing floating rate short-term borrowings with floating rate deposits.

The table below summarizes the impact of increases/decreases of interest rate on the Group's equity and post-tax profit for the year. The analysis is based on the assumption that the interest rate has increased/decreased by 1% (100 basis points) with all other variables held constant.

		Impact on post-tax profit		Impact on equity	
		2022	2021	2022	2021
<i>(in millions of Korean won)</i>					
Increase	Deposits	44,606	8,421	44,606	8,421
	Borrowings	<u>(41,996)</u>	<u>(38,741)</u>	<u>(41,996)</u>	<u>(38,741)</u>
	Total	<u>2,610</u>	<u>(30,320)</u>	<u>2,610</u>	<u>(30,320)</u>
Decrease	Deposits	(44,606)	(8,421)	(44,606)	(8,421)
	Borrowings	<u>41,996</u>	<u>38,741</u>	<u>41,996</u>	<u>38,741</u>
	Total	<u>(2,610)</u>	<u>30,320</u>	<u>(2,610)</u>	<u>30,320</u>

The deposits exposed to the above interest rate risk are held for the purpose of meeting the short-term demand for cash as it is easily convertible to a determined amount of cash. Also, the above borrowings are variable interest rate borrowings from KDB Bank and others, and the Group has entered into a currency interest rate swap contract amounting to USD 525 million (equivalent to ₩665,333 million) to hedge interest rate risk of variable interest rate borrowings.

(2) Credit risk

Credit risk arises from trade receivables and that the Group holds, as well as debt instruments at amortized cost or fair value through other comprehensive income.

1) Trade receivables

The Group applies the simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance for trade receivables. To measure the expected credit losses, trade receivables have been grouped based on shared credit risk characteristics and the days past due. The loss allowance provision as at December 31, 2022 is as follows. Expected credit losses include forward-looking information.

	<i>(in millions of Korean won)</i>			
	Receivables not past due¹	Receivables past due but not impaired¹	Impaired receivables²	Total
December 31, 2022				
<i>(trade receivables)</i>				
Gross carrying amount	7,349,259	223,992	2,859	7,576,110
Expected loss rate	0.00%	0.30%	88.40%	0.10%
Loss allowance	1,900	591	2,526	5,017
December 31, 2021				
<i>(trade receivables)</i>				
Gross carrying amount	6,118,779	338,693	1,656	6,459,128
Expected loss rate	0.1%	0.2%	81.5%	0.1%
Loss allowance	3,152	592	1,350	5,094

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¹ See Note 7.(3) for aging analysis.

² Impaired receivables are those for which impairment indicators have been confirmed, such as significant lack of collectability.

Movements in the loss allowance provision for trade receivables for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	Trade receivables	
	2022	2021
Beginning balance	5,094	4,391
Increase in (reversal of) loss allowance recognized in profit or loss	-	(127)
Business combination	724	-
Receivables written off as uncollectible	(849)	(447)
Exchange differences	48	1,277
Ending balance	5,017	5,094

As at December 31, 2022, the carrying amount of trade receivables representing the maximum exposure to credit risk amounts to ₩7,571,093 million (2021: ₩6,454,034 million).

2) Other financial assets at amortized cost

Movements in loss allowance provision for other financial assets at amortized cost for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	Other receivables	
	2022	2021
Beginning balance	2,165	2,165
Reversal of loss allowance recognized in profit or loss	(331)	-
Receivables written off as uncollectible	(1,152)	-
Ending balance	682	2,165

All of the financial assets at amortized costs are considered to have low credit risk, and the loss allowance recognized during the period was, therefore, limited to 12 months expected losses.

The Group has established the following policies and procedures to manage credit risks.

To manage credit risks relating to trade receivables, the Group evaluates the credit rating of customers and determines credit limit for each customer based on the information provided by credit rating agencies and other available financial information before commencing business with new customers. The credit risks relating to trade receivables are also mitigated by insurance contracts, collateral as well as payment guarantees.

The Group has entered into export bond insurance contracts with Korea Trade Insurance Corporation to mitigate credit risks relating to export trade receivables to overseas customers. The Group is also provided with collateral by customers depending on their credit rating or payment guarantees from the customers' financial institutions if necessary.

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The Group has deposited its cash and cash equivalents and other long-term deposits in several financial institutions, such as Woori Bank and others. The Group has also entered into derivative contract with several financial institutions. The Group maintains business relationship with those financial institutions with high credit ratings evaluated by independent credit rating agencies and accordingly, credit risks associated with these financial institutions are limited.

(3) Liquidity risk

Finance team of the Group monitors rolling forecasts of the Group's liquidity requirements to ensure it has sufficient cash to meet operational needs while maintaining sufficient headroom on its undrawn committed borrowing facilities at all times so that the Group does not breach borrowing limits or covenants (where applicable) on any of its borrowing facilities. The Group's liquidity management policy involves projecting cash flows in major currencies and considering the level of liquid assets necessary to meet these, monitoring balance sheet liquidity ratios against internal and external regulatory requirements and maintaining debt financing plans.

The table below analyzes the Group's non-derivative financial liabilities into relevant maturity groupings based on the remaining period at the reporting period to the contractual maturity date. Cash flows presented below are gross cash flows before discount, and includes cash flows for interests.

<i>(in millions of Korean won)</i>	2022			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Non-derivative financial instruments				
Borrowings (excluding lease liabilities)	4,098,366	3,315,867	5,730,247	3,963,315
Lease liabilities	138,892	70,516	100,099	120,992
Trade and other payables	9,655,799	41,085	1,546	1,077
	<u>13,893,057</u>	<u>3,427,468</u>	<u>5,831,892</u>	<u>4,085,384</u>
Derivative instruments				
Gross settlement currency forwards and swaps				
(Inflows)	(344,898)	(1,157,662)	(1,787,213)	(1,327,497)
Outflows	328,856	1,047,373	1,694,337	1,168,399
	<u>(16,042)</u>	<u>(110,289)</u>	<u>(92,876)</u>	<u>(159,098)</u>
	<u>13,877,015</u>	<u>3,317,179</u>	<u>5,739,016</u>	<u>3,926,286</u>

(*) Although not included in the above cash flow, the agreement is made to purchase additional shares of LG Toray Hungary Battery Separator kft. in accordance with the agreed price calculation method (Note 18).

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<i>(in millions of Korean won)</i>	2021			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Non-derivative financial instruments				
Borrowings (excluding lease liabilities)	3,548,442	2,403,648	5,984,843	3,551,215
Lease liabilities	82,568	54,416	87,498	156,494
Trade and other payables ¹	7,733,917	13,757	1,694	171
	<u>11,364,927</u>	<u>2,471,821</u>	<u>6,074,035</u>	<u>3,707,880</u>
Derivative instruments				
Gross settlement currency forwards and swaps				
(Inflows)	(1,096,082)	(27,579)	(1,690,054)	(1,255,889)
Outflows	1,096,734	26,825	1,613,263	1,181,161
	<u>652</u>	<u>(754)</u>	<u>(76,791)</u>	<u>(74,728)</u>
	<u>11,365,579</u>	<u>2,471,067</u>	<u>5,997,244</u>	<u>3,633,152</u>

¹ Included ₩301,946 million of financial liabilities due to a financial institution relating to reverse factoring arrangement as at December 31, 2021. The Group has entered into reverse factoring arrangement (interest rate CD 91 days + 0.93~1.20%) with a financial institution whereby suppliers receive payments from the financial institution on the due date of each invoice and the Group pays to the financial institution at the end of extended credit period as agreed in the reverse factoring arrangement. As at December 31, 2022, there is no utilized amount in the reverse factoring arrangement.

As at December 31, 2022, the Group has entered into swap contracts for which cash flow hedge accounting is applied, to avoid market price fluctuation of raw materials.

<i>(in millions of Korean won)</i>	2022					
	Purpose of the contracts	Hedged items	Financial institution	Maturity	Fair value	
					Assets	Liabilities
Merchandise (raw materials) swap ¹	Cash flow hedge	Non-ferrous metal	Citi and others	~2025. 12	13,931	2,143

¹ Gain (loss) resulting from the contracts to avoid cash flow fluctuation risk of expected future transaction is accounted for as accumulated other comprehensive income which corresponds to an effective portion of the hedges (Note 5).

Details of financial guarantee contracts by maturity as at December 31, 2022, are as follows:

<i>(in millions of Korean won)</i>	2022			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Financial Guarantee Contracts ¹	88,711	-	-	-

¹ The financial guarantee contracts above are for joint ventures and are presented based on the maximum amount of guarantee that can be requested as at December 31, 2022 (Note 18).

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3.2 Capital Risk Management

The Group's objectives for managing capital are to safeguard the Group's ability to continue as a going concern, so the Group can continue to provide returns for shareholders and benefits for other stakeholders, and to maintain an optimal capital structure to reduce the cost of capital.

Consistent with others in the industry, the Group monitors capital on the basis of the gearing ratio. This ratio is calculated as net debt divided by total capital. Net debt is calculated as total borrowings less cash and cash equivalents. Total capital is calculated as 'equity' as shown in the consolidated statement of financial position plus net debt.

The gearing ratio and debt-to-equity ratio as at December 31, 2022 and 2021, were as follows:

<i>(in millions of Korean won, except for ratios)</i>	2022	2021
Total borrowings (Note 14) (A)	15,964,519	14,765,734
Less: cash and cash equivalents (B)	<u>(8,497,882)</u>	<u>(3,760,834)</u>
Net debt (C=A+B)	<u>7,466,637</u>	<u>11,004,900</u>
Total liabilities (D)	30,492,696	27,925,314
Total equity (E)	<u>37,481,127</u>	<u>23,209,988</u>
Total capital (F=C+E)	<u>44,947,764</u>	<u>34,214,888</u>
Gearing ratio (C/F)	16.6%	32.2%
Debt-to-equity ratio (D/E)	81.4%	120.3%

3.3 Fair Value

(1) Carrying amount and fair value of financial instruments by category as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022		2021	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets (current)				
Cash and cash equivalents	8,497,882	1	3,760,834	1
Deposits held by financial institutions	14,448	1	64,583	1
Trade receivables	7,450,395	1	6,386,979	1
Other receivables (excluding deposits held by financial institutions)	727,983	1	983,966	1
Current derivative financial assets (currency forward)	-	-	18,683	18,683
Current derivative financial assets (excluding currency forward)	9,167	9,167	4,606	4,606
Financial assets (non-current)				
Deposits held by financial institutions	277,210	1	267,116	1
Trade receivables	120,698	1	67,055	1
Other receivables (excluding deposits held by financial institutions)	340,234	1	446,050	1
Other non-current financial assets (carried at fair value)				
Marketable financial assets	462,330	462,330	21,630	21,630

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<i>(in millions of Korean won)</i>	2022		2021	
	Carrying amount	Fair value	Carrying amount	Fair value
Non-marketable financial assets ²	495,484	495,484	340,823	340,823
Non-current derivative financial assets (currency forward)	89,475	89,475	54,918	54,918
Non-current derivative financial assets (excluding currency forward)	138,764	138,764	88,651	88,651
Non-current derivative financial assets (purchase of interests)	51,114	51,114	-	-
Financial liabilities (current)				
Trade and other payables	9,655,799	¹	7,733,916	¹
Current borrowings (excluding lease liabilities)	3,709,288	¹	3,405,215	¹
Current lease liabilities	95,079	²	71,865	³
Current derivative financial liabilities (currency forward)	5,870	5,870	-	-
Current derivative financial liabilities (excluding currency forward)	1,401	1,401	-	-
Financial liabilities (non-current)				
Non-current borrowings (excluding lease liabilities)	11,865,593	11,092,812	11,041,274	10,923,942
Non-current lease liabilities	294,559	³	247,380	³
Other non-current payables	43,708	²	15,623	¹
Non-current derivative financial liabilities (currency forward)	4,364	4,364	-	-
Non-current derivative financial liabilities (excluding currency forward)	21,178	21,178	126	126
Non-current derivative financial liabilities (purchase of interests)	7,777	7,777	-	-

¹ These financial assets and liabilities are not included in the disclosure above as their carrying amount is a reasonable approximation of the fair value.

² Fair values for these financial assets and liabilities are not disclosed above in accordance with related Korean IFRS.

³ Including some unmarketable financial assets for which acquisition cost is used as the best estimate of fair value.

(2) Fair value hierarchy

Items that are measured at fair value are categorized by the fair value hierarchy levels, and the defined levels are as follows:

- Quoted prices (unadjusted) in active markets for identical assets or liabilities that an entity can access at the measurement date (Level 1).
- All inputs other than quoted prices included in level 1 that are observable (either directly that is, prices, or indirectly that is, derived from prices) for the asset or liability (Level 2).
- Unobservable inputs for the asset or liability (Level 3).

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Fair value hierarchy classifications of the financial instruments that are measured at fair value or their fair value are disclosed as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (marketable financial assets)	462,330	-	-	462,330
Other non-current financial assets (non-marketable financial assets) ¹	-	-	495,484	495,484
Current derivative financial assets (excluding currency forward)	-	9,167	-	9,167
Non-current derivative financial assets (currency forward)	-	89,475	-	89,475
Non-current derivative financial assets (excluding currency forward)	-	138,764	-	138,764
Non-current derivative financial assets (purchase of interests)	-	-	51,114	51,114
Current derivative financial liabilities (currency forward)	-	5,870	-	5,870
Current derivative financial liabilities (excluding currency forward)	-	1,401	-	1,401
Non-current derivative financial liabilities (currency forward)	-	4,364	-	4,364
Non-current derivative financial liabilities (excluding currency forward)	-	21,178	-	21,178
Non-current derivative financial liabilities (purchase of interests)	-	-	7,777	7,777
Financial assets/liabilities not measured at fair value				
Non-current borrowings (excluding lease liabilities)	-	-	11,092,812	11,092,812

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<i>(in millions of Korean won)</i>	2021			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (marketable financial assets)	21,630	-	-	21,630
Other non-current financial assets (non-marketable financial assets) ¹	-	-	340,823	340,823
Current derivative financial assets (currency forward)	-	18,683	-	18,683
Current derivative financial assets (currency swap)	-	4,606	-	4,606
Non-current derivative financial assets (currency forward)	-	54,918	-	54,918
Non-current derivative financial assets (currency swap)	-	72,491	16,160	88,651
Non-current derivative financial liabilities (currency swap)	-	126	-	126
Financial assets/liabilities not measured at fair value				
Non-current borrowings (excluding lease liabilities)	-	-	10,923,942	10,923,942

¹ Acquisition costs of a part of these financial assets approximate their fair values. For fair values measured by using other methods, see (3) Valuation technique and the inputs.

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(3) Valuation technique and the inputs

Valuation techniques and inputs used in the fair value measurements categorized within Level 3 of the fair value hierarchy as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022				
	Fair value	Level	Valuation Technique	Inputs	Coverage of Level 3 inputs
Non-current derivative financial assets (purchase of interests)	46,555	3	Monte Carlo Simulation	Stock volatility of underlying assets	40.54%
				Stock price correlation coefficient	35.81%
				Volatility of Financial Indicators	44.11%
	4,559	3	Binominal option pricing model	Volatility	45.6%
Non-current derivative financial liabilities (purchase of interests)	7,777	3	Monte Carlo Simulation	Stock volatility of underlying assets	40.54%
				Stock price correlation coefficient	57.86%
				Volatility of Financial Indicators	21.90%
Other non-current financial assets (Unlisted shares)	132,686	3	Adjusted net asset method	-	-
Non-current borrowings (Excluding lease liabilities)	11,092,812	3	Discounted cash flows model	Discount rates	4.94%~5.33%

(in millions of Korean won)

	2021				
	Fair value	Level	Valuation Technique	Inputs	Coverage of Level 3 inputs
Other non-current financial assets (Unlisted shares)	97,121	3	Discounted cash flows model	Long-term growth rate through subsequent cash flows	1.00%
				Weighted average cost of equity	10.98% ~ 12.2%
Non-current derivative financial assets (Option)	16,160	3	Binominal option pricing model	Volatility	2.36 ~ 2.4%
Non-current borrowings (Excluding lease liabilities)	10,923,942	3	Discounted cash flows model	Discount rates	1.77% ~ 2.99%

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4. Critical Accounting Estimates and Assumptions

The preparation of financial statements requires the Group to make estimates and assumptions concerning the future. Management also needs to exercise judgement in applying the Group's accounting policies. Estimates and assumptions are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. The resulting accounting estimates may differ from the related actual results. The management's judgment and the estimates and assumptions of significant risk that may have adjustments to the carrying amounts of assets and liabilities in the following fiscal year are addressed as below.

(a) Impairment test of goodwill

The Group tests whether goodwill has suffered any impairment on an annual basis. The recoverable amount of a cash generating unit (CGU) is determined based on value-in-use or fair value less cost of disposal calculations (Note 12).

(b) Income taxes

If certain portion of the taxable income is not used for investments or increase in wages or dividends in accordance with the *Tax System for Recirculation of Corporate Income*, the Group is liable to pay additional income tax calculated based on the tax laws. Accordingly, the measurement of current and deferred income tax is affected by the tax effects from the new tax system. As the Group's income tax is dependent on the investments, increase in wages and dividends, there is an uncertainty measuring the final tax effects.

(c) Provisions

The Group recognizes provisions for product warranties as explained in Note 15. These provisions are estimated based on the past experience. Provisions related to voluntary recall by the Group's customer are estimated based on the number of vehicles subject to recall, estimated total repair costs, and cost sharing ratio.

(d) Fair value of financial instruments

The fair value of financial instruments that are not traded in an active market is determined by using valuation techniques. The Group uses its judgment to select a variety of methods and make assumptions that are mainly based on market conditions existing at the end of each reporting period (Note 3.3).

(e) Impairment of financial assets

The provision for impairment for financial assets are based on assumptions about risk of default and expected loss rates. The Group uses judgement in making these assumptions and selecting the inputs to the impairment calculation based on the Group's past experience, existing market conditions as well as forward looking estimates at the end of each reporting period (Note 3.1.(2)).

(f) Net defined benefit liabilities

The present value of net defined benefit liability depends on a number of factors that are determined on an actuarial basis using a number of assumptions including the discount rate (Note 16).

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(g) Leases

In determining the lease term, management considers all facts and circumstances that create an economic incentive to exercise an extension option, or not exercise a termination option. Extension options (or periods after termination options) are only included in the lease term if the lease is reasonably certain to be extended (or not terminated).

The lease term is reassessed if an option is actually exercised (or not exercised) or the Group becomes obliged to exercise (or not exercise) it. The assessment of reasonable certainty is only revised if a significant event or a significant change in circumstances occurs, which affects this assessment, and that is within the control of the lessee.

(h) Valuation of Inventories

Inventories are stated at the lower of cost and net realizable value which is determined on the estimated selling price and the estimated costs necessary to make the sale. The assessment of slow-moving inventories is made of net realizable value estimated with the market circumstances and the historical experience.

(i) Impairment assessment of CGU

The recoverable amount of a cash-generating unit used in the impairment assessment of Property, Plant and Equipment and Intangible Assets is determined with the value in use.

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5. Financial Instruments by Category

Categorizations of financial instruments as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

Financial assets	2022				Total
	Financial assets at amortized cost	Financial assets at fair value through profit or loss	Financial assets at fair value through other comprehensive income	Other financial assets ¹	
Cash and cash equivalents	8,497,882	-	-	-	8,497,882
Trade receivables	6,919,243	-	531,152	-	7,450,395
Non-current trade receivables	120,698	-	-	-	120,698
Other receivables	741,000	-	1,431	-	742,431
Other non-current receivables	617,444	-	-	-	617,444
Other current financial assets	-	-	-	9,167	9,167
Other non-current financial assets	-	245,459	712,355	279,353	1,237,167
Total	16,896,267	245,459	1,244,938	288,520	18,675,184

(in thousands of Korean won)

Financial liabilities	2022		Total
	Financial liabilities at amortized cost	Other financial liabilities ²	
Trade payables	4,756,246	-	4,756,246
Other payables	4,899,553	-	4,899,553
Borrowings (current)	3,709,288	95,079	3,804,367
Other current financial liabilities	-	7,271	7,271
Other non-current financial liabilities	-	33,319	33,319
Other non-current payables	43,708	-	43,708
Borrowings (non-current)	11,865,593	294,559	12,160,152
Total	25,274,388	430,228	25,704,616

(in millions of Korean won)

Financial assets	2021				Total
	Financial assets at amortized cost	Financial assets at fair value through profit or loss	Financial assets at fair value through other comprehensive income	Other financial assets ¹	
Cash and cash equivalents	3,760,834	-	-	-	3,760,834
Trade receivables	5,898,369	-	488,610	-	6,386,979
Non-current trade receivables	67,055	-	-	-	67,055
Other receivables	1,047,224	-	1,325	-	1,048,549
Other non-current receivables	713,166	-	-	-	713,166
Other current financial assets	-	-	-	23,289	23,289
Other non-current financial assets	-	160,145	202,308	143,569	506,022
Total	11,486,648	160,145	692,243	166,858	12,505,894

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(in thousands of Korean won)

Financial liabilities	2021		Total
	Financial liabilities at amortized cost	Other financial liabilities ²	
Trade payables	3,742,132	-	3,742,132
Other payables	3,991,784	-	3,991,784
Borrowings (current)	2,954,262	522,818	3,477,080
Other non-current financial liabilities	-	126	126
Other non-current payables	15,623	-	15,623
Borrowings (non-current)	11,041,274	247,380	11,288,654
Total	21,745,075	770,324	22,515,399

¹ Other financial assets include derivative assets that are not subject to the categorizations.

² Other financial liabilities include lease liabilities, derivative liabilities and negotiated borrowings that are not subject to the categorizations.

Net gains or losses on each category of financial instruments for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2021	2020
Dividend income		
Financial assets at fair value through other comprehensive income	1,979	7,376
(Reversal of) Impairment losses		
Financial assets at amortized cost	(331)	127
Interest income		
Financial assets at amortized cost	265,289	75,658
Interest expense		
Financial liabilities at amortized cost	(305,255)	(246,714)
Other financial liabilities	(9,495)	(8,653)
Financial assets at amortized cost ¹	(8,380)	(507)
Financial assets at fair value through other comprehensive income ¹	-	(998)
Gain (loss) on valuation/disposal		
Financial assets at fair value through profit or loss	7,141	29,810
Financial assets at fair value through other comprehensive income	(62,993)	15,990
Derivative instruments	58,252	177,157
Exchange differences		
Financial assets at amortized cost	451,191	434,624
Financial liabilities at amortized cost	(598,297)	(390,429)
Derivative instruments	3,122	-
Other financial liabilities	(16,795)	(1,548)

¹ Fees paid to financial institutions for factoring.

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6. Cash and Cash Equivalents

Details of cash and cash equivalents as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Bank deposits and cash on hand	1,640,251	1,943,818
Deposits held by financial institutions and others	6,857,631	1,817,016
Total	<u>8,497,882</u>	<u>3,760,834</u>

As at December 31, 2022, cash and cash equivalents include ₩32,908 million which is subject to a restriction on the use in association with the national R&D projects.

7. Trade and Other Receivables

Trade and other receivables and its provisions for impairment, as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables	7,455,412	(5,017)	7,450,395
Non-current trade receivables	120,698	-	120,698
Other current receivables	743,113	(682)	742,431
Other non-current receivables	617,444	-	617,444
Total	<u>8,936,667</u>	<u>(5,699)</u>	<u>8,930,968</u>

<i>(in millions of Korean won)</i>	2021		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables	6,392,073	(5,094)	6,386,979
Non-current trade receivables	67,055	-	67,055
Other current receivables	1,050,714	(2,165)	1,048,549
Other non-current receivables	713,166	-	713,166
Total	<u>8,223,008</u>	<u>(7,259)</u>	<u>8,215,749</u>

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Details of other receivables as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Current		
Non-trade receivables	487,646	865,984
Deposits held by financial institutions	14,448	64,583
Accrued income	68,294	31,955
Loans	129,908	65,266
Guarantee deposits provided	42,135	20,761
	<u>742,431</u>	<u>1,048,549</u>
Non-current		
Non-trade receivables	30,793	29,195
Deposits held by financial institutions ¹	277,210	267,116
Loans	207,247	330,643
Guarantee deposits provided	102,194	86,212
	<u>617,444</u>	<u>713,166</u>
Total	<u>1,359,875</u>	<u>1,761,715</u>

¹ As at December 31, 2022, ₩266,100 million (2021: ₩266,100 million) is withdrawal restricted in relation to large, small and medium-sized companies cooperation agreement, ₩123 million is restricted in use to be retained in connection with maintaining checking accounts (2021: ₩120 million), and ₩10,000 million is restricted in use to be retained in connection with employee loan deposits. Also, PLN 3 million is withdrawal restricted in relation to overseas transportation of hazardous waste.

The aging analysis of trade and other receivables as at December 31, 2022 and 2021, is as follows:

<i>(in millions of Korean won)</i>	2022		2021	
	Trade receivables	Other receivables	Trade receivables	Other receivables
Receivables not past due	<u>7,349,259</u>	<u>1,309,179</u>	<u>6,118,779</u>	<u>1,690,123</u>
Past due but not impaired				
Up to 3 months	223,992	50,696	338,693	71,592
Between 3-6 months	220,785	31,873	236,860	70,136
Over 6 months	2,445	10,989	15,811	457
	<u>762</u>	<u>7,834</u>	<u>86,022</u>	<u>999</u>
Impaired receivables	<u>2,859</u>	<u>682</u>	<u>1,656</u>	<u>2,165</u>
Total	<u>7,576,110</u>	<u>1,360,557</u>	<u>6,459,128</u>	<u>1,763,880</u>

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Movements on the provision for impairment of trade and other receivables for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	5,094	-	2,165	-
Reversal	-	-	(331)	-
Business combination (Note 37)	724	-	-	-
Write-off	(849)	-	(1,152)	-
Exchange differences	48	-	-	-
Ending balance	5,017	-	682	-

(in millions of Korean won)

	2021			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	4,391	-	2,165	-
Reversal	(127)	-	-	-
Business combination (Note 37)	-	-	-	-
Write-off	(447)	-	-	-
Exchange differences	1,277	-	-	-
Ending balance	5,094	-	2,165	-

As at December 31, 2022 and 2021, the carrying amounts of trade and other receivables are approximation of their fair values.

The Group transferred trade and other receivables to financial institutions for ₩201,640 million as at December 31, 2022 (2021: ₩3,469 million), and derecognized the trade and other receivables from the financial statements at the date of disposal, as substantial all the risks and rewards were transferred.

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8. Other Financial Assets and Liabilities

Details of other financial assets and liabilities as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Other financial assets		
Financial assets at fair value through other comprehensive income (derivative instruments) (current)	9,167	4,606
Financial assets at fair value through profit or loss (derivative instruments) (current)	-	18,683
Financial assets at fair value through other comprehensive income (derivative instruments) (non-current)	4,764	1,305
Financial assets at fair value through other comprehensive income (excluding derivative instruments) (non-current)	712,355	202,308
Financial assets at fair value through profit or loss (derivative instruments) (non-current)	274,589	142,264
Financial assets at fair value through profit or loss (excluding derivative instruments) (non-current)	245,459	160,145
	<u>1,246,334</u>	<u>529,311</u>
Other financial liabilities		
Financial liabilities at fair value through other comprehensive income (derivative instruments) (current)	1,401	-
Financial liabilities at fair value through profit or loss (derivative instruments) (current)	5,870	-
Financial liabilities at fair value through other comprehensive income (derivative instruments) (non-current)	742	126
Financial liabilities at fair value through profit or loss (derivative instruments) (non-current)	32,577	-
	<u>40,590</u>	<u>126</u>

Changes in equity and debt instruments included in other financial assets for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Beginning balance	362,452	81,532
Acquisitions / transfer	680,284	248,354
Disposals	(32,578)	(16,388)
Gain (loss) on valuation through other comprehensive income (before income tax effects)	(51,355)	15,990
Gain (loss) on valuation through profit or loss	(4,761)	29,810
Exchange differences on translation of foreign operations	4,018	3,154
Ending balance	<u>958,060</u>	<u>362,452</u>

During the years ended December 31, 2022 and 2021, the Group did not recognize impairment for other financial assets.

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9. Inventories

Details of inventories as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022		
	Gross amount	Valuation allowance	Carrying amount
Merchandise	379,412	(29,242)	350,170
Finished / Semi-finished products	7,186,610	(333,643)	6,852,967
Work-in-process	32,439	-	32,439
Raw materials	3,004,491	(44,344)	2,960,147
Supplies	307,117	-	307,117
Materials-in-transit	1,377,791	-	1,377,791
Total	12,287,860	(407,229)	11,880,631

(in millions of Korean won)

	2021		
	Gross amount	Valuation allowance	Carrying amount
Merchandise	192,580	(6,131)	186,449
Finished / Semi-finished products	4,715,464	(233,613)	4,481,851
Work-in-process	25,587	-	25,587
Raw materials	2,040,432	(24,104)	2,016,328
Supplies	266,487	-	266,487
Materials-in-transit	1,306,772	-	1,306,772
Total	8,547,322	(263,848)	8,283,474

During the year ended December 31, 2022, the cost of inventories recognized as expense and included in 'cost of sales' amounted to ₩ 32,772,084 million (2021: ₩23,830,865 million).

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10. Investments in Associates and Joint Ventures

Changes in investments in associates and joint ventures for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)	2022							
	Beginning balance	Acquisitions / transfer	Dividends	Share of profit (loss) of associates and joint ventures	Share of other comprehensive income (loss) of associates and joint ventures	Impairment / disposals	Others	Ending balance
VINA Plasticizers Chemical Co.,Ltd. ¹	12,822	-	-	2,239	1,761	-	(16,822)	-
TECHWIN Co., Ltd.	19,024	-	-	(2,447)	(51)	-	-	16,526
SEETEC Co., Ltd	134,843	-	(5,000)	4,946	-	-	(307)	134,482
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	(579)	-
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	(150)	-
LG Life Sciences Poland Ltd.	17	-	-	-	-	-	-	17
HUAJIN NEW ENERGY MATERIALS(QUZHOU)C O., LTD.	93,835	-	-	(8,879)	(3,777)	-	-	81,179
VINFAST LITHIUM BATTERY PACK LIMITED LIABILITY COMPANY	3,769	-	-	(1,611)	270	-	-	2,428
Jiangxi VL Battery Co.,Ltd	20,310	-	-	(6,820)	(167)	-	-	13,323
PT.HLI Green Power	201,488	-	-	(28,210)	14,667	-	-	187,945
TL Chemical CO., Ltd	48,473	-	-	(657)	-	-	-	47,816
LG Toray Hungary Battery Separator Kft.	-	445,628	-	(4,334)	4,705	-	-	445,999
KOREA PRECURSOR CO.,LTD.	-	20,384	-	(442)	(104)	-	-	19,838
	<u>535,310</u>	<u>466,012</u>	<u>(5,000)</u>	<u>(46,215)</u>	<u>17,304</u>	<u>-</u>	<u>(17,858)</u>	<u>949,553</u>

¹ During the year ended December 31, 2022, the Group reclassified the shares of VINA Plasticizers Chemical Co., Ltd. amounting to ₩16,822 million as assets held for sale.

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	2021							Ending balance
	Beginning balance	Acquisitio ns / transfer	Dividends	Share of profit (loss) of associates and joint ventures	Share of other comprehensiv e income (loss) of associates and joint ventures	Impairment / disposals	Others	
VINA Plasticizers Chemical Co., Ltd.	5,875	-	(334)	7,204	77	-	-	12,822
HL Greenpower Co., Ltd.	22,710	-	-	1,847	-	(24,323)	(234)	-
TECHWIN Co., Ltd.	20,113	-	-	(1,106)	17	-	-	19,024
SEETEC Co., Ltd	140,116	-	(10,000)	4,727	-	-	-	134,843
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	-	579
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	-	150
FJ Composite Materials Co., LTD.	2,737	-	-	(544)	652	(2,576)	(269)	-
WUXI CL New Energy Technology Ltd	-	-	-	-	-	-	-	-
LG Chem Life Sciences Poland Ltd.	17	-	-	-	-	-	-	17
Combustion Synthesis Co., Ltd.	1,867	-	-	273	(106)	(1,969)	(65)	-
HUAJIN NEW ENERGY MATERIALS(QUZHOU)C O., LTD.	89,525	-	-	(5,537)	9,847	-	-	93,835
VINFAST LITHIUM BATTERY PACK LIMITED LIABILITY COMPANY	4,179	-	-	(730)	320	-	-	3,769
Jiangxi VL Battery Co.,Ltd	21,461	-	-	(3,471)	2,320	-	-	20,310
PT.HLI Green Power	-	209,132	-	(9,201)	1,557	-	-	201,488
TL Chemical CO., Ltd	-	48,544	-	(71)	-	-	-	48,473
	<u>309,329</u>	<u>257,676</u>	<u>(10,334)</u>	<u>(6,609)</u>	<u>14,684</u>	<u>(28,868)</u>	<u>(568)</u>	<u>535,310</u>

Summarized financial information of associates and joint ventures as of December 31, 2022 and 2021 are disclosed in Note 1.3 and Note 1.4.

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The tables below provide a reconciliation of the summarized financial information presented to the carrying amount of its interest in the joint ventures or associates:

<i>(in millions of Korean won)</i>	2022					
	Net Asset (a)	Group's share in % (b)	Group's share in KRW (a x b)	Investment difference	Intercompany transactions, etc.	Carrying amount
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	167,236	49	81,946	-	(767)	81,179
SEETEC Co., Ltd.	276,826	50	138,412	(3,470)	(460)	134,482
LG Toray Hungary Battery Separator Kft.	749,309	50	374,655	71,344	-	445,999
PT.HLI Green Power	440,626	50	220,313	-	(32,368)	187,945

<i>(in millions of Korean won)</i>	2021					
	Net Asset (a)	Group's share in % (b)	Group's share in KRW (a x b)	Investment difference	Intercompany transactions, etc.	Carrying amount
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	192,621	49	94,384	-	(549)	93,835
SEETEC Co., Ltd.	276,012	50	138,006	(3,470)	307	134,843
PT.HLI Green Power	402,975	50	201,488	-	-	201,488

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11. Property, Plant and Equipment

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

	2022											
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Right-of-use assets	Construction-in-progress	Machinery-in-transit	Total
Beginning balance	1,851,637	5,444,946	1,275,184	10,357,706	13,211	771,272	262,375	185,957	377,209	3,745,602	93,160	24,378,259
Cost	1,888,589	6,604,140	2,048,100	23,410,612	41,694	1,840,714	605,971	490,049	535,460	3,828,841	93,160	41,387,330
Accumulated depreciation	-	(1,114,990)	(742,272)	(12,904,400)	(28,388)	(1,064,130)	(340,646)	(298,174)	(158,226)	-	-	(16,651,226)
Accumulated impairment	(36,952)	(44,204)	(30,644)	(148,506)	(95)	(5,312)	(2,950)	(5,918)	(25)	(83,239)	-	(357,845)
Business combination (Note 37)	-	-	167	2,464	-	-	3	-	4,617	-	-	7,251
Acquisitions/transfer	154,638	1,741,647	164,047	3,029,289	6,004	491,589	276,401	215,170	223,816	8,964,447	143,651	15,410,699
Disposals/transfer	(31,738)	(21,197)	(7,703)	(46,556)	(105)	(26,393)	(2,594)	(2,891)	(72,397)	(6,517,021)	(108,802)	(6,837,397)
Exchange differences	(250)	(43,602)	(4,934)	(104,966)	(124)	(6,229)	(3,459)	-	(106,599)	(14,242)	-	(138,953)
Depreciation	-	(189,704)	(79,011)	(2,247,581)	(3,855)	(264,233)	(90,652)	(121,495)	9	-	-	(3,103,130)
Impairment	-	(1,219)	(895)	(33,313)	(141)	(2,898)	(175)	(163)	-	-	-	(38,804)
Reversal of impairment	-	-	-	705	-	-	-	-	-	4	-	709
Transfer to non-current assets held for sale	(9,869)	(581)	(457)	(2,172)	-	(121)	(96)	-	-	(2,595)	-	(15,891)
Ending balance	1,964,418	6,930,290	1,346,398	10,955,576	14,990	962,987	441,803	276,578	465,499	6,176,195	128,009	29,662,743
Cost	2,001,370	8,272,652	2,181,125	25,948,544	45,823	2,201,510	848,431	678,499	721,164	6,258,282	128,009	49,285,409
Accumulated depreciation	-	(1,297,878)	(803,560)	(14,821,068)	(30,726)	(1,231,443)	(403,726)	(395,840)	(255,665)	-	-	(19,239,906)
Accumulated impairment	(36,952)	(44,484)	(31,167)	(171,900)	(107)	(7,080)	(2,902)	(6,081)	-	(82,087)	-	(382,760)

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(in millions of Korean won)	2021											
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Right-of- use assets	Construction -in-progress	Machinery -in-transit	Total
Beginning balance	1,772,039	4,821,014	985,190	7,573,016	9,920	645,341	185,213	112,295	230,854	3,886,682	345,911	20,567,475
Cost	1,808,991	5,794,729	1,677,231	18,812,951	36,372	1,579,923	511,358	413,150	348,412	3,968,793	345,911	35,297,821
Accumulated depreciation	-	(931,321)	(667,122)	(11,062,720)	(26,346)	(922,831)	(322,812)	(294,937)	(117,522)	-	-	(14,345,611)
Accumulated impairment	(36,952)	(42,394)	(24,919)	(177,215)	(106)	(11,751)	(3,333)	(5,918)	(36)	(82,111)	-	(384,735)
Business combination (Note 37)	69,872	84,333	3,336	77,349	1,089	4,501	1,255	-	7,482	911	-	250,128
Acquisitions/ transfer	30,821	590,203	351,122	4,472,368	5,501	361,060	148,227	181,304	217,014	6,025,137	129,251	12,512,008
Disposals/ transfer	(21,952)	(9,980)	(2,935)	(78,168)	(363)	(35,340)	(14,293)	-	(12,661)	(6,309,583)	(378,865)	(6,864,140)
Exchange differences	857	118,509	16,713	246,941	228	15,547	4,641	-	14,391	143,131	-	560,958
Depreciation	-	(157,125)	(71,822)	(1,916,345)	(3,164)	(218,880)	(62,609)	(107,642)	(79,871)	-	-	(2,617,458)
Impairment	-	(2,008)	(6,420)	(17,455)	-	(957)	(59)	-	-	(676)	(3,137)	(30,712)
Ending balance	1,851,637	5,444,946	1,275,184	10,357,706	13,211	771,272	262,375	185,957	377,209	3,745,602	93,160	24,378,259
Cost	1,888,589	6,604,140	2,048,100	23,410,612	41,694	1,840,714	605,971	490,049	535,460	3,828,841	93,160	41,387,330
Accumulated depreciation	-	(1,114,990)	(742,272)	(12,904,400)	(28,388)	(1,064,130)	(340,646)	(298,174)	(158,226)	-	-	(16,651,226)
Accumulated impairment	(36,952)	(44,204)	(30,644)	(148,506)	(95)	(5,312)	(2,950)	(5,918)	(25)	(83,239)	-	(357,845)

During the year ended December 31, 2022, the Group capitalized ₩20,061 million of borrowing costs (2021: ₩45,890 million) in relation to acquisition of property, plant and equipment, on property, plant and equipment. The capitalization rate of borrowings used to determine the amount of borrowing costs eligible for capitalization is 1.66% (2021: 1.32%).

Line items including depreciation in the consolidated statements of profit or loss for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)	2022	2021
Cost of sales	2,808,076	2,366,918
Selling and administrative expenses	292,694	243,166
Others	1,148	1,024
Discontinued operations	1,212	6,350
Total	3,103,130	2,617,458

Lease

(i) Amounts recognized in the consolidated statement of financial position

The consolidated statement of financial position shows the following amounts relating to leases:

(in millions of Korean won)	2022	2021
Right-of-use assets ¹		
Real-estate	382,714	329,920

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Machinery	50,078	23,258
Vehicles	29,935	21,475
Tools	2,204	2,083
Equipment	568	473
	<u>465,499</u>	<u>377,209</u>

¹ Included in the line item 'property, plant and equipment' in the consolidated statements of financial position.

Additions to the right-of-use assets during the year ended December 31, 2022, were ₩228,433 million (2021: ₩217,014 million).

<i>(in millions of Korean won)</i>	2022	2021
Lease liabilities ¹		
Current	95,079	71,865
Non-current	294,559	247,380
	<u>389,638</u>	<u>319,245</u>

¹ Included in the line item 'borrowings' in the consolidated statements of financial position.

(ii) Amounts recognized in the consolidated statement of profit or loss

The consolidated statement of profit or loss shows the following amounts relating to leases:

<i>(in millions of Korean won)</i>	2022	2021
Depreciation of right-of-use assets		
Real-estate	79,287	57,810
Machinery	6,950	5,698
Vehicles	17,914	14,320
Tools	2,055	1,461
Equipment	393	433
	<u>106,599</u>	<u>79,722</u>
Interest expense relating to lease liabilities (included in finance cost)	9,495	8,653
Expense relating to short-term leases (included in cost of goods sold and administrative expenses)	27,475	26,932
Expense relating to leases of low-value assets that are not short-term leases (included in cost of goods sold and administrative expenses)	15,084	12,927

The total cash outflow for leases during the year ended December 31, 2022, was ₩ 147,857 million (2021: ₩124,153 million).

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12. Intangible Assets

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

<i>(in millions of Korean won)</i>	2022						Total
	Development costs	Software	Industrial property rights	Goodwill	Memberships	Others	
Beginning balance	49,950	632,045	641,366	803,924	35,120	281,898	2,444,303
Business combination (Note 37)	-	1,504	-	-	-	-	1,504
Acquisitions/ transfer	87	436,564	133,995	-	13,965	13,997	598,608
Disposals/transfer	-	(22,879)	(2,509)	-	(15,712)	(394)	(41,494)
Exchange differences	-	1,936	1,028	1,452	1,294	(1,505)	4,205
Amortization	(6,106)	(190,779)	(65,781)	-	-	(28,255)	(290,921)
Impairment	(274)	(125)	(62)	(18,998)	-	(6,539)	(25,998)
Transfer to assets held for sale (Note 34)	-	(4)	-	-	-	-	(4)
Ending balance	43,657	858,262	708,037	786,378	34,667	259,202	2,690,203

<i>(in millions of Korean won)</i>	2021						Total
	Development costs	Software	Industrial property rights	Goodwill	Memberships	Others	
Beginning balance	55,857	466,358	604,661	887,037	31,589	234,415	2,279,917
Business combination (Note 37)	-	904	642	202,568	-	47,742	251,856
Acquisitions/ transfer	10	298,839	97,409	-	3,583	27,239	427,080
Additions – internal development	220	-	-	-	-	-	220
Disposals/transfer	-	(3,773)	(4,611)	(4,112)	(110)	(2,819)	(15,425)
Exchange differences	-	2,701	2,631	13,349	58	4,303	23,042
Amortization	(6,137)	(132,924)	(58,602)	-	-	(25,515)	(223,178)
Impairment	-	(60)	(404)	(294,918)	-	(3,467)	(298,849)
Transfer to assets held for sale (Note 34)	-	-	(360)	-	-	-	(360)
Ending balance	49,950	632,045	641,366	803,924	35,120	281,898	2,444,303

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Line items including amortization of intangible assets for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Cost of sales	60,635	54,611
Selling and administrative expenses	230,279	168,384
Discontinued operations	7	183
Total	<u>290,921</u>	<u>223,178</u>

The Group recognized total research and development costs of ₩1,764,788 million (2021: ₩1,357,398 million) as expenses.

Details of greenhouse gas emission permits included in other intangible assets are as follows:

Greenhouse gas emission permits held for the purpose of fulfilling obligations

The number of greenhouse gas emission permits received at free of charge for the 3rd planning period (2021 to 2025) is as follows:

<i>(in thousands of tons)</i>	2021	2022	2023	2024	2025	Total
Allocation with nil consideration	10,113	9,417	9,417	9,329	9,329	47,605

Changes in greenhouse gas emission permits during the years ended December 31, 2022 and 2021, are as follows:

<i>(in thousands of tons and millions of Korean won)</i>	2022							
	2020		2021		2022		2023	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance								
/Allocation with nil consideration	8,666	-	10,113	-	9,417	-	9,417	-
Purchase/Sale	(69)	1,111	(285)	(20)	(249)	-	-	-
Exchange	100	-	(100)	-	-	-	-	-
Issuance of offset emission permits	-	-	-	-	119	-	-	-
Borrowings/Carry forwards between years	(49)	(388)	(392)	388	441	-	-	-
Surrendered to the government	(8,648)	(723)	(9,336)	(368)	-	-	-	-
Ending balance	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>9,728</u>	<u>-</u>	<u>9,417</u>	<u>-</u>

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<i>(in thousands of tons and millions of Korean won)</i>	2022					
	2024		2025		Total	
	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance / Allocation with nil consideration	9,329	-	9,329	-	56,271	-
Purchase/Sale	-	-	-	-	(603)	1,091
Exchange	-	-	-	-	-	-
Issuance of offset emission permits	-	-	-	-	119	-
Borrowings/Carry forwards between years	-	-	-	-	-	-
Surrendered to the government	-	-	-	-	(17,984)	(1,091)
Ending balance	9,329	-	9,329	-	37,803	-

<i>(in thousands of tons and millions of Korean won)</i>	2021							
	2020		2021		2022		2023	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance /Allocation with nil consideration	8,666	-	9,405	-	9,430	-	9,430	-
Purchase/Sale	(69)	1,111	(54)	-	-	-	-	-
Exchange	100	-	(100)	-	-	-	-	-
Borrowings/Carry forwards between years	(49)	(388)	49	388	-	-	-	-
Surrendered to the government	(8,648)	(723)	-	-	-	-	-	-
Ending balance	-	-	9,300	388	9,430	-	9,430	-

<i>(in thousands of tons and millions of Korean won)</i>	2021					
	2024		2025		Total	
	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance / Allocation with nil consideration	9,343	-	9,343	-	55,617	-
Purchase/Sale	-	-	-	-	(123)	1,111
Exchange	-	-	-	-	-	-
Borrowings/Carry forwards between years	-	-	-	-	-	-
Surrendered to the government	-	-	-	-	(8,648)	(723)
Ending balance	9,343	-	9,343	-	46,846	388

During the years ended December 31, 2022 and 2021, there are no greenhouse gas emission permits held for short-term trading purpose.

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Details of Greenhouse gas emission permits included in other intangible assets of consolidated financial statements regarding to EU ETS(Emissions Trading System) are as follows:

(in thousands of tons and
millions of Korean won)

	2022			
	2021		2022	
	Quantity	Amount	Quantity	Amount
Beginning balance / Allocation with nil consideration	-	-	-	-
Purchase/Sale	35	3,585	78	7,902
Surrendered to the government	(34)	(3,792)	-	-
Borrowings/Carry forwards between years	-	1	-	33
Ending balance	1	67	78	7,935

Goodwill is allocated to the Group's CGUs identified for each operating segment. The carrying amounts of goodwill allocation by CGUs as at December 31, 2022 and 2021, are as follows:

(in millions of
Korean won)

	2022						Total
	Acquisition of NanoH2O Co., Ltd.	Acquisition of FarmHannong Co., Ltd.	Acquisition of LG Life Sciences, Ltd.	Acquisition of Uniseal, Inc.	Acquisition of CEM business	Others	
Petrochemicals							
NCC	-	-	-	-	-	-	-
ABS ¹	-	-	-	-	-	17,867	17,867
PO	-	-	-	-	-	1,092	1,092
PVC	-	-	-	-	-	1,271	1,271
Acrylic	-	-	-	-	-	25,817	25,817
Plasticizer	-	-	-	-	-	89	89
BPA	-	-	-	-	-	495	495
Others	-	-	-	-	-	1,712	1,712
Advanced Materials							
RO ¹	108,814	-	-	-	-	-	108,814
Separator ^{1,3}	-	-	-	-	178,191	-	178,191
VCF ³	-	-	-	-	5,183	-	5,183
Prism ^{2,3}	-	-	-	-	-	-	-
Life Sciences							
Life sciences	-	-	391,311	-	-	-	391,311
Common and others							
FarmHannong Co., Ltd.	-	3,091	-	-	-	-	3,091
Adhesive ¹	-	-	-	51,445	-	-	51,445
Total	108,814	3,091	391,311	51,445	183,374	48,343	786,378

¹ Included changes resulting from foreign currency translation.

² During the year ended December 31, 2022, the Group recognized ₩18,998 million of impairment against goodwill allocated to Prism Sheet business acquired due to the acquisition of CEM business.

³ Goodwill related to CEM business acquired in the prior year has been allocated to the relevant CGUs during the year ended December 31, 2022.

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(in millions of
Korean won)

	2021						
	Acquisition of NanoH2O Co., Ltd.	Acquisition of FarmHannong Co., Ltd.	Acquisition of LG Life Sciences, Ltd.	Acquisition of Uniseal, Inc.	Acquisition of CEM business	Others	Total
Petrochemicals							
NCC	-	-	-	-	-	2,639	2,639
ABS ¹	-	-	-	-	-	14,657	14,657
PO	-	-	-	-	-	1,054	1,054
PVC	-	-	-	-	-	808	808
Acrylic	-	-	-	-	-	25,572	25,572
Plasticizer	-	-	-	-	-	53	53
BPA	-	-	-	-	-	467	467
Others	-	-	-	-	-	1,350	1,350
Advanced Materials							
RO ¹	111,453	-	-	-	-	-	111,453
PSAA ²	-	-	-	-	-	-	-
Separator ^{1,3}	-	-	-	-	203,344	-	203,344
Life Sciences							
Life sciences ⁴	-	-	391,311	-	-	-	391,311
Common and others							
FarmHannong Co.,Ltd.	-	3,091	-	-	-	-	3,091
Adhesive ¹	-	-	-	48,125	-	-	48,125
Total	111,453	3,091	391,311	48,125	203,344	46,600	803,924

¹ Included changes resulting from foreign currency translation.

² During 2021, the Group has sold PSAA business.

³ During 2021, the Group recognized goodwill in relation to the acquisition of CEM business.

⁴ During 2021, the Group recognized ₩ 294,918 million of impairment against goodwill recognized in relation to the acquisition of LG Life Sciences, Ltd.

The recoverable amounts of CGUs have been determined based on value-in-use. Value-in-use calculations use pre-tax cash flow projections based on financial budgets approved by management covering a five-year period. Fair value less cost of disposal reflects expectation of future business and usage pattern of assets from the perspective of market participants. Management determined the estimated pre-tax cash flow based on past performance and its expectations of market development.

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During 2022, key assumptions used for calculation of value in use and fair value less cost of disposal are as follows:

<i>(in millions of Korean won)</i>	2022	
	Pre-tax discount rate	Growth rate for subsequent years after five years
NCC/ABS/PO/PVC/Plasticizer/BPA/others	8.3%	0.0%
Acrylic	8.5%	0.0%
RO fliter	11.3%	1.0%
FarmHannong	10.3%	1.0%
LG Life Sciences	11.6%	3.0%
Uniseal, Inc.	14.8%	2.0%
ABS	15.8%	0.0%
Separator	12.5%	1.0%
VCF	17.7%	2.0%
Prism	12.6%	0.0%

The results of the sensitivity analysis for the recoverable value of disposal calculation of Life Sciences CGU are as follows:

<i>(in millions of Korean won)</i>	0.5% Increase	0.5% Decrease
Discount rate		
Increase (decrease) in recoverable value	(130,450)	151,874
Growth rate		
Increase (decrease) in recoverable value	101,255	(87,072)

Had the discount rate been 0.5% higher than the management's estimate, the Group should have recognized impairment loss of ₩6,345 million for the carrying value of goodwill.

The results of the sensitivity analysis for the recoverable value of Uniseal (Adhesive) CGU are as follows:

<i>(in millions of Korean won)</i>	0.5% Increase	0.5% Decrease
Discount rate		
Increase (decrease) in recoverable value	(8,514)	9,463
Growth rate		
Increase (decrease) in recoverable value	5,775	(5,212)

Had the discount rate been 0.5% higher than the management's estimate, the Group should have recognized impairment loss of ₩6,514 million for the carrying value of goodwill. Also, had the growth rate been 0.5% lower than the management's estimate, the Group should have recognized impairment loss of ₩3,212 million for the carrying value of goodwill.

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Impairment test on intangible assets other than goodwill

The impairment losses for intangible assets other than goodwill that the Group recognized during the year are as follows:

(in millions of Korean won)

	2022			Total
	Development costs	Industrial property rights	Other intangible assets	
Acquisition of Prism	-	-	6,539	6,539
	-	-	6,539	6,539

13. Other Current and Non-Current Assets

Details of other current and non-current assets as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022	2021
Current		
Prepayments to suppliers and prepaid expenses	455,013	201,019
Prepaid value added tax	293,627	465,660
Others	264,823	82,353
Total	1,013,463	749,032
Non-current		
Net defined benefit assets	618,049	45,050
Long-term prepayments and long-term prepaid expenses	143,876	70,775
Others	138	96
Total	762,063	115,921

14. Borrowings

Borrowings as at December 31, 2022 and 2021, consist of:

(in millions of Korean won)

	2022	2021
Current		
Short-term borrowings	1,402,367	1,688,383
Current portion of long-term borrowings of bank loans	921,928	1,056,963
Current portion of debentures	1,384,993	659,869
Finance lease liabilities	95,079	71,865
	3,804,367	3,477,080
Non-current		
Long-term borrowings	5,285,629	3,628,563
Debentures	6,579,964	7,412,711
Lease liabilities	294,559	247,380
	12,160,152	11,288,654
Total	15,964,519	14,765,734

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Details of short- and long-term borrowings and debentures as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)	Currency	Bank	Latest maturity date	Interest rate(%) as at December 31, 2022	2022		2021	
					Current	Non-current	Current	Non-current
Short-term borrowings								
Bank loans	Foreign currency	KDB Bank	2023-11-26	5.56 and others	1,402,367	-	1,237,430	-
Negotiated borrowings in foreign currency	Foreign currency	KB Kookmin Bank and others	2022-12-17	3M EURIBOR + 0.50 and others	-	-	450,953	-
Total					1,402,367	-	1,688,383	-
Long-term borrowings								
Bank loans	Korean won	KDB Bank and others	2028-11-01	3.05 and others	-	500,000	-	450,000
	Foreign currency	KDB Bank and others	2029-01-11	3M LIBOR + 0.95 and others	921,928	4,786,280	1,056,963	3,178,563
Less: discount on long-term borrowings					-	(651)	-	-
Total					921,928	5,285,629	1,056,963	3,628,563
Debentures								
Public debentures	Korean won	KB Securities Co., Ltd and others	2036-02-19	3.29 and others	710,000	3,540,000	660,000	4,250,000
Private debentures	Korean won	KB Securities Co., Ltd and others	2036-05-07	2.52 and others	-	150,000	-	150,000
	Foreign currency	CITI Securities and others	2031-07-07	4.38 and others	675,600	2,914,790	-	3,042,170
Less: discount on debentures					(607)	(24,826)	(131)	(29,459)
Total					1,384,993	6,579,964	659,869	7,412,711

Details of lease liabilities as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)	Leaser	2022				
		Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
	Hyundai Oil Bank and others	0.67 ~ 8.68	2082.2.28	389,638	95,079	294,559
(in millions of Korean won)		2021				
	Leaser	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
	Hyundai Oil Bank and others	0.65 ~ 8.68	2068.3.31	319,245	71,865	247,380

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15. Provisions

Changes in provisions for other liabilities and charges for the years ended December 31, 2022 and 2021, as follows:

(in millions of Korean won)

	2022				Total
	Warranty ¹	Greenhouse gas emission ²	Legal claims ³	Restoration ⁴	
Beginning balance	2,110,180	79	15,642	83,807	2,209,708
Business Combination (Note 37)	4,999	-	-	-	4,999
Additions (reversal)	666,923	12,493	(248)	9,384	688,552
Used	(1,296,124)	(3,860)	(1,039)	(42,376)	(1,343,399)
Ending balance	<u>1,485,978</u>	<u>8,712</u>	<u>14,355</u>	<u>50,815</u>	<u>1,559,860</u>
Current	971,836	8,712	-	45,898	1,026,446
Non-current	514,142	-	14,355	4,917	533,414

(in millions of Korean won)

	2021				Total
	Warranty ¹	Greenhouse gas emission ²	Legal claims ³	Restoration ⁴	
Beginning balance	1,244,017	4,875	8,286	112,829	1,370,007
Business Combination (Note 37)	2,406	-	-	-	2,406
Additions (reversal)	1,477,429	(4,072)	14,013	14,186	1,501,556
Used	(613,672)	(724)	(6,657)	(43,208)	(664,261)
Ending balance	<u>2,110,180</u>	<u>79</u>	<u>15,642</u>	<u>83,807</u>	<u>2,209,708</u>
Current	1,532,356	79	-	40,320	1,572,755
Non-current	577,824	-	15,642	43,487	636,953

¹ Warranty provisions have been accrued based on historical experience for the estimated warranty costs to be incurred due to quality control, exchange, refunds with regard to products. In addition, provisions related to replacement costs for ESS and voluntary automotive battery recalls are determined based on the best estimate and included in the above warranty provision. The provisions are adjusted to reflect the current best estimate. As at December 31, 2022, the above warranty provision included ₩1,482,900 million of warranty provision for LG Energy Solution, Ltd. and its subsidiaries.

² Greenhouse gas emission provisions have been accrued for estimated expenditures to be obligated for any excess emission. The estimated emission as at December 31, 2022 amounts to 9,067 thousand tons (December 31, 2021: 8,266 thousand tons).

³ Lawsuit provisions have been accrued for certain pending cases.

⁴ As at December 31, 2022, restoration provisions have been accrued for the estimated expenses to restore land pollutions and others.

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16. Net Defined Benefit Liabilities

Details of net defined benefit liabilities (assets) recognized in the consolidated statements of financial position as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Present value of defined benefit obligations ¹	1,554,870	1,616,781
Fair value of plan assets	<u>(2,153,449)</u>	<u>(1,643,709)</u>
Liabilities (assets) in the consolidated statement of financial position²	<u>(598,579)</u>	<u>(26,928)</u>

¹ The present value of retirement benefit obligations is net of existing contributions to the National Pension Plan of ₩655 million as at December 31, 2022 (2021: ₩708 million).

² Net defined benefit assets are included in other non-current assets.

The amounts recognized in the consolidated statements of profit or loss for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Current service cost ¹	210,372	191,482
Interest cost	<u>(779)</u>	<u>2,059</u>
Total, included in employee benefit expenses	<u>209,593</u>	<u>193,541</u>

¹ The above amounts excluded ₩1,365 million (2021: ₩2,456 million) of expenses capitalized to construction in progress and development costs.

Post-employment benefits recognized for defined contribution plan for the year ended December 31, 2022, amounted to ₩11,365 million (2021: ₩9,533 million).

Post-employment benefits recognized in the consolidated statements of profit or loss for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Cost of sales	128,450	118,525
Selling and administrative expenses	92,508	84,241
Discontinued operations	<u>-</u>	<u>308</u>
Total	<u>220,958</u>	<u>203,074</u>

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

<i>(in millions of Korean won)</i>	2022	2021
Beginning balance	1,616,781	1,454,596
Increase in defined benefit obligations		
due to business combination	-	54,897
Transfer in	11,434	39,334
Transfer out	(6,334)	(8,314)
Current service cost	211,737	193,938
Interest expense	46,328	37,257
Remeasurements:		
Actuarial loss (gain) from change in demographic assumptions	(1,210)	4,586
Actuarial gain from change in financial assumptions	(284,041)	(76,784)
Actuarial loss from experience adjustments	78,279	9,665
Others	459	11,336
Exchange differences	(1,108)	(4,600)
Payments from plans	(117,455)	(99,130)
Ending balance	<u>1,554,870</u>	<u>1,616,781</u>

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

<i>(in millions of Korean won)</i>	2022	2021
Beginning balance	1,643,709	1,336,637
Increase in plan assets due to business combination	-	45,275
Transfer in	-	1,135
Transfer out	(933)	(1,238)
Interest income	47,107	35,198
Remeasurements:		
Return on plan assets	(13,380)	(13,326)
Contributions:		
Employers	586,745	332,299
Payments from plans	(107,204)	(89,445)
Administrative costs	(2,595)	(2,826)
Ending balance	<u>2,153,449</u>	<u>1,643,709</u>

The actual return on plan assets for the year ended December 31, 2022, was ₩33,727 million (2021: ₩21,872 million).

The significant actuarial assumptions as at December 31, 2022 and 2021, are as follows:

	2022	2021
Discount rate	5.3% ~ 5.6%	2.9% ~ 3.0%
Salary growth rate	6.0%	5.0%

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The sensitivity analysis for changes in key actuarial assumptions as at December 31, 2022, is as follows:

<i>(in millions of Korean won)</i>	Increase by 0.5%	Decrease by 0.5%
Discount rate:		
Increase (decrease) in defined benefit obligations	(154,181)	183,259
Salary growth rate:		
Increase (decrease) in defined benefit obligations	191,490	(162,907)

A decrease in corporate bond yields is a major factor contributing to an increase in defined benefit liabilities.

The above sensitivity analyses are based on a change in an assumption while holding all other assumptions constant. In practice, this is unlikely to occur, and changes in some of the assumptions may be correlated. The sensitivity of the defined benefit obligation to changes in principal actuarial assumptions is calculated using the projected unit credit method, the same method applied when calculating the defined benefit obligations recognized on the statement of financial position.

The methods and types of assumptions used in preparing the sensitivity analysis did not change compared to the prior period.

Plan assets as at December 31, 2022 and 2021, consist of:

<i>(in millions of Korean won)</i>	2022		2021	
	Amount	Composition (%)	Amount	Composition (%)
Insurance contracts with guaranteed yield	2,142,224	99.5	1,629,239	99.1
Equity linked bonds	11,222	0.5	12,988	0.8
Time deposits	3	0.0	1,482	0.1
	<u>2,153,449</u>	<u>100.0</u>	<u>1,643,709</u>	<u>100.0</u>

Plan assets consist of various debt instruments with principal and interest protection and others which have no quoted market prices in an active market.

The weighted average duration of the defined benefit obligation is 11.77 years.

The Group reviews the funding level on an annual basis and has a policy of eliminating deficit from the fund. Expected contributions to post-employment benefit plans for the year ending December 31, 2023, are ₩77,539 million.

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17. Other Current and Non-Current Liabilities

Details of other current and non-current liabilities as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Current		
Advances from customers	232,059	373,356
Withholdings	147,334	143,600
Unearned revenues	149,293	104,121
Accrued expenses	810,768	699,592
Total	<u>1,339,454</u>	<u>1,320,669</u>
Non-current		
Long-term accrued expenses	65,182	73,880
Long-term unearned revenues	224,619	99,169
Long-term advanced received	114,544	16,829
Total	<u>404,345</u>	<u>189,878</u>

18. Commitments and Contingencies

- As at December 31, 2022, the Parent Company and certain subsidiaries have been guaranteed from Seoul Guarantee Insurance Company for the execution of contracts and others.
- As at December 31, 2022, the Parent Company and certain subsidiaries have various specific line of credit agreements with several financial institutions, as follows:

(unit: Korean won in millions, foreign currencies in millions)

Classification	The Parent Company		Certain Overseas Subsidiaries							
	KRW	USD	KRW	USD	CNY	EUR	PLN	INR	THB	MYR
Limit of bank overdraft	20,400	-	8,700	50	1,400	93	-	-	10	-
Limit of the letter of credit	15,000	278	-	836	2,007	-	-	-	-	-
Limit of discount of notes from export	-	569	-	485	2,900	-	-	-	-	-
Limit of guaranteed payments in other foreign currency	-	305	-	220	448	-	-	-	-	-
Limit of loan arrangements	800,000	725	-	6,087	7,895	2,988	155	3,010	-	450
Derivatives	-	-	24	1,341	-	156	-	-	-	-
Limit of other loans	-	-	-	70	-	-	-	-	-	-

The Group also entered into comprehensive credit line agreements with other financial institutions relating to trade finance and import/export amounting to ₩20,000 million (including bank overdraft of ₩15,000 million) and USD 320 million. Certain subsidiaries entered into factoring agreements with a credit limit of ₩150,000 million and CNY 450 million.

- As at December 31, 2022, the Parent Company and certain subsidiaries have B2B purchase arrangements with several financial institutions with a credit limit of ₩235,000 million and

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₩150,000 million, respectively.

- (4) As at December 31, 2022, the Parent Company has reverse factoring agreements, and there is no utilized amount.
- (5) As at December 31, 2022, the Group's litigation status is as follows.
- i) As at December 31, 2022, in connection with styrene monomer gas leakage accident, several lawsuits against LG Polymer India Pvt. Ltd., a subsidiary, have been filed with National Green Tribunal of India (NGT) and Andhra Pradesh High Court (APHC). The ultimate outcome of these cases cannot be determined at the reporting date. LG Polymer India Pvt. Ltd deposited INR 500 million under the order from NGT, and deposited INR 953 million generated from sales of inventories, under the order from APHC in connection with this accident. The manufacturing facility is currently closed with limited access in accordance with the order from APHC.
 - ii) As at December 31, 2022, in relation to price fixing of small rechargeable batteries, the consumers in Israel have filed a class action against a subsidiary. However, the ultimate outcome of these cases cannot be determined at the reporting date.
 - iii) As at December 31, 2022, in relation to General Motors (GM) Bolt EV, the class action against General Motors (GM) Bolt EV including the Group is still pending. However, the ultimate outcome of the case cannot be determined at the reporting date.
 - iv) In addition, as at December 31, 2022, the Parent Company and certain subsidiaries have been named as plaintiffs in 8 (related claim amount of ₩26,494 million) and 22 (related claim amount of USD 90 million and ₩5,596 million) legal actions, respectively. They have been named as defendants in 15 and 139 legal actions, respectively, with ₩48,670 million and ₩5,222 million in claims, respectively. The ultimate outcome of these cases cannot be determined at the reporting date.
- (6) The Parent Company has entered into manufacture and production technical contracts with ExxonMobil and others.
- (7) The Parent Company has entered into a license agreement with LG Corp. to use trademarks on the products that the Group manufactures and sells, and on the services the Group provides in relation to its business.
- (8) As at December 31, 2022, the Parent Company has entered into payment guarantee contract of USD 65 million, and certain subsidiaries have entered into payment guarantee contracts of USD 25 million, EUR 2 million and ₩7,755 million with financial institutions to guarantee the warrant of products and payment. Certain subsidiaries have entered into payment guarantee contract of CNY 250 million with financial institutions in relation to custom of imported raw materials.
- (9) Capital expenditure arrangement that has not incur at the end of the reporting period is as follows:

<i>(in millions of Korean won)</i>	2022	2021
Property, plant and equipment	6,522,401	3,822,461

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- (10) As at December 31, 2022, the Group has entered into an agreement with General Motors (GM) regarding joint investment in Ultium Cells Holdings LLC and Ultium Cells LLC, whereby each party can sell its shares to third parties in 8 years after the inception of the contract. In addition, if one party defaults, the other party has the right to purchase shares from the other party. The Group completed the process of approval by the government for the use of core technologies according to the Industrial Technology Protection Act.
- (11) As at December 31, 2022, the Group has entered into a joint venture agreement with Honda in which the Group agreed to invest USD 1,802 million. In addition, the Group determined payment guarantees of USD 450 million for the joint venture, in accordance with the equity ratio of the borrowing with a credit limit of USD 883 million.
- (12) As at December 31, 2022, the Group has entered into a joint venture agreement with Stellantis in which the Group agreed to invest USD 1,464 million.
- (13) As at December 31, 2022, the Group and certain subsidiaries' investment agreements, are as follows:

<i>(in millions of Korean won and USD)</i>	Currency	Committed investments	Cumulative investments	Remaining
KBE Fund	KRW	150,000	53,974	96,026
Gross Acceleration Fund	KRW	5,000	4,750	250
BNZ(Beyond Net Zero) Fund	USD	150	46	104
Secondary battery growth Fund	KRW	6,700	2,680	4,020
U.S. Venture Partners XII ¹	USD	5	4	1
U.S. Venture Partners XIII ¹	USD	5	-	5
Phoenix Venture Partners III ¹	USD	10	4	6

¹ Investment agreements of LG Chem Fund I LLC.

- (14) The Parent Company acquired 50% of new shares issued by LG Toray Hungary Battery Separator kft. for USD 375 million in accordance with the joint venture agreement with Toray Industries, Inc. during the ended December 31, 2022. The shares were recognized as investment in associates as it was determined that there was a joint control under the agreement. The details on agreements entered into upon the acquisition of shares are as follows:

Category	Details
Agreement to purchase additional shares	After 30 months from the acquisition date of the 50% shares, purchasing the 20% shares through the agreed pricing method
Restrictions on share transfer	- During the lock-up period ¹ , share transfer is prohibited without prior written consent of the other shareholder. - When sold to a third party, the Parent Company holds a drag-along right and Toray Industries, Inc. holds a tag-along right.
Default	In case the Parent Company or the contracting party defaults, non-default shareholder and subsidiaries have the right to request the default shareholder to sell their shares (Call Option) and the default shareholder to purchase the shares held by the non-default shareholder (Put Option).
Exit put option	Once the lock-up period ¹ ends, the other shareholder has a put option to sell the remaining 30% of the shares to the Parent Company.

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Deadlock	In the event of a dead lock agreed by both parties, 1) the Parent Company holds a call option to request the counterparty's company and affiliates to sell their shares. 2) The other party holds a put option to request the Parent Company to purchase shares of the counterparty.
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¹ Lock-up period: restriction period of share transfer for 5 years from the time the Parent Company acquires 50% of the shares.

(15) The Group has entered into a put-option agreement regarding its equity investment for Volta Energy Solutions S.a.r.l, for the purpose of guaranteeing the principal amount of investments. The main conditions of the put-option agreement are as follows:

Category	Details
Exercise Date	For 3 years from the date on which three years lapse since it was acquired (Date of initial investment: January 27, 2021)
Exercise Price	Investment amount deducting dividends (received from the time of investment to the time of exercise) from the investment
Other conditions	Put-option cannot be exercised in case Volta Energy Solutions S.a.r.l is listed

(16) Certain subsidiaries provide payment guarantees amounting to ₩88,711 million for borrowings as at December 31, 2022, details are as follows:

(in millions of Korean won)

Guarantor	Guaranteed company	Creditor	Guaranteed amount		Amount of borrowing	
			2022	2021	2022	2021
LG ENERGY SOLUTION, LTD.	PT. HLI Green Power	ANZ and others	88,711	-	450,525	-

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19. Share Capital

Changes in share capital and share premium for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won and in shares)

	Ordinary shares		Preferred shares		Share premium
	Number of shares	Share capital	Number of shares	Share capital	
January 1, 2021	70,592,343	352,962	7,688,800	38,444	2,014,036
December 31, 2021	70,592,343	352,962	7,688,800	38,444	2,014,036
December 31, 2022	70,592,343	352,962	7,688,800	38,444	2,014,036

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

<i>(in millions of Korean won and in shares)</i>	Number of shares		Carrying amount	Gain on disposal of treasury shares
	Ordinary shares	Preferred shares		
January 1, 2021	464,842	16,368	35,699	431,719
Treasury shares reduction due to the exercise of exchange rights	(91,228)	-	(14,302)	28,344
Disposal of treasury shares ¹	(6,085)	(10,327)	(3,386)	3,744
December 31, 2021	367,529	6,041	18,011	463,807
Disposal of treasury shares ²	(367,529)	-	(17,741)	192,119
December 31, 2022	-	6,041	270	655,926

¹ After the exchange of exchangeable bonds, all of the remaining treasury shares purchased in early 2017 due to the exercise of share purchase rights by the dissenting shareholders who objected to the merger with LG Life Sciences, Ltd. have been disposed of during the year ended December 31, 2021.

² The Group disposed of all of treasury shares of the Parent Company (367,529 shares), on November 23, 2022, as the Board of Directors' meeting decided to exchange treasury shares of Korea Zinc Company, Ltd with the treasury shares of the Parent Company.

Capital surplus as at December 31, 2022, and 2021, consist of:

(in millions of Korean won)

	2022	2021
Revaluation reserve	206,769	206,769
Share premium	2,014,036	2,014,036
Gain on disposal of treasury shares	655,926	463,807
Other capital surplus	8,692,824	11,773
Total	11,569,556	2,696,385

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20. Retained Earnings

Retained earnings as at December 31, 2022 and 2021, consist of:

<i>(in millions of Korean won)</i>	2022	2021
Legal reserve ¹	674,327	540,492
Discretionary reserve ²	14,570,240	12,945,537
Retained earnings before appropriation	<u>3,897,696</u>	<u>4,605,921</u>
Total	<u>19,142,263</u>	<u>18,091,950</u>

¹ The Commercial Code of the Republic of Korea requires the Parent Company to appropriate for each financial period, as a legal reserve, an amount equal to a minimum of 10% of cash dividends paid until such reserve equals 50% of its issued share capital. The reserve is not available for cash dividends payment, but may be transferred to share capital or used to reduce accumulated deficit. When the accumulated legal reserves (the sum of capital reserves and earned profit reserves) are greater than 1.5 times the paid-in capital amount, the excess legal reserves may be distributed in accordance with a resolution of the shareholders' meeting.

² The Parent Company separately accumulates a discretionary reserve for research and human resource development through appropriation of retained earnings, which has been included as deductible expense for the corporate income tax return according to the Special Tax Treatment Law. Among these reserves, the used amounts for each specific purpose and the balances after use can be transferred to discretionary reserve and will be able used for dividends.

21. Other Components of Equity

Details of other components of equity as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Treasury shares (Note 19)	(270)	(18,011)
Capital transactions within the Group	<u>(19,299)</u>	<u>(19,299)</u>
Total	<u>(19,569)</u>	<u>(37,310)</u>

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22. Selling and Administrative Expenses

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

<i>(in millions of Korean won)</i>	2022	2021
Wages and salaries	1,606,669	1,232,345
Post-employment benefits (Note 16)	92,508	84,241
Employee benefits	312,374	241,601
Travel expense	85,016	44,407
Water & utilities	97,157	69,352
Packaging expense	13,260	7,826
Rental expenses	152,639	124,487
Commission expenses	1,057,269	904,765
Depreciation (Note 11 and 36)	295,870	244,462
Advertising expense	48,795	39,055
Freight expenses	1,543,374	934,698
Training expense	49,442	28,370
Amortization (Note 12)	230,279	168,384
Sample expense	25,332	20,941
Development costs	384,750	255,142
Others	996,030	1,788,182
Total	6,990,764	6,188,258

23. Breakdown of Expenses by Nature

Cost of sales, and selling and administrative expenses by nature for the years ended December 31, 2022 and 2021, consist of:

<i>(in millions of Korean won)</i>	2022	2021
Changes in inventories of merchandise, finished goods, semi-finished goods and work in process	(2,548,289)	(1,597,340)
Raw materials and consumables used	33,460,484	24,057,996
Purchase of merchandise	1,859,889	1,370,209
Employee benefit expenses (Note 24)	4,650,948	3,574,822
Advertising expenses	50,159	40,404
Freight expenses	1,602,487	978,910
Commission expenses	1,777,349	1,531,290
Depreciation and amortization	3,394,860	2,834,375
Rent expenses	107,260	82,297
Other expenses	4,514,043	4,699,951
Total	48,869,190	37,572,914

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24. Employee Benefit Expenses

Details of employee benefit expenses for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Salaries	3,897,241	3,044,446
Post-employment benefits – Defined benefit plan (Note 16)	209,593	193,233
Post-employment benefits – Defined contribution plan (Note 16)	11,365	9,533
Others	532,749	327,610
Total	<u>4,650,948</u>	<u>3,574,822</u>

25. Finance Income and Costs

Details of finance income and costs for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Finance income		
Interest income ¹	265,289	75,658
Dividend income	1,979	7,376
Exchange differences	554,182	368,490
Gain on derivative instruments	104,718	203,344
Others	14,620	31,730
Total	<u>940,788</u>	<u>686,598</u>
Finance costs		
Interest expense ²	303,069	210,982
Exchange differences	857,657	441,175
Loss on derivative instruments	52,487	8,104
Others	7,479	409
Total	<u>1,220,692</u>	<u>660,670</u>

¹ Details of interest income for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Deposits held by financial institutions	199,056	31,135
Other loans and receivables	66,233	44,523
Total	<u>265,289</u>	<u>75,658</u>

² Details of interest expense for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Interest on financial institutions	110,166	45,598
Interest on lease liabilities	9,495	8,653
Interest on debentures	183,802	166,433
Other interest expenses	19,667	36,188
Capitalized interest for qualifying assets	(20,061)	(45,890)
Total	<u>303,069</u>	<u>210,982</u>

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26. Other Non-operating Income

Details of other non-operating income for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Exchange differences	2,031,034	698,351
Gain on disposal of property, plant and equipment	76,697	36,207
Gain on disposal of intangible assets	8	5,266
Gain on disposal of investments in associates	-	8,152
Profit from bargain purchase	30,673	-
Insurance income	131,902	62,648
Others	38,866	91,740
Total	<u>2,309,180</u>	<u>902,364</u>

27. Other Non-operating Expenses

Details of other non-operating expenses for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Exchange differences	1,888,338	583,019
Loss on disposal of property, plant and equipment	79,080	65,016
Loss on disposal of intangible assets	23,032	2,355
Impairment loss on property, plant and equipment (Note 11)	38,661	29,362
Impairment loss on intangible assets (Note 12)	25,998	298,849
Loss on disasters	28,055	22,824
Donations	22,256	17,291
Others	60,788	37,307
Total	<u>2,166,208</u>	<u>1,056,023</u>

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28. Tax Expense and Deferred Tax

Details of income tax expense for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Current tax		
Current tax on profit for the years	903,431	1,735,744
Adjustments in respect of prior years	(17,654)	20,296
Deferred tax		
Deferred tax - movement in temporary differences	359,307	(420,739)
Deferred tax – changes in Korean tax rate	14,185	-
Deferred tax – tax credit carryforwards	(173,376)	(20,096)
Deferred tax – Tax loss carryforwards	(340,573)	(3,577)
	<u>745,320</u>	<u>1,311,628</u>
Deferred tax charged directly to equity	(49,128)	17,534
Current tax charged directly to equity	(47,132)	(13,304)
Others	(7,578)	(80,079)
Income tax expense	<u>641,482</u>	<u>1,235,779</u>

The aggregate current and deferred tax charged directly to equity (other comprehensive income) for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Current tax		
Gain on disposal of financial assets at fair value through other comprehensive income	1	138
Gain on disposal of treasury shares	(47,133)	(13,442)
Total	<u>(47,132)</u>	<u>(13,304)</u>
Deferred tax		
Remeasurements of net defined benefit liabilities	(43,794)	(10,717)
Loss on valuation of derivative instruments	-	6,459
Exchange differences on translation of foreign operations	(25,712)	25,003
Gain (loss) on valuation of financial assets at fair value through other comprehensive income	16,778	(3,211)
Others	3,600	-
Total	<u>(49,128)</u>	<u>17,534</u>

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

(in millions of Korean won)

	2022					Ending balance
	Beginning balance	Profit (loss) for the year	Other comprehensive income	Increase (decrease)		
				Others	Exchange differences	
Net defined benefit liabilities	411,680	(13,159)	(45,549)	(2,043)	342	351,271
Plan assets	(447,134)	(55,517)	1,755	-	-	(500,896)
Provision for impairment on receivables	161	803	-	-	(44)	920
Property, plant and equipment	120,679	18,520	-	62	323	139,584
Intangible assets	(34,944)	4,399	-	(40)	(49)	(30,634)
Investments in subsidiaries, associates and joint ventures	(97,113)	(60,396)	7,759	-	-	(149,750)
Accrued income	49,252	13,664	-	-	(693)	62,223
Others	1,098,100	(232,678)	12,619	(2,491)	(310)	875,240
	<u>1,100,681</u>	<u>(324,364)</u>	<u>(23,416)</u>	<u>(4,512)</u>	<u>(431)</u>	<u>747,958</u>
Exchange differences on translation of foreign operations	24,703	-	(25,712)	-	43	(966)
Tax credit carryforwards	36,763	173,376	-	-	121	210,260
Tax loss carryforwards	29,139	340,573	-	-	(132)	369,580
Deferred tax assets (liabilities)	<u>1,191,286</u>	<u>189,585</u>	<u>(49,128)</u>	<u>(4,512)</u>	<u>(399)</u>	<u>1,326,832</u>

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(in millions of Korean won)

	2021						
	Beginning balance	Business combination	Profit (loss) for the year	Increase (decrease)			Ending balance
				Other comprehensive income	Others	Exchange differences	
Net defined benefit liabilities	388,609	-	19,942	3,122	-	7	411,680
Plan assets	(366,060)	-	(67,235)	(13,839)	-	-	(447,134)
Provision for impairment on receivables	429	-	(286)	-	-	18	161
Property, plant and equipment	175,014	(2,156)	(53,526)	-	(2,820)	4,167	120,679
Intangible assets	(41,541)	(1,695)	2,561	-	5,521	210	(34,944)
Investments in subsidiaries, associates and joint ventures	(86,544)	-	(15,333)	-	4,764	-	(97,113)
Accrued income	(255)	-	50,248	-	3	(744)	49,252
Others	602,492	-	466,834	3,248	3,434	22,092	1,098,100
	672,144	(3,851)	403,205	(7,469)	10,902	25,750	1,100,681
Exchange differences on translation of foreign operations	(2,837)	-	-	25,003	2,537	-	24,703
Tax credit carryforwards	15,250	-	20,096	-	1,388	29	36,763
Tax loss carryforwards	35,383	-	3,577	-	(10,072)	251	29,139
Deferred tax assets (liabilities)	719,940	(3,851)	426,878	17,534	4,755	26,030	1,191,286

The reconciliations between income tax expense and accounting profit for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022	2021
Profit before income tax expense¹	2,842,314	5,266,838
Tax at domestic tax rates applicable to profits in the respective countries²	823,097	1,487,382
Tax effects of:	(181,615)	(251,603)
Income not subject to tax	(3,649)	(34,084)
Expenses not deductible for tax purposes	130,565	107,755
Recognized deferred income tax arising from temporary differences from previous years	(56,813)	(131,475)
Unrecognized deferred income tax arising from temporary differences in the current year	68,738	16,048
Tax credit	(281,268)	(304,633)
Change in the Korean tax rate	14,185	-
Others (Reflection of discontinuation effects, etc.)	(53,373)	94,786
Income tax expense	641,482	1,235,779
Effective tax rate (income tax expense/profit before income tax)	22.57%	23.46%

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¹ The amount includes profit before income tax from discontinued operations

² The weighted average applicable tax rate on profit before income tax for the year ended December 31, 2022, is 28.96% (2021: 28.24%).

Realization of deferred tax assets is dependent on the Group's ability to generate future taxable profits in excess of the profits arising from the reversal of taxable temporary differences, and economic and industry outlooks. Management periodically reviews on these factors.

Details of deductible (taxable) temporary differences unrecognized as deferred tax assets (liabilities) as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021	
Investments in subsidiaries, associates and joint ventures	(908,818)	(986,976)	Permanently re-invested income not distributed as dividend
	5,789,860	6,928,748	No possibility of disposal
Land	420	373	
Unused tax loss carryforwards ¹	280,513	333,647	Uncertainty of future tax income

¹ The maturity of unused tax loss carryforwards is as follows:

<i>(in millions of Korean won)</i>	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
2022 Tax loss carryforwards	220	5,956	54,914	219,423
2021 Tax loss carryforwards	-	-	5,220	328,427

29. Earnings per Share

Basic earnings per share is calculated by dividing the profit attributable to equity holders of the Parent Company by the weighted average number of shares in issue excluding shares purchased by the Parent Company and held as treasury shares. As at the reporting date, the Parent Company has no potential ordinary shares. Preferred shares have a right to participate in the profits of the Group. These participation rights have been considered in presenting the earnings per share information for the both of ordinary shares and preferred shares.

Basic earnings per share for profit from continuing operations and earnings per share attributable to the equity holders of the Parent Company for the years ended December 31, 2022 and 2021, are computed as follows:

Basic earnings per ordinary share from continuing operations

<i>(in millions of Korean won and in number of shares)</i>	2022	2021
Profit from continuing operations attributable to ordinary shares ¹	1,641,087	3,039,554
Weighted average number of ordinary shares outstanding ²	70,262,070	70,218,611
Basic earnings per ordinary share from continuing operations <i>(in won)</i>	<u>23,357</u>	<u>43,287</u>

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Basic earnings per ordinary share

<i>(in millions of Korean won and in number of shares)</i>	2022	2021
Profit attributable to ordinary shares ¹	1,663,125	3,307,881
Weighted average number of ordinary shares outstanding ²	70,262,070	70,218,611
Basic earnings per ordinary shares <i>(in won)</i>	<u>23,670</u>	<u>47,108</u>

Basic earnings per preferred share from continuing operations

<i>(in millions of Korean won and in number of shares)</i>	2022	2021
Profit from continuing operations attributable to preferred share ¹	179,827	332,580
Weighted average number of preferred shares outstanding ²	7,682,759	7,674,271
Basic earnings per preferred share from continuing operations <i>(in won)</i>	<u>23,407</u>	<u>43,337</u>

Basic earnings per preferred share

<i>(in millions of Korean won and in number of shares)</i>	2022	2021
Profit attributable to preferred shares ¹	182,238	361,906
Weighted average number of preferred shares outstanding ²	7,682,759	7,674,271
Basic earnings per preferred shares <i>(in won)</i>	<u>23,720</u>	<u>47,158</u>

¹ Profit attributable to ordinary and preferred shares are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Profit from continuing operations attributable to the equity holders of the Parent Company	1,820,914	3,372,134
Ordinary shares dividends (A)	702,621	842,623
Preferred shares dividends (B)	77,211	92,475
Undistributed earnings from continuing operation for the period	1,041,082	2,437,036
Undistributed earnings available for ordinary shares (C)	938,466	2,196,931
Undistributed earnings available for preferred shares (D)	102,616	240,105
Profit from continuing operations for the period attributable to ordinary shares (A+C)	1,641,087	3,039,554
Profit from continuing operations for the period attributable to preferred shares (B+D)	179,827	332,580
<i>(in millions of Korean won)</i>	2022	2021
Profit attributable to the equity holders of the Parent Company	1,845,363	3,669,787
Ordinary shares dividends (A)	702,621	842,623
Preferred shares dividends (B)	77,211	92,475
Undistributed earnings for the period	1,065,531	2,734,689
Undistributed earnings available for ordinary shares (C)	960,504	2,465,258
Undistributed earnings available for preferred shares (D)	105,027	269,431
Profit for the period attributable to ordinary shares (A+C)	1,663,125	3,307,881
Profit for the period attributable to preferred shares (B+D)	182,238	361,906

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² Weighted average numbers of shares are calculated as follows:

Ordinary shares outstanding	2022			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2022. 1. 1 – 2022. 12. 31	70,224,814	365	25,632,057,110
Disposal of treasury shares	2022. 11. 28 – 2022. 12. 31	367,529	37	13,598,573
Total				25,645,655,683

Weighted average number of ordinary shares outstanding: 25,645,655,683 / 365 = 70,262,070 shares

Preferred shares outstanding	2022			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2022. 1. 1 - 2022. 12. 31	7,682,759	365	2,804,207,035
Total				2,804,207,035

Weighted average number of preferred shares outstanding: 2,804,207,035 / 365 = 7,682,759 shares

Ordinary shares outstanding	2021			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2021. 1. 1 – 2021. 12. 31	70,163,895	365	25,609,821,675
Disposal of treasury shares	2021. 10. 28 - 2021. 12. 31	6,085	65	395,525
Conversion of treasury shares	2021. 1. 9 - 2021. 12. 31	54,834	357	19,575,738
Total				25,629,792,938

Weighted average number of ordinary shares outstanding: 25,629,792,938 / 365 = 70,218,611 shares

Preferred shares outstanding	2021			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2021. 1. 1 - 2021. 12. 31	7,672,432	365	2,800,437,680
Disposal of treasury shares	2021. 10. 28 - 2021. 12. 31	10,327	65	671,255
Total				2,801,108,935

Weighted average number of preferred shares outstanding: 2,801,108,935 / 365 = 7,674,271 shares

For the year ended December 31, 2022, there were no dilutive potential outstanding ordinary shares at the reporting date. Accordingly, diluted earnings per share for profit attributable to owners of the Parent Company is identical to basic earnings per share. In addition, for the year ended December 31, 2021, the Parent Company did not calculate diluted earnings per share due to antidilution effect.

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Basic and diluted earnings per share attributable to ordinary and preferred shares from discounted operations for the years ended December 31, 2022 and 2021, are as follows:

<i>(in Korean won)</i>	2022	2021
Basic earnings per ordinary share from discounted operations	314	3,821
Basic earnings per preferred share from discounted operations	314	3,821
Diluted earnings per ordinary share from discounted operations	314	3,821
Diluted earnings per preferred share from discounted operations	314	3,821

30. Dividends

Details of dividends of the Parent Company as at December 31, 2022 and 2021, are as follows:

	2022	2021
Number of shares entitled to dividends: shares issued and outstanding (par value per share: ₩5,000)		
Ordinary shares	70,592,343	70,224,814
Preferred shares	7,682,759	7,682,759
Dividend per share <i>(in Korean won, %)</i>		
Ordinary shares: cash	10,000 (200%)	12,000 (240%)
Preferred shares: cash	10,050 (201%)	12,050 (241%)
Cash dividends to distribute <i>(in millions of Korean won)</i>		
Ordinary shares	705,923	842,698
Preferred shares	77,212	92,577
	<u>783,135</u>	<u>935,275</u>

Dividend payout ratios of the Parent Company for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Dividends (A)	783,135	935,275
Profit attributable to equity holders of the Parent Company (B)	1,845,363	3,669,787
Dividend payout ratio (A/B)	<u>42.44%</u>	<u>25.49%</u>

Dividend yield ratios of the Parent Company for the years ended December 31, 2022 and 2021, are as follows:

<i>(in Korean won)</i>	2022		2021	
	Ordinary shares	Preferred Shares	Ordinary shares	Preferred Shares
Dividend per share (A)	10,000	10,050	12,000	12,050
Market value at the end of year (B) ¹	616,800	294,700	628,500	298,875
Dividend yield ratio (A/B)	<u>1.62%</u>	<u>3.41%</u>	<u>1.91%</u>	<u>4.03%</u>

¹ Average price in the stock market during one week preceding two business days before shareholder list closing date for the general shareholders' meeting.

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31. Related Party Transactions

As at December 31, 2022 and 2021, LG Corp. is an entity exercising a significant influence over the Group, which owns 33.34% of the Parent Company's ordinary shares.

Details of associates and other related parties that have sales and other transactions with the Group or have receivables and payables balances as at December 31, 2022 and 2021, are as follows, and the details of investments in subsidiaries, associates and joint ventures are described in Note 1.3:

Related party	Related party's subsidiary (Domestic)	Related party's subsidiary (Overseas)	Details
D&O Corp. ¹	D&O CM Corp. Co., Ltd.	D&O CM NANJING and others	Subsidiary of LG Corp.
LG CNS Co., Ltd.	BIZTECH I CO., LTD. and others	LG CNS America Inc. and others	Subsidiary of LG Corp.
LG Management Development Institute	-	-	Subsidiary of LG Corp.
LG Sports Ltd.	-	-	Subsidiary of LG Corp.
LG Display Co., Ltd.	-	LG Display (China) Co., Ltd. and others	LG Enterprise group ^{2,3}
LG Electronics Inc.	LG Innotek Co., Ltd. and others	Inspur LG Digital Mobile Communications Co., Ltd. and others	LG Enterprise group ^{2,3}
LG Household & Health Care Ltd.	Coca-Cola Beverage Co. and others	-	LG Enterprise group ^{2,3}
LG Uplus Corp.	LG HelloVision Corp.	-	LG Enterprise group ^{2,3}
G II R Inc.	HS AD Inc.	Beijing Yuanzhimeng Advertising Co., Ltd.	LG Enterprise group ^{2,3}
Shanjin Optoelectronics (Suzhou) Co., Ltd.	-	Shanjin Optoelectronics (Nanjing) Co., LTD. and others	Others ⁴

¹ During the year ended December 31, 2022, the entity's name of S&I Corp. and its subsidiaries has been changed.

² Although these entities are not the related parties of the Group in accordance with K-IFRS 1024, these entities belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act.

³ During the year ended December 31, 2022, LX Holdings Corp. and its affiliates were excluded from the LG Group due to the spin-off of LG Corp.

⁴ These entities are included in the scope of related parties in accordance with Korean IFRS 1024.

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Sales and purchases with related parties for the years ended December 31, 2022 and 2021, are as follows:

	2022					
	Sales and others	Purchase and others				
		Purchase of raw materials /merchandises	Acquisition of property, plant and equipment and intangible assets	Acquisition of right-of-use assets	Interest expense	Others
Entity with a significant influence over the Group						
LG Corp.	9	-	1,273	12,230	163	109,233
Associates and joint ventures						
SEETEC Co., Ltd.	133,706	251,919	-	38	395	82,900
TECWIN Co., Ltd.	-	465	2,046	-	-	183
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	9,453	328,975	-	-	-	76
PT. HLI Greenpower Co., Ltd.	45,987	-	-	-	-	-
Others	4,977	11,481	-	-	-	184
Other related parties						
D&O Corp. and its subsidiaries and associates	207	8,945	775,195	-	-	112,683
LG CNS Co., Ltd. and its subsidiaries	20,356	3,673	784,769	1,221	16	227,618
Others	5	-	-	-	-	50,875
Others						
LG Display Co., Ltd. and its subsidiaries	556,420	70	-	-	13	244
LG Electronics Inc. and its subsidiaries and joint ventures	1,571,438	377,247	539,325	-	377	47,583
LX International Corp. and its subsidiaries ¹	43,477	266,666	79,395	2,783	9	812,884
LX Hausys, Ltd. and its subsidiaries ¹	147,990	4,552	1,048	-	-	3
LX MMA Corporation ^{1,2}	111,379	109,790	-	-	-	2,582
Shanjin Optoelectronics (Suzhou) Co., Ltd. and its subsidiaries	491,229	20,381	-	-	-	25,935
Others	10,637	32,521	882	48	50	8,736
Total	3,147,270	1,416,685	2,183,933	16,320	1,023	1,481,719

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(in millions of Korean won)

	2021					
	Sales and others	Purchase and others				
		Purchase of raw materials /merchandises	Acquisition of property, plant and equipment and intangible assets	Acquisition of right-of- use assets	Interest expense	Others
Entity with a significant influence over the Group						
LG Corp.	12	-	-	11,866	139	89,645
Associates and joint ventures						
SEETEC Co., Ltd.	66,149	180,001	654	33	413	76,313
TECWIN Co., Ltd.	10	182	5,513	-	-	192
HL Greenpower Co., Ltd. ³	470,525	440	-	-	-	-
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	804	161,775	-	-	-	33
PT. HLI Greenpower Co., Ltd.	19,151	-	-	-	-	-
Others	7,576	10,949	-	-	-	2,697
Other related parties						
D&O Corp. and its subsidiaries	445	17,392	575,567	-	-	135,895
LG CNS Co., Ltd. and its subsidiaries	13,919	5,076	540,690	1,192	14	197,093
Others	156	-	-	-	-	32,485
Others						
LG Display Co., Ltd. and its subsidiaries	634,886	151	-	-	15	21
LG Electronics Inc. and its subsidiaries and joint ventures ⁴	1,170,195	918,280	312,448	17,673	98	597,519
LX International Corp. and its subsidiaries	96,336	609,316	28,546	-	1	939,085
LX Hausys, Ltd. and its subsidiaries	281,017	5,169	31,951	-	-	1,253
LX MMA Corporation ²	159,877	191,431	-	-	-	4,408
Shanjin Optoelectronics (Suzhou) Co., Ltd. and its subsidiaries ⁵	500,693	40,061	11,064	-	-	11,830
Others	10,943	34,215	2,590	2,231	45	10,680
Total	3,432,694	2,174,438	1,509,023	32,995	725	2,099,149

¹ The entity has been excluded from the related parties due to the spin-off from LG Corp. during the year ended December 31, 2022. Transactions with this entity until the spin-off from LG Corp. have been included in the above information.

² Net sales and purchase amounts after offsetting for Raffinate transactions with LX MMA Corporation.

³ This entity has been excluded from the related parties since the Group sold its shares in 2021. Transactions with this entity until the sale of shares have been included in the above information.

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⁴ During FY2021, the consideration transferred for the acquisition of CEM business has been included in other purchase from LG Electronics Inc. and its subsidiaries (Note 38)

⁵ The amount of sales and others does not include the amount of transaction (USD 889 million) related to the transfer of the LCD polarizer business

Balances of receivables and payables arising from sales and purchases of goods and services as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022			
	Receivables			Total
	Trade receivables and others	Loan receivables	Other receivables	
Entity with a significant influence over the Group				
LG Corp.	-	-	10,335	10,335
Associates and joint ventures				
SEETEC Co., Ltd.	15,002	-	1,221	16,223
TECWIN Co., Ltd.	-	-	-	-
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	9,453	-	-	9,453
PT. HLI Greenpower Co., Ltd.	-	-	1,311	1,311
Others	-	-	-	-
Other related parties				
D&O Corp. and its subsidiaries and associates ¹	-	-	-	-
LG CNS Co., Ltd. and its subsidiaries	5,782	-	319	6,101
Others	-	-	5	5
Others				
LG Display Co., Ltd. and its subsidiaries	78,507	-	419	78,926
LG Electronics Inc. and its subsidiaries and joint ventures ²	396,289	-	27,917	424,206
Shanjin Optoelectronics (Suzhou) Co., Ltd. and its subsidiaries	57,361	-	1,792	59,153
Others	42	-	2,923	2,965
Total	562,436	-	46,242	608,678

(in millions of Korean won)

	2022			
	Payables			
	Trade payables	Borrowings	Lease liabilities	Other payables
Entity with a significant influence over the Group				
LG Corp.	-	-	12,232	30,349
Associates and joint ventures				
SEETEC Co., Ltd.	29,368	-	19,127	10,939
TECWIN Co., Ltd.	-	-	-	328
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	34,300	-	-	-
PT. HLI Greenpower Co., Ltd.	-	-	-	88,093
Others	1	-	-	47
Other related parties				
D&O Corp. and its subsidiaries and associates ¹	-	-	-	497,005
LG CNS Co., Ltd. and its subsidiaries	536	-	1,221	495,940
Others	-	-	-	1,168
Others				
LG Display Co., Ltd. and its subsidiaries	28	-	454	47
LG Electronics Inc. and its subsidiaries and joint ventures ²	77,581	-	17,264	162,152

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Shanjin Optoelectronics (Suzhou) Co., Ltd. and its subsidiaries	449	-	-	16,965	17,414
Others	1,488	-	2,146	7,404	11,038
Total	143,751	-	52,444	1,310,437	1,506,632

(in millions of Korean won)

	2021			
	Receivables			
	Trade receivables and others	Loan receivables	Other receivables	Total
Entity with a significant influence over the Group				
LG Corp.	-	-	9,983	9,983
Associates and joint ventures				
SEETEC Co., Ltd.	7,426	-	462	7,888
TECWIN Co., Ltd.	-	-	-	-
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	-	-	-	-
Others	463	-	4,586	5,049
Other related parties				
D&O Corp. and its subsidiaries and affiliates ¹	388	-	8,762	9,150
LG CNS Co., Ltd. and its subsidiaries	5,632	-	326	5,958
Others	-	-	6,739	6,739
Others				
LG Display Co., Ltd. and its subsidiaries	110,826	-	935	111,761
LG Electronics Inc. and its subsidiaries and joint ventures ²	270,116	-	25,438	295,554
LX International Corp. and its subsidiaries	2,676	-	-	2,676
LX Hausys, Ltd. and its subsidiaries	58,934	-	55	58,989
LX MMA Corporation	20,754	-	625	21,379
Shanjin Optoelectronics (Suzhou) Co., Ltd. and its subsidiaries	56,032	-	-	56,032
Others	23	-	1,773	1,796
Total	533,270	-	59,684	592,954

(in millions of Korean won)

	2021				
	Payables				
	Trade payables	Borrowings	Lease liabilities	Other payables	Total
Entity with a significant influence over the Group					
LG Corp.	-	-	11,866	23,609	35,475
Associates and joint ventures					
SEETEC Co., Ltd.	17,164	-	20,442	10,310	47,916
TECWIN Co., Ltd.	317	-	-	16,116	16,433
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	48,054	-	-	-	48,054
Others	-	-	-	410	410
Other related parties					
D&O Corp. and its subsidiaries and affiliates ¹	-	-	-	282,691	282,691
LG CNS Co., Ltd. and its subsidiaries	233	-	1,192	316,160	317,585
Others	-	-	-	715	715
Others					
LG Display Co., Ltd. and its subsidiaries	32	-	595	2,942	3,569
LG Electronics Inc. and its subsidiaries and joint ventures ²	59,289	-	18,695	148,185	226,169
LX International Corp. and its subsidiaries	18,467	-	-	182,716	201,183

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LX Hausys, Ltd. and its subsidiaries	-	-	-	5,501	5,501
LX MMA Corporation	15,960	-	-	-	15,960
Shanjin Optoelectronics (Suzhou) Co., Ltd. and its subsidiaries	16,513	-	-	4,144	20,658
Others	3,226	-	2,730	8,583	14,539
Total	179,255	-	55,520	1,002,082	1,236,858

¹ During the year ended December 31, 2022, the Group collected other receivables to D&O Corp. (formerly, S&I Corp.) which includes the amount of deposits classified as memberships in the consolidated financial statements of the Group. The amount is included in other receivables for the year ended December 31, 2021.

² The warranty provision related to the recall of GM Bolt is not included in the above receivables and payables.

Fund transactions with related parties for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022						
	Dividends received	Dividends paid	Equity contributions in cash (capital reduction)	Loans		Borrowings ¹	
Loans				Repayment	Borrowings	Repayment	
Entity with a significant influence over the Group							
LG Corp.	-	282,411	-	-	-	12,230	11,845
Associates and joint ventures							
SEETEC Co., Ltd.	5,000	-	-	-	-	38	959
LG Toray Hungary Battery Separator Kft. ²	-	-	483,638	-	-	-	-
KOREA PRECURSOR CO.,LTD.	-	-	20,384	-	-	-	-
Other related parties							
LG CNS Co., Ltd.	-	-	-	-	-	1,221	1,190
Others							
LG Display America, Inc.	-	-	-	-	-	-	176
LX Pantos Poland sp.z.o.o ³	-	-	-	-	-	62	7
PANTOS LOGISTICS MEXICO S.A. de C.V ³	-	-	-	-	-	2,384	320
LX PANTOS TURKEY LOJISTIK ³	-	-	-	-	-	337	41
LG Electronics Deutschland GmbH	-	-	-	-	-	-	293
LG ELECTRONICS WROCLAW SP. Z O.O.	-	-	-	-	-	-	1,411
LG HOUSEHOLD & HEALTH CARE LTD	-	-	-	-	-	48	628
Shanjin Optoelectronics (Suzhou) ⁴	-	-	-	-	-	-	-
Total	5,000	282,411	504,022	-	-	16,320	16,870

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(in millions of Korean won)

	2021						
	Dividends received	Dividends paid	Equity contributions in cash (capital reduction)	Loans		Borrowings ¹	
Loans				Repayment	Borrowings	Repayment	
Entity with a significant influence over the Group							
LG Corp.	-	235,342	-	-	-	11,866	11,791
Associates and joint ventures							
SEETEC Co., Ltd.	10,000	-	-	-	-	33	929
LG Vina Chemical	334	-	-	-	-	-	-
TL Chemical Co., Ltd.	-	-	48,544	-	-	-	-
PT. HKML Battery Indonesia	-	-	209,132	-	-	-	-
Other related parties							
LG CNS Co., Ltd.	-	-	-	-	-	1,192	1,192
LG Holdings Japan Co., Ltd.	-	-	-	-	-	-	91
Others							
LG Display America, Inc.	-	-	-	-	-	-	149
Pantos Logistics France	-	-	-	-	-	-	419
Pantos Logistics Spain S.L.	-	-	-	-	-	-	161
LG Electronics Deutschland GmbH	-	-	-	-	-	-	286
LG ELECTRONICS WROCLAW SP. Z O.O.	-	-	-	-	-	17,673	231
LX Hausys, Ltd.	-	-	-	-	-	-	-
LG HOUSEHOLD & HEALTH CARE LTD	-	-	-	-	-	2,231	61
Shanjin Optoelectronics (Suzhou) ⁵	-	-	-	-	-	-	-
Total	10,334	235,342	257,676	-	-	32,995	15,310

¹ The amounts represent lease liabilities that were recognized or repaid for the years ended December 31, 2022 and 2021.

² The amount is related to the acquisition of 50% of the shares during the year ended December 31, 2022.

³ The entity has been excluded from the related parties due to the spin-off from LG Corp. during the year ended December 31, 2022. Transactions with this entity until the spin-off from LG Corp. have been included in the above information.

⁴ During the year ended December 31, 2022, the Company disposed its shares of Shanjin Optoelectronics (Taiwan) Co., LTD. amounting to USD 38 million. This amount is not included in the above table.

⁵ During the year ended December 31, 2021, the Company disposed its shares of LG Chem Display Materials (Beijing) Co., Ltd. amounting to USD 36 million. This amount is not included in the above table.

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Compensation for key management of the Group for the years ended December 31, 2022 and 2021, consists of:

<i>(in millions of Korean won)</i>	2022	2021
Short-term employee benefits	124,860	108,507
Post-employment benefits	<u>12,779</u>	<u>19,714</u>
Total	<u>137,639</u>	<u>128,221</u>

Key management includes directors and audit committee members having duties and responsibilities over planning, operations and controlling of the Group's business activities.

There are no provisions recognized against receivables from related parties as at December 31, 2022 and 2021; therefore, there are no impairment losses recognized against the receivables from related parties for the years ended December 31, 2022 and 2021.

As at December 31, 2022, the payment guarantees provided by the Group for related parties is presented in Note 18.

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32. Cash Flows

Cash generated from operations for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Profit before income tax	2,842,314	5,266,838
Profit before income tax from continuing operations	2,812,551	4,892,029
Profit before income tax from discontinued operations	<u>29,763</u>	<u>374,809</u>
Adjustments for:		
Depreciation	3,105,158	2,617,730
Amortization	290,921	223,178
Post-employment benefits	209,593	193,541
Finance income	(475,836)	(363,841)
Finance costs	710,368	416,873
Other foreign exchange differences	70,601	(37,417)
Loss on valuation of inventories	143,381	113,954
Gain on disposal of property, plant and equipment	(77,051)	(44,466)
Gain on disposal of intangible assets	(8)	(5,266)
Loss on disposal of property, plant and equipment	79,080	65,072
Loss on disposal of intangible assets	23,032	2,401
impairment loss on property, plant and equipment	38,661	29,925
Impairment loss on intangible assets	25,998	298,849
Gain on disposal of investments in associates	-	(6,098)
Gain on disposal of business	(35,445)	(371,125)
Additions to provisions	688,552	1,501,556
Other income	27,033	62,165
Increase in inventories	(3,818,016)	(2,816,268)
Increase in trade receivables	(1,446,523)	(653,921)
Decrease (increase) in other receivables	421,479	(567,365)
Increase in other current assets	(462,353)	(27,789)
Increase in trade payables	1,147,415	289,248
Increase in other payables	463,027	1,512,613
Increase in other current liabilities	165,520	267,640
Decrease in provisions	(1,343,399)	(664,261)
Decrease in net defined benefit liabilities	(588,368)	(308,035)
Other cash flows from operations	<u>145,163</u>	<u>(38,552)</u>
Cash generated from operations	<u>2,350,297</u>	<u>6,957,179</u>

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Changes in liabilities arising from financial activities for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022					At December 31, 2022
	At January 1, 2022	Cash flows from financing activities	Acquisition	Amortization	Others	
Short-term borrowings	6,373,909	1,168,663	-	-	67,351	7,609,923
Long-term borrowings	8,072,580	(273,232)	-	8,138	157,471	7,964,957
Debentures	319,245	(95,804)	172,352	-	(6,155)	389,638
Other payables for the reverse factoring arrangement	299,645	(299,645)	-	-	-	-
Total	15,065,379	499,982	172,352	8,138	218,667	15,964,518

<i>(in millions of Korean won)</i>	2021					At December 31, 2021
	At January 1, 2021	Cash flows from financing activities	Acquisition	Amortization	Others	
Short-term borrowings	4,352,214	1,902,731	-	-	118,964	6,373,909
Long-term borrowings	5,649,278	2,293,691	-	6,646	122,965	8,072,580
Debentures	184,625	(75,785)	212,929	-	(2,524)	319,245
Exchange rights	16,797	-	-	-	(16,797)	-
Other payables for the reverse factoring arrangement	2,081,307	(3,565,365)	-	-	1,783,703	299,645
Total	12,284,221	555,272	212,929	6,646	2,006,311	15,065,379

The significant non-cash transactions for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Reclassification of construction-in-progress	6,517,021	6,309,583
Reclassification of machinery-in-transit	108,802	378,865
Reclassification of long-term borrowings into current portion	2,431,697	1,865,862
Other payables related to acquisitions of property, plant and equipment and intangible assets	2,838,260	2,041,805
Reclassification of other payables under the reverse factoring arrangement	-	1,783,703
Exchange of treasury stocks such as exchangeable bonds	-	54,383
Transfer of non-current assets held for sale	23,129	-
Transfer of non-current liabilities held for sale	15	-

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33. Segment Information

General information about the Group's reportable segments is as follows:

Segment	Products or services	Major customers
Petrochemicals	ABS, PC, PE, PP, Acrylic, Alcohol, SAP, PVC, Synthetic rubber, Special resin, BPA, Ethylene, Propylene and others	LG Electronics Inc., OCI Group Co. Ltd., Mitsubishi Corp. and others
LG Energy solution	Mobile batteries, Automotive batteries, Electricity storage batteries and others	Hewlett-Packard Co., General Motors Corp., and others
Advanced materials	Automotive components, LCD Photoresist, OLED materials, anodic materials and others	LG Display Co., Ltd., Samsung Display Co., Ltd., BOE, AUO and others
Life sciences	Growth hormone, Vaccine, Antidiabetic, agricultural chemicals and others	UNICEF, Intervet, SOUSAM IMPORTACAO E EXPORTACAO LTDA and others
Common and others ¹	Crop protection products, Seeds, Fertilizers, General management, sales and R&D and others	National Agriculture Cooperative Federation and others

¹ The management approved to dispose of LCD polarizer business from the subsidiary in Taiwan and related profit and loss are presented as discontinued operations. The information for the comparative period has been restated to reflect these changes.

The segment information on revenue, profit and loss for the years ended December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022					
	Petro-chemicals	LG Energy Solution	Advanced materials	Life sciences	Common and others ³	Total
Total segment revenue	21,723,421	25,598,609	7,979,342	909,085	877,372	57,087,829
Inter-segment revenue	572,066	12,244	4,544,266	59,796	34,569	5,222,941
Revenue from external customers ¹	21,151,355	25,586,365	3,435,076	849,289	842,803	51,864,888
Operating profit (loss) ²	1,074,494	1,215,937	923,065	73,490	(291,288)	2,995,698
Depreciation and amortization	982,360	1,835,806	226,455	99,180	251,059	3,394,860
<i>(in millions of Korean won)</i>	2021					
	Petro-chemicals	LG Energy Solution	Advanced materials	Life sciences	Common and others ³	Total
Total segment revenue	20,759,589	17,820,701	4,792,356	760,357	792,304	44,925,307
Inter-segment revenue	584,097	16,838	1,589,375	70,011	65,702	2,326,023
Revenue from external customers ¹	20,175,492	17,803,863	3,202,981	690,346	726,602	42,599,284
Operating profit (loss) ²	4,081,476	771,121	235,900	66,991	(129,118)	5,026,370

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Depreciation and amortization	898,289	1,444,622	210,538	83,766	197,160	2,834,375
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¹ Revenue from external customers consists of sales of goods. Interest income and dividend income are included in finance income.

² Management assesses the performance of the operating segments based on a measurement of operating profit of segment.

³ Common and other segments include operating segments not qualifying as a reportable segment, supporting divisions as well as R&D divisions.

The segment information on assets and liabilities as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022					
	Petro-chemicals	LG Energy Solution	Advanced materials	Life sciences	Common and others	Total
Reportable segment asset ¹	14,894,527	38,260,414	6,828,293	1,794,744	6,195,845	67,973,823
Investments in associates and joint ventures	47,816	203,696	547,016	17	151,008	949,553
Reportable segment liability ¹	5,375,055	17,688,146	2,292,775	333,712	4,803,008	30,492,696

<i>(in millions of Korean won)</i>	2021					
	Petro-chemicals	LG Energy Solution	Advanced materials	Life sciences	Common and others	Total
Reportable segment asset ¹	15,297,794	23,728,448	4,972,040	1,576,987	5,560,033	51,135,302
Investments in associates and joint ventures	62,024	225,567	93,835	17	153,867	535,310
Reportable segment liability ¹	5,016,619	14,980,391	1,406,698	220,954	6,300,652	27,925,314

¹ Assets and liabilities are measured in a manner consistent with those in the financial statements, and allocated on the basis of segment operation.

The external sales and non-current assets by geographical segments from continuing operations for the years ended December 31, 2022 and 2021, and as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	Sales		Non-current assets¹	
	2022	2021	2022	2021
Korea ²	8,846,694	10,164,222	17,886,010	16,157,398
China	16,222,518	12,130,895	4,875,247	4,688,935
Asia / Oceania	5,775,377	5,190,798	229,732	147,809
America	9,048,043	4,309,768	4,846,029	1,692,631
Europe	11,485,654	10,351,454	4,609,954	4,192,086
Others	486,602	452,147	-	-
Total	51,864,888	42,599,284	32,446,972	26,878,859

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¹ Represents aggregate amount of property, plant and equipment, intangible assets and investment properties.

² Domestic sales include the exports made through local letters of credit.

There is no single external customer who contributes over 10% of the Group's revenue for the years ended December 31, 2022 and 2021.

34. Assets and Liabilities Held for Sale and Discontinued Operations

34.1 Assets and Liabilities Held for Sale

In accordance with the final approval of management in September 2022, the Group decided to dispose of all shares of VINA PLASTICIZERS CHEMICAL COMPANY LIMITED. As a result, the related assets were reclassified as assets held for sale. The disposal of acrylic film business was completed in April 2022, the disposal of LCD polarizer business in Taiwan was completed in July 2022. The land of FarmHannong Co., Ltd. which is held for sale in accordance with the river maintenance plan is in the process of the compensation plan with Gimhae City Hall.

In November 2022, the Group decided to dispose of the land and building related to former horticultural factory of FarmHannong Co., Ltd. As a result, the related assets were reclassified as assets held for sale.

Details of assets and liabilities of disposal group classified as held for sale as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Assets of disposal group		
Property, plant and equipment	10,658	5,364
Investments in joint ventures	16,822	-
Total	<u>27,480</u>	<u>5,364</u>

Assets of the disposal group were measured at the lower of net fair value and book value immediately before the initial classification as assets held for sale and there are no other non-operating expenses (income) recognized from the measurement for the years ended December 31, 2022 and 2021.

34.2 Discontinued Operations

The Group decided to discontinue Glass substrate business with the resolution of the Board of Directors in January 2020 and substantially discontinued the related business as at March 2020. In addition, the Group decided to dispose of LCD polarizer business with the resolution of the Board of Directors in June 2020, and the disposal has been completed in February 2021. The Group disposed of all of its shares of Ugimag Korea Co., Ltd., in July 2021, and determined to dispose of LCD polarizer business in Taiwan in May 2022 and the disposal was completed in July 2022. Accordingly, the profit and loss from the related operations are presented as discontinued operations and the comparative consolidated statements of profit or loss have been restated.

Comprehensive income information from discontinued operation for the years ended December 31, 2022 and 2021, are as follows:

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(in millions of Korean won)

	2022		
	LCD polarizer	Glass substrate	Total
Revenue	80,185	354	80,539
Expense	(47,593)	(3,183)	(50,776)
Profit (loss) before income tax of discontinued operation	32,592	(2,829)	29,763
Income tax benefits (expense)	(5,958)	644	(5,314)
Profit (loss) after income tax of discontinued operations	26,634	(2,185)	24,449

(in millions of Korean won)

	2021			
	LCD polarizer	Glass substrate	Ugimag	Total
Revenue	705,664	10,026	11,609	727,299
Expense	(303,604)	(8,230)	(40,656)	(352,490)
Profit (loss) before income tax of discontinued operation	402,060	1,796	(29,047)	374,809
Income tax benefits (expense)	(85,508)	(443)	8,795	(77,156)
Profit (loss) after income tax of discontinued operations	316,552	1,353	(20,252)	297,653

Net cash flows from discontinued operations for the years ended December 31, 2022 and 2021, are as follows:

(in millions of Korean won)

	2022		
	LCD polarizer	Glass substrate	Total
Net cash outflow from operating activities	(4,558)	(2,782)	(7,340)
Net cash inflow from investing activities	45,119	712	45,831
Net cash inflow(outflow) from financing activities	(40,561)	2,070	(38,491)

(in millions of Korean won)

	2021			
	LCD polarizer	Glass substrate	Ugimag	Total
Net cash inflow (outflow) from operating activities	251,744	(7,266)	6,022	250,500
Net cash inflow from investing activities	1,277,333	10,923	27,964	1,316,220
Net cash outflow from financing activities	(1,541,577)	(3,657)	(33,985)	(1,579,219)

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35. Assets and Liabilities related to Contracts with Customers

Assets and liabilities related to contracts with customers as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Contract assets		
Due from customers for contract work	11,570	-
Total contract assets	<u>11,570</u>	<u>-</u>
Contract liabilities		
Advances in relation to revenue from the Group's main business activities	364,763	376,487
Expected customer incentives	6,277	5,636
Unearned revenue	140,024	167,151
Due to customers for contract work	14,315	-
Total contract liabilities	<u>525,379</u>	<u>549,274</u>

Revenue recognized in relation to contract liabilities

The following table shows how much of the revenue recognized in the current reporting period relates to carried-forward contract liabilities and how much relates to performance obligations that were satisfied in the prior periods.

<i>(in millions of Korean won)</i>	2022	2021
Revenue recognized in the current period from the contract liabilities balance at the beginning of the period	242,438	205,125
Advances in relation to revenue from the Group's main business activities	191,414	200,987
Unearned revenue	51,024	4,138
Revenue recognized from performance obligations satisfied in previous periods	-	-

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36. Investment Properties

Details of investment properties as at December 31, 2022 and 2021, are as follows:

(in millions of Korean won)	2022				2021			
	Acquisition cost	Accumulated depreciation	Accumulated impairment	Book amount	Acquisition cost	Accumulated depreciation	Accumulated impairment	Book amount
Land	5,287	(46)	(497)	4,744	4,211	-	-	4,211
Buildings	123,296	(15,764)	(18,250)	89,282	65,542	(13,409)	(47)	52,086
Total	128,583	(15,810)	(18,747)	94,026	69,753	(13,409)	(47)	56,297

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

(in millions of Korean won)	2022			2021		
	Land	Building	Total	Land	Building	Total
Beginning balance	4,211	52,086	56,297	4,211	45,222	49,433
Acquisitions/transfers	1,562	60,018	61,580	-	8,233	8,233
Disposals/transfers	(486)	(1,493)	(1,979)	-	(73)	(73)
Depreciation	(46)	(3,130)	(3,176)	-	(1,296)	(1,296)
Impairment ¹	(497)	(18,199)	(18,696)	-	-	-
Ending balance	4,744	89,282	94,026	4,211	52,086	56,297

¹ Impairment recognized for Magok contributed public facility classified as investment properties. As the recoverable amount was less than the carrying amount due to the impact of lease payment setting for public purposes and others, impairment losses were recognized during the year ended December 31, 2022.

The fair value of investment properties is measured either by independent professional appraisers with certified qualification or measured based on official appraised value of land and available information from recent transactions of similar properties, and it is classified as 'level 3' of the fair value hierarchy. The fair value of investment properties as at December 31, 2022, is ₩102,298 million (2021: ₩66,861 million).

Rental income from investment properties under operating lease is ₩7,857 million (2021: ₩6,752 million), and operating expenses incurred for investment properties that generated rental income (including maintenance and repair expenses) are ₩3,409 million (2021: ₩1,283 million). Operating expenses incurred for investment properties that do not generate rental income (including maintenance and repair expenses) are ₩8 million (2021: ₩12 million).

Operating lease

Investment properties are leased to tenants under operating leases with monthly rent payments. Where considered necessary to reduce credit risk, the Group may obtain bank guarantees for the term of the lease.

Although the Group is exposed to changes in the residual value at the end of the current leases, the Group typically enters into new operating leases and therefore will not immediately realize any reduction in residual value at the end of these leases. Expectations about the future residual values

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are reflected in the fair value of investment properties.

The future minimum lease payments expected to be received in relation to the above operating lease agreement for investment properties as at December 31, 2022 and 2021, are as follows:

<i>(in millions of Korean won)</i>	2022	2021
Within one year	8,575	6,874
Within two years	2,039	6,016
Within five years	6,106	-
Total	<u>16,720</u>	<u>12,890</u>

37. Business Combination

On February 28, 2022, the Group acquired 100% shares of LG Energy Solution Vertech Inc., an electricity storage batteries installation service provider in USA. The acquisition is expected to increase sales through expanded vertical integration by strengthening contact points with customers of electricity storage batteries.

Details of consideration transferred, assets and liabilities recognized as a result of the business combination, are as follows:

Gain from a bargain purchase amounting to ₩30,673 million occurred from the acquisition is recognized as other non-operating income in the consolidated statement of profit or loss.

<i>(in millions of Korean won)</i>	Amount
Consideration transferred	
Cash and cash equivalents	<u>16,168</u>
Total consideration	<u>16,168</u>
Identifiable assets acquired and liabilities assumed	
Cash and cash equivalents	7,748
Trade and other receivables ¹	56,333
Inventories	5,477
Property, plant and equipment	7,251
Intangible assets	1,503
Other assets	12,295
Trade and non-trade payables	(25,859)
Other payables	(15,543)
Deferred tax liabilities	<u>(2,364)</u>
Fair value of net identifiable assets acquired	<u>46,841</u>
Goodwill (gain from a bargain purchase)	<u>(30,673)</u>
Total	<u>16,168</u>

¹ The fair value of trade and other receivables is equal to the total contractual amount.

The revenue and net loss for the year ended December 31, 2022 contributed by LG Energy Solution Vertech Inc. since the acquisition date were ₩60,224 million and ₩ 23,881 million, respectively.

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Revenue and profit or loss of the Group for the year ended December 31, 2022 would have been ₩ 51,864,206 million and ₩ 2,174,754 million, respectively as though the acquisition of LG Energy Solution Vertech Inc. had occurred as at the beginning of the year ended December 31, 2022

The Group accounts for the business combination with provisional amounts as at December 31, 2022 and the amounts may be adjusted if there is new information obtained about facts and circumstances related to business combination within the measurement period of one year from the acquisition date.

On November 1, 2021, the Parent Company and its subsidiary, LG Chem Poland Sp. z o.o., acquired CEM (Chemical Electronics Material) business from LG Electronics Inc. to drive competitive separator business. The Parent Company acquired the domestic CEM business for ₩ 389,973 million and the 70% shares of LG Chem Hangzhou Advanced Materials Co., Ltd. (formerly, LG Electronics(Hangzhou) Co., Ltd) for ₩67,027 million. LG Chem Poland Sp. z o.o., a subsidiary, acquired CEM business in Poland for ₩67,700 million.

The goodwill of ₩202,568 million arising from the business combination is attributable to sales increase from combining the operations of the Group and CEM business.

Details of consideration transferred, assets and liabilities recognized as a result of the business combination, are as follows:

<i>(in millions of Korean won)</i>	LG Chem Ltd.	LG Chem Poland Sp. Z.o.o
Consideration transferred		
Cash and cash equivalents	457,000	67,700
Total consideration	<u>457,000</u>	<u>67,700</u>
Identifiable assets acquired and liabilities assumed		
Cash and cash equivalents	4,376	-
Trade and other receivables ¹	190,386	26,228
Inventories	43,084	36,627
Property, plant and equipment	211,373	38,755
Intangible assets	48,841	447
Other assets	4,204	-
Trade and other payables	(213,669)	(24,602)
Provisions	(1,809)	(597)
Net defined benefit liabilities	(9,622)	-
Other liabilities	(5,930)	(522)
Deferred tax liabilities	(3,851)	-
Fair value of net identifiable assets acquired	<u>267,383</u>	<u>76,336</u>
Less: non-controlling interest	<u>(12,951)</u>	<u>-</u>
Acquired amount attributable to the Parent Company	254,432	76,336
Goodwill	202,568	-
Gain (loss) from a bargain purchase	-	(8,636)
Total	<u>457,000</u>	<u>67,700</u>

¹ The fair value of trade and other receivables as of the acquisition date and the total contractual amount are ₩217,624 million, of which the amount that is not expected to be recovered is ₩1,010 million.

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38. Events after the Reporting Period

- (a) On January 20, 2023, the Group acquired 100% shares of Aveo Pharmaceuticals, Inc. through a capital investment in LG Chem Life Science Innovation Center, Inc., its subsidiary, to penetrate into the anticancer medicine market in the United States.

Meanwhile, the assessment of fair value for net assets of Aveo Pharmaceuticals, Inc., including measurement of fair value of tangible assets and recognition of identifiable intangible assets, has not yet been completed, and accordingly, purchase price allocation procedures have not been completed.

- (b) The Group decided to borrow loans in foreign currencies and issue non-guaranteed debentures in KRW currency by resolution of the Management Committee held on January 3, 2023. Accordingly, the Group borrowed USD 400 million on January 26, 2023 and issued bonds in KRW 800,000 million on January 27, 2023.

<i>(in millions of USD and Korean won)</i>	Maturity date	Amount	
Foreign currency borrowing (2 years maturity)	2025.01.26	USD	200
Foreign currency borrowing (3 years maturity)	2026.01.26	USD	200
Non-guaranteed bonds in KRW (2 years maturity)	2025.01.27	KRW	150,000
Non-guaranteed bonds in KRW (3 years maturity)	2026.01.27	KRW	415,000
Non-guaranteed bonds in KRW (5 years maturity)	2028.01.25	KRW	235,000

- (c) In February 2023, the Group has entered into the long-term supply agreement of EV battery module with the US Freudenberg E-Power Systems (FEPS) in order to secure sales channel in the fast growing commercial vehicle (bus, truck and others) field.
- (d) The Group borrowed KRW 80 billion in January 2023 and KRW 80 billion in February 2023 for refinancing of debentures and operating funds.

39. Approval of Issuance of the Financial Statements

The consolidated financial statements 2022 were approved for issue by the Board of Directors on January 31, 2023 and are subject to change with approval of shareholders at their Annual General Meeting.