

LG Chem, Ltd. and Subsidiaries

Consolidated Financial Statements
December 31, 2021 and 2020

LG Chem, Ltd. and Subsidiaries

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December 31, 2021 and 2020

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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, 2021 and 2020, 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, 2021 and 2020, 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.

Emphasis of Matter

Without modifying our opinion, we draw attention to the following matters of the consolidated financial statements.

Uncertainty relating to COVID-19

Note 4 to the consolidated financial statements describes management's plans and action taken to resolve uncertainty relating to the impact of Coronavirus disease 2019 (COVID-19) on the Group's productivity and ability to satisfy customer's orders, and to solve these events or circumstances.

Settlement with SK on, Co., Ltd.

As described in Note 37 to the consolidated financial statements, on May 15, 2021, the Group and SK Innovation Co., Ltd., which has spun off its battery business into SK on Co., Ltd., later in 2021, have entered into an agreement to settle all legal disputes relating to trade secret infringement. In accordance with the agreement, SK on Co., Ltd. agreed to pay the Group lump-sum payments of KRW 1 trillion and running royalties of KRW 1 trillion based on certain percentage of annual revenues of SK on Co., Ltd. for certain periods in the future. During the year ended December 31, 2021, the Group recognized operating income of KRW 992,233 million for the lump-sum payments (discounted present value of the lump-sum payments of KRW 1 trillion).

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) Goodwill impairment assessment for Life Sciences Cash Generating Unit

Why this matter was determined to be a key audit matter

We focused on goodwill impairment assessment due to the significance of size of goodwill balance (₩ 803,924 million as at December 31, 2021) and because the measurement of the 'recoverable amount' of the Group's Cash Generating Units (CGUs) involves management's judgements about the future results of the business, discount rate and adjustments arising from the perspective of market participants. 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, 2021) which is the most significant element among all relevant CGUs with goodwill. The Life Sciences business was acquired by the Group in 2017 and has recognized ₩ 294,918 million of impairment loss on goodwill for the year ended December 31, 2021. Considering the size of the balance and impairment loss recognized on this goodwill as well as the significant level of management's judgment involved for the estimation of value-in-use, we have included this matter as a key audit matter.

How this matter was addressed the in our audit

Audit procedures we performed to address this key audit matter include:

- Understanding, evaluation and testing of 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.
- Evaluation of valuation model used by management to estimate value-in-use.
- Evaluation of the competence and objectivity of the expert utilized by the management
- Comparison of 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.
- Comparison of the current year actual results with the prior year forecasts to assess whether management's forecasts include optimistic assumptions.
- Evaluation of management's assumptions used to estimate value-in-use.
 - Comparison of 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.
 - Evaluation of long-term growth rate by considering economic and industry forecasts
 - Comparison of the discount rate used by the management with the discount rate independently calculated by us using observable information in the market.
- Evaluation of CGUs identification and testing of book values allocated to CGUs
- Evaluation of sensitivity analysis performed by management on the discount rate and terminal growth rate

(2) Purchase price allocation

Why this matter was determined to be a key audit matter

As disclosed in Note 38 to the consolidated financial statements, on November 1, 2021, the Group acquired CEM(Chemical Electronics Material) business from LG Electronics Inc. for ₩ 524,700 million and accounted for the acquisition in accordance with Korean IFRS 1103 *Business Combinations*. LG Chem, Ltd. acquired the domestic CEM business for ₩ 389,973 million and the 70% shares of LG Chem Hangzhou Advanced Materials Co., Ltd.(former, 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 consideration transferred has been allocated to assets and liabilities acquired based on their fair values. The Group utilized an independent external expert for the valuation of the fair value of major tangible and intangible assets acquired.

Considering the size of the consideration transferred and the significant level of management's judgment involved for the allocation of consideration transferred, we have included this matter as a key audit matter.

How this matter was addressed the in our audit

Audit procedures we performed to address this key audit matter include:

- Understanding and evaluation of the design and operating effectiveness of relevant internal controls in place in connection with business combination including management's review of future cash flow forecasts and assumptions applied in the fair value determination, etc.
- Review of the agreements for business combination
- Evaluation of the competence and objectivity of the external experts utilized by the management
- Procedures performed by the auditor's expert included:
 - Evaluation of the valuation model used to determine the fair value of identifiable intangible assets and other assets/liabilities.
 - Evaluation of the key assumptions and variables used in the fair value determination.
 - Testing of mathematical accuracy of the fair value calculation.
 - Assessment of the appropriateness of disclosures in the notes to the consolidated financial statements in relation to this business combination.

(3) Warranty provision of LG Energy Solution, Ltd.

Why this matter was determined to be a key audit matter

LG Energy Solution, Ltd. and its subsidiaries ("LG Energy Solution"), as a subsidiary of the Group, are engaged in Energy Solution business and recognizes provisions for product warranties. These provisions are estimated based on historical experience, etc. Provisions related to voluntary recalls for customers are estimated based on the number of vehicles subject to recall, estimated total repair cost, and cost sharing ratio.

As disclosed in Note 15 to the consolidated financial statements, the warranty provision in the consolidated financial statements as at December 31, 2021 amounted to ₩ 2,110,180 million of which warranty provision of LG Energy Solution amounted to ₩ 2,103,880 million. Considering the size of the warranty provision and the significant level of management's judgment involved in the estimation, we have included this matter as a key audit matter.

How this matter was addressed the in our audit

Audit procedures we performed to address this key audit matter include:

- Understanding of the Group's accounting policies and internal controls in place related to the warranty provision.
- Comparison of the data used by management for the estimation of warranty provision with internal and external information.
- Comparison of the actual results with the estimates to assess whether key assumptions used by

management for the estimation of warranty provision are reasonable.

- Mathematical recalculation for the estimated warranty provision.
- Assessment of the appropriateness of disclosures in the notes to the consolidated financial statements in relation to 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 Kibok Lee, Certified Public Accountant.

Seoul, Korea

March 8, 2022

<p>This report is effective as of March 8, 2022, 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.</p>
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LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2021 and 2020

<i>(in millions of Korean won)</i>	Notes	2021	2020
Assets			
Current assets			
Cash and cash equivalents	3, 5, 6	3,760,834	3,274,250
Trade receivables	3, 5, 7, 31	6,386,979	5,298,365
Other receivables	3, 5, 7, 31	1,048,549	924,303
Other current financial assets	3, 5, 8	23,289	23,821
Prepaid income taxes		156,299	17,049
Other current assets	13	749,032	643,152
Inventories	9	8,283,474	5,349,688
Assets held for sale	34	5,364	789,072
Total current assets		20,413,820	16,319,700
Non-current assets			
Trade receivables	3, 5, 7	67,055	29,376
Other receivables	3, 5, 7	713,166	255,030
Other non-current financial assets	3, 5, 8	506,022	81,532
Investments in associates and joint ventures	1, 10, 33	535,310	309,329
Deferred tax assets	28	1,905,149	1,409,757
Property, plant and equipment	11	24,378,259	20,567,475
Intangible assets	12	2,444,303	2,279,917
Investment properties	36	56,297	49,433
Other non-current assets	13	115,921	87,345
Total non-current assets		30,721,482	25,069,194
Total assets		51,135,302	41,388,894
Liabilities			
Current liabilities			
Trade payables	3, 5, 31	3,742,132	3,458,526
Other payables	3, 5, 31	3,991,784	5,266,974
Borrowings	3, 5, 14	3,477,080	1,548,815
Other current financial liabilities	3, 5, 8	-	16,797
Provisions	15	1,572,755	1,041,451
Income tax payables	28	957,676	373,244
Other current liabilities	17	1,320,669	788,029
Liabilities held for sale	34	-	130,383
Total current liabilities		15,062,096	12,624,219
Non-current liabilities			
Other payables	3, 5	15,623	11,927
Borrowings	3, 5, 14	11,288,654	8,637,302
Other non-current financial liabilities	3, 5, 8	126	41,768
Provisions	15	636,953	328,556
Net defined benefit liabilities	16	18,122	117,959
Deferred tax liabilities	28	713,862	689,817
Other non-current liabilities	17	189,878	146,906
Total non-current liabilities		12,863,218	9,974,235
Total liabilities		27,925,314	22,598,454

LG Chem, Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2021 and 2020

(in millions of Korean won)

	Notes	2021	2020
Equity			
Share capital	1, 19	391,406	391,406
Capital surplus		2,696,385	2,692,485
Other components of equity	21	(37,310)	(54,998)
Accumulated other comprehensive income		551,354	(165,076)
Retained earnings	20	18,091,949	15,175,304
Equity attributable to owners of the Parent Company		<u>21,693,784</u>	<u>18,039,121</u>
Non-controlling interests		1,516,204	751,319
Total equity		<u>23,209,988</u>	<u>18,790,440</u>
Total liabilities and equity		<u>51,135,302</u>	<u>41,388,894</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, 2021 and 2020

<i>(in millions of Korean won, except per share amounts)</i>	Notes	2021	2020
Revenue	31, 33	42,654,722	30,058,872
Cost of sales	23, 31	<u>(31,436,412)</u>	<u>(23,741,385)</u>
Gross profit		11,218,310	6,317,487
Selling and administrative expenses	22, 23, 31	<u>(6,192,844)</u>	<u>(4,512,128)</u>
Operating profit	33	5,025,466	1,805,359
Finance income	5, 25	686,684	417,461
Finance costs	5, 25	(660,789)	(1,108,879)
Share of net profit of associates and joint ventures accounted for using the equity method	10	(6,609)	9,343
Other non-operating income	5, 26	903,155	1,155,129
Other non-operating expenses	5, 27	<u>(1,057,255)</u>	<u>(1,326,816)</u>
Profit before income tax	32	4,890,652	951,597
Income tax expense	28	<u>(1,235,790)</u>	<u>(367,839)</u>
Profit from continuing operations		<u>3,654,862</u>	<u>583,758</u>
Profit from discontinued operations	34	<u>299,042</u>	<u>98,650</u>
Profit for the year		<u>3,953,904</u>	<u>682,408</u>
Profit is attributable to:			
Owners of the Parent Company			
Profit from continuing operations		3,370,745	413,984
Profit from discontinued operations		<u>299,042</u>	<u>98,650</u>
		3,669,787	512,634
Non-controlling interests			
Profit from continuing operations		<u>284,117</u>	<u>169,774</u>
		284,117	169,774
Earnings per share for profit attributable to the equity holders of the Parent Company (in won)	29		
Basic earnings per ordinary share		47,108	6,666
Basic earnings per preferred share		47,158	6,716
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		43,269	5,382
Basic earnings per preferred share		43,319	5,432

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, 2021 and 2020

<i>(in millions of Korean won)</i>	Notes	2021	2020
Profit for the year		<u>3,953,904</u>	<u>682,408</u>
Other comprehensive income			
<i>Items that will not be reclassified to profit or loss</i>			
Remeasurements of net defined benefit liabilities	16	37,871	25,345
Gain on valuation of financial assets at fair value through other comprehensive income		15,990	2,364
Shares of remeasurements of net defined benefit liabilities of associates		(234)	365
Income tax relating to these items		(13,451)	(7,580)
<i>Items that may be subsequently reclassified to profit or loss</i>			
Exchange differences on translation of foreign operations		769,186	(115,678)
Cash flow hedge		(18,083)	2,451
Shares of other comprehensive income of associates and joint ventures		14,724	29,554
Income tax relating to these items		41,165	(7,071)
Other comprehensive income (loss) for the year, net of tax		<u>847,168</u>	<u>(70,250)</u>
Total comprehensive income for the year		<u>4,801,072</u>	<u>612,158</u>
Total comprehensive income for the year is attributable to:			
Owners of the Parent Company		4,413,552	451,834
Non-controlling interest		387,520	160,324

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, 2020 and 2019

(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, 2020	391,406	2,274,620	(374,243)	(85,496)	14,798,690	17,004,977	378,812	17,383,789
Comprehensive income								
Profit for the year	-	-	-	-	512,634	512,634	169,774	682,408
Remeasurements of net defined benefit liabilities	16	-	-	-	18,415	18,415	-	18,415
Exchange differences on translation of foreign operations	-	-	-	(112,625)	-	(112,625)	(9,450)	(122,075)
Gain on valuation of financial assets at fair value through other comprehensive income	-	-	-	1,714	-	1,714	-	1,714
Cash flow hedge	-	-	-	1,777	-	1,777	-	1,777
Others	-	-	-	29,554	365	29,919	-	29,919
Total comprehensive income for the year	-	-	-	(79,580)	531,414	451,834	160,324	612,158
Transactions with owners:								
Disposal of treasury shares	30	417,865	319,245	-	-	737,110	-	737,110
Dividends	-	-	-	-	(153,608)	(153,608)	(24,040)	(177,648)
Increase in paid-in capital of a subsidiary	-	-	-	-	-	-	236,620	236,620
Others	-	-	-	-	(1,192)	(1,192)	(397)	(1,589)
Total transactions with owners	-	417,865	319,245	-	(154,800)	582,310	212,183	794,493
Balance at December 31, 2020	391,406	2,692,485	(54,998)	(165,076)	15,175,304	18,039,121	751,319	18,790,440
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	-	-	-	13,115	-	13,115	-	13,115
Cash flow hedge	-	-	-	(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	-	-	-	-	-	-	12,951	12,951
Disposal of treasury shares	-	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

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, 2021 and 2020

<i>(in millions of Korean won)</i>	Notes	2021	2020
Cash flows from operating activities			
Cash generated from operations	32	6,957,179	6,526,644
Interest received		44,792	28,918
Interest paid		(223,452)	(215,865)
Dividends received		13,093	14,263
Income taxes paid		(1,281,796)	(513,128)
Net cash inflow from operating activities		<u>5,509,816</u>	<u>5,840,832</u>
Cash flows from investing activities			
Decrease in other receivables		642,252	79,603
Decrease in other non-current receivables		113,827	75,745
Proceeds from disposal of investments in associates		35,302	382,941
Proceeds from disposal of financial instruments		22,202	91,263
Proceeds from disposal of property, plant and equipment		85,616	37,482
Proceeds from disposal of intangible assets		163	17,182
Government grants received		351,127	273,577
Proceeds from disposal of investments in subsidiaries		1	-
Proceeds from disposal of assets held for sale		103,357	93,165
Proceeds from transfer of business		906,658	354,466
Increase in other receivables		(151,907)	(658,735)
Increase in other non-current receivables		(529,359)	(136,854)
Acquisition of investments in associates and joint ventures		(257,676)	(44,006)
Acquisition of financial assets		(248,012)	(18,519)
Acquisition of property, plant and equipment		(5,773,593)	(5,535,791)
Acquisition of intangible assets		(128,939)	(123,592)
Cash outflows from transfer of business		(520,324)	(184,302)
Net cash outflow from investing activities		<u>(5,349,305)</u>	<u>(5,296,375)</u>
Cash flows from financing activities			
Proceeds from borrowings		5,661,093	4,073,803
Disposal of treasury shares		8,835	-
Capital contribution from non-controlling interests		626,883	236,621
Repayments of borrowings and others		(5,105,821)	(3,194,707)
Decrease in non-controlling interests		(197,603)	-
Dividends paid		(869,717)	(177,648)
Net cash inflow from financing activities		<u>123,670</u>	<u>938,069</u>
Net increase in cash and cash equivalents			
Cash and cash equivalents at the beginning of the year		3,274,250	1,888,631
Effects of exchange rate changes on cash and cash equivalents		202,403	(84,407)
Cash and cash equivalents included in disposal groups classified as held for sale		-	(12,500)
Cash and cash equivalents at the end of the year in the consolidated statement of financial position		<u>3,760,834</u>	<u>3,274,250</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, 2021 and 2020

1. General Information

General information about LG Chem, Ltd. (the Parent Company) and its fifty six 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, 2021, 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, 2021, 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 polarizer, 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.

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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

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

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LG PETRONAS CHEMICALS Malaysia Sdn. Bhd. ⁹	51	Malaysia	December	NBL manufacturing and sales
LG Hangzhou Advanced Materials Co., Ltd. ¹⁰	70	China	December	EP manufacturing and sales
LG BCM ¹¹	100	Korea	December	EP manufacturing and sales
LG Chem Ohio Petrochemical, Inc. ¹²	100	USA	December	ABS manufacturing and sales
FarmHannong Co., Ltd. ¹³	100	Korea	December	Agricultural pesticide manufacturing and sales
Farmhannong America, Inc. ¹³	100	USA	December	Agricultural pesticide sales
FarmHannong(Thailand) Ltd. ¹³	100	Thailand	December	Research and development on seeds
FARMHANNONG(MALAYSIA) SDN. BHD. ¹³	100	Malaysia	December	Agricultural pesticide licensing
PT FARM HANNONG INDONESIA ^{7,13}	100	Indonesia	December	Agricultural pesticide licensing
FarmHannong do Brasil Limitada ¹³	100	Brazil	December	Agricultural pesticide sales
LG Energy Solution (Nanjing) Co., Ltd. ¹	100	China	December	Battery manufacturing and sales
LG Energy Solution Michigan Inc ¹	100	USA	December	Automotive battery research and manufacturing
LG Energy Solution Battery (Nanjing) Co., Ltd. ¹	100	China	December	Automotive battery manufacturing and sales
LG Energy Solution Wroclaw sp. z o.o. ¹	100	Poland	December	Automotive battery manufacturing and sales
LG Energy Solution Australia Pty Ltd ¹	100	Australia	December	Energy saving battery sales
LG Energy Solution Technology (Nanjing) Co., Ltd. ¹	100	China	December	Battery manufacturing and sales
Ultium Cells LLC ^{1, 16}	50	USA	December	Automotive battery manufacturing and sales
LG Energy Solution Europe GmbH ¹	100	Germany	December	Sales and trading
LG Energy Solution (Taiwan), Ltd. ¹	100	Taiwan	December	Sales and trading
Aremnuri. Co. Ltd ¹	100	Korea	December	Facility management and general cleaning
LG Energy Solution Fund I LLC ¹	100	USA	December	Investments in venture companies
Associates				
TECHWIN Co., Ltd.	20	Korea	December	Environment solution and construction of chemical plant
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA. ¹⁵	100	Brazil	December	Sales and trading
LG Chem Malaysia SDN.BHD. ¹⁵	100	Malaysia	December	Sales and trading
LG Chem Life Sciences Poland Ltd. ¹⁵	100	Poland	December	Pharmaceutical products sales
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD. ¹⁶	49	China	December	Battery materials manufacturing and sales
TL Chemical CO., Ltd ¹⁷	40	Korea	December	AN manufacturing and sales
VINFAST LITHIUM BATTERY PACK LLC. ¹	35	Vietnam	December	Battery manufacturing and sales
Jiangxi VL Battery., Ltd. ¹	34	China	December	Battery manufacturing and sales
Joint ventures				
VINA Plasticizers Chemical Co.,Ltd. ¹⁸	50	Vietnam	December	DOP production and sales
SEETEC Co., Ltd.	50	Korea	December	Plant utility and distribution, research assistance service
PT.HLI Greenpower Co., Ltd. ^{1, 14, 19}	50	Indonesia	December	Automotive battery manufacturing and sales

¹ These are subsidiaries, associates, and joint venture of LG Energy Solution, Ltd. As at December 31, 2021, the Parent Company owns 100% of LG Energy Solution, Ltd.'s shares.

² As at December 31, 2021, Ningbo LG Yongxing Chemical Co., Ltd. owns 100% of Ningbo Zhenhai LG Yongxing Trading Co., Ltd.'s shares.

³ As at December 31, 2021, LG Chemical India Pvt. Ltd. owns 100% of LG Polymers India Pvt. Ltd.'s shares.

⁴ As at December 31, 2021, LG Chem (China) Investment Co., Ltd. owns 100% of LG Chem China Tech Center's shares. LG Chem China Tech Center was newly established during the year ended December 31, 2021, and the Group newly acquired 100% shares of LG Chem China Tech Center for ₩32,311 million.

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- ⁵ During the year ended December 31, 2021, the Parent Company additionally acquired shares of LG Jiansheng Life Sciences (Beijing) Co., Ltd. for ₩2,257 million. The entity name of LG Jiansheng Life Sciences (Beijing) Co., Ltd. has been changed from LG Chem Life Sciences (Beijing) Co., Ltd. and the percentage of ownership of the Parent Company has decreased to 60%.
- ⁶ During the year ended December 31, 2021, the Parent Company additionally acquired shares of LG CHEM FUND I LLC for ₩11,253 million.
- ⁷ LG Chem Asia Pte. Ltd. was newly established during the year ended December 31, 2021, and the Parent Company acquired 100% shares of LG Chem Asia Pte. Ltd. for ₩821 million.
- ⁸ Shanjin Optoelectronics (Taiwan) Co., Ltd. was newly established during the year ended December 31, 2021, and the Parent Company acquired 100% shares of Shanjin Optoelectronics (Taiwan) Co., Ltd. for ₩55,297 million.
- ⁹ LG PETRONAS CHEMICALS Malaysia Sdn.Bhd. was newly established during the year ended December 31, 2021, and the Parent Company acquired 51% shares of LG PETRONAS CHEMICALS Malaysia Sdn.Bhd. for ₩36,867 million.
- ¹⁰ During the year ended December 31, 2021, the Parent Company newly acquired 70% shares of LG Chem Hangzhou Advanced Materials Co., Ltd. for ₩67,027 million.
- ¹¹ LG BCM was newly established during the year ended December 31, 2021, and the Parent Company acquired 100% shares of LG BCM for ₩53,504 million.
- ¹² LG Chem Ohio Petrochemical, Inc. was newly established during the year ended December 31, 2021, and the Parent Company acquired 100% shares of LG BCM for ₩22,516 million.
- ¹³ As at December 31, 2021, FarmHannong Co., Ltd. owns 100% ownership in Farmhannong America, Inc., FarmHannong(Thailand) Ltd., FARMHANNONG(MALAYSIA) SDN.BHD., PT FARM HANNONG INDONESIA and FarmHannong do Brasil Limitada.
- ¹⁴ PT.HKML Battery Indonesia was newly established in accordance with a joint arrangement in which the Group participated during the year ended December 31, 2021. This investment is classified as a joint venture since the joint arrangement is structured through a separate vehicle and the Group has rights to the net assets of the arrangement.
- ¹⁵ Classified as an investment in associate due to its small size.
- ¹⁶ The Group possesses control over Ultium Cells LLC as the Group 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.
- ¹⁷ TL Chemical CO., Ltd. was newly established during the year ended December 31, 2021, and the Parent Company acquired 40% shares of TL Chemical CO., Ltd. for ₩48,544 million.
- ¹⁸ LG VINA Chemical Co.,Ltd. changed its name to VINA Plasticizers Chemical Co., Ltd. during the year ended December 31, 2021.
- ¹⁹ HKML Battery Indonesia changed its name to PT.HLI Green Power. during the year ended December 31, 2021.

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:

(in millions of Korean won)

	December 31, 2021			2021	
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the period
Subsidiaries					
LG Energy Solution, Ltd. ^{1,2}	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)

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LG Chemical (Guangzhou) Engineering Plastics Co.,Ltd.	119,231	42,590	76,641	273,693	7,344
LG Chem (Taiwan), Ltd.	109,772	35,905	73,867	108,308	1,761
LG Chem Display Materials (Beijing) Co.,Ltd. ²	-	-	-	-	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 ³	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. ²	317,592	109,131	208,461	176,337	(12,007)
LEYOU NEW ENERGY MATERIALS(WUXI) Co.,LTD	608,961	172,607	436,354	655,602	62,083
LG Chem Fund I LLC	45,922	9	45,913	-	(2,084)
Ugimag Korea Co., Ltd. ²	-	-	-	11,512	(3,838)
Uniseal,Inc. ³	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.	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. ^{1,3}	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 Q UIMICO LTDA.	729	91	638	1,659	182
LG Chem Malaysia SDN.BHD.	525	2	523	687	82
LG Chem Life Sciences Poland Ltd.	188	70	118	183	5
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 Plasticizers 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
PT.HLI Green Power	404,131	1,156	402,975	-	(18,402)

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¹ LCD polarizer business of these entities was classified as discontinued operations and profit or loss from the business was included in profit from discontinued operations(Note 34).

² Fair value adjustments due to business combination recorded in the consolidated financial statements are not included in the above information.

³ Represent financial information of intermediate parent company consolidating its subsidiaries.

(in millions of Korean won)

	December 31, 2020			2020	
	Assets	Liabilities	Equity	Revenue	Profit (loss) for the year
Subsidiaries					
LG Energy Solution, Ltd.	12,342,717	5,090,619	7,252,098	632,954	(377,980)
Ningbo LG Yongxing Chemical Co.,Ltd.	1,092,905	219,173	873,732	1,718,744	363,954
Ningbo Zhenhai LG Yongxing Trade Co.,Ltd.	6,224	1,303	4,921	21,144	413
LG Chem America, Inc.	237,946	208,031	29,915	683,181	5,641
LG Chemical India Pvt. Ltd.	32,680	19	32,661	-	29
LG Polymers India Pvt. Ltd.	56,029	38,833	17,196	61,709	(62,422)
LG Chemical (Guangzhou) Engineering Plastics Co.,Ltd.	107,270	33,741	73,529	202,417	15,097
LG Chem (Nanjing) Information & Electronics Materials Co.,Ltd. ¹	3,793,936	1,536,320	2,257,616	3,187,317	351,732
LG Chem (Taiwan), Ltd.	113,717	46,372	67,345	127,861	2,693
LG Chem Display Materials (Beijing) Co.,Ltd. ¹	40,417	13,171	27,246	167	1,406
Tianjin LG Bohai Chemical Co.,Ltd.	282,683	53,113	229,570	484,912	67,720
Tianjin LG BOTIAN Chemical Co.,Ltd.	38,391	14,760	23,631	107,588	8,991
LG Chem (China) Investment Co.,Ltd.	703,145	392,501	310,644	61,415	77,465
LG Chem (Tianjin) Engineering Plastics Co.,Ltd.	52,446	10,440	42,006	60,210	3,923
LG Chem Europe GmbH	229,078	166,779	62,299	656,984	16,461
LG Chem Poland Sp. z o.o.	74,063	27,931	46,132	110,923	10,237
LG Energy Solution Michigan Inc.	915,288	607,065	308,223	727,897	(121,895)
LGC Petrochemical India Private Ltd.	3,722	590	3,132	3,721	362
HAENGBOKNURI CO., LTD.	4,869	2,453	2,416	11,562	537
LG CHEM TK Kimya SANAYI VE TIC. Ltd. STI.	7,033	6,154	879	44,961	55
LG Chem Japan Co.,Ltd.	5,863	852	5,011	5,730	573
LG NanoH2O, LLC ²	33,155	11,117	22,038	40,871	5,033
Nanjing LG Chem New Energy Battery Co.,Ltd.	1,059,066	781,217	277,849	1,237,064	63,336
LG Chem (Chongqing) Engineering Plastics Co.,Ltd.	38,629	10,973	27,656	49,391	5,067
LG Chem Wroclaw Energy sp. z o.o.	6,526,231	5,350,936	1,175,295	5,119,379	(302,248)
LG Chem (HUIZHOU) Petrochemical Co., Ltd.	392,176	199,465	192,711	700,735	118,374
FarmHannong Co., Ltd. ^{2,3}	1,023,232	646,884	376,348	601,679	7,940
LG Chem Life Sciences India Pvt. Ltd.	1,295	837	458	5,176	1,027
LG Chem Life Sciences (Beijing) Co.,Ltd.	2,099	716	1,383	1,856	82
LG Chem Life Sciences (Thailand) Ltd.	22,854	9,722	13,132	33,434	2,752
LG Chem Hai Phong Vietnam Company Ltd.	14,277	6,770	7,507	16,881	1,264
LG Energy Solution Australia Pty Ltd.	4,793	3,049	1,744	9,398	565
LG Chem Mexico S.A. de C.V.	1,081	152	929	1,362	214
LG Chem Hai Phong Engineering Plastics Ltd.	23,110	11,430	11,680	16,148	(1,395)
LG Chem (Guangzhou) Information & Electronics Materials Co.,Ltd. ¹	630,513	399,728	230,785	49,440	62,871
LEYOU NEW ENERGY MATERIALS(WUXI) Co.,LTD	429,359	97,122	332,237	50,174	1,874
LG Chem Fund I LLC	28,842	31	28,811	-	(4,109)
Ugimag Korea Co., Ltd. ²	39,015	15,903	23,112	17,638	(7,905)
Uniseal,Inc. ^{2,3}	34,452	6,050	28,402	57,725	757

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LG Chem Nanjing Energy Solution Co., Ltd.	1,767,706	964,689	803,017	837,968	42,555
LG Chem Life Science Innovation Center, Inc.	3,314	1,868	1,446	4,500	263
Ultium Cells LLC	336,851	32,309	304,542	-	11
LG Energy Solution Europe GmbH	49,626	14,814	34,812	9,855	130
Associates					
TECHWIN Co., Ltd.	134,405	38,746	95,659	112,184	11,049
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	528	80	448	1,423	252
LG Chem Malaysia SDN.BHD.	418	2	416	677	28
FJ Composite Material Co., Ltd.	11,026	4,635	6,391	1,867	302
WUXI CL New Energy Technology Ltd.	1,910	2,972	(1,062)	1,065	(34)
LG Chem Life Sciences Poland Ltd.	191	78	113	256	11
Combustion Synthesis Co., Ltd.	717	66	651	105	(488)
HUAJIN NEW ENERGY MATERIALS(QUZHOU)CO., LTD.	226,471	43,454	183,017	-	565
VINFAST LITHIUM BATTERY PACK LLC.	18,148	6,322	11,826	19,555	(1,342)
Jiangxi VL Battery.,Ltd	67,186	4,066	63,120	-	208
Joint ventures					
LG VINA Chemical Co., Ltd.	35,832	27,515	8,317	91,304	2,237
HL Greenpower Co., Ltd.	406,928	360,547	46,381	1,255,431	(591)
SEETEC Co., Ltd.	342,227	55,056	287,171	490,978	14,556

¹ LCD polarizer business of these entities was classified as discontinued operations and profit or loss from the business was included in profit from discontinued operations(Note 34).

² Fair value adjustments due to business combination recorded in the consolidated financial statements are not included in the above information.

³ Represent financial information of intermediate parent company consolidating its subsidiaries.

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

(a) Ultium Cells LLC

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

<i>(in millions of Korean won)</i>	2021	2020
Percentage of ownership held by non-controlling interests	50.0%	50.0%
Accumulated non-controlling interests	776,257	152,271

- Profit and dividends attributable to non-controlling interests for the year ended December 31, 2021, are as follows:

<i>(in millions of Korean won)</i>	2021
Profit allocated to non-controlling interests	141
Dividends paid to non-controlling interests	-

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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>	2021	2020
Current assets	472,813	87,883
Non-current assets	1,267,920	248,968
Total assets	<u>1,740,733</u>	<u>336,851</u>
Current liabilities	188,200	32,309
Non-current liabilities	21	-
Total liabilities	<u>188,221</u>	<u>32,309</u>
Total equity	1,552,512	304,542

Summarized consolidated statements of comprehensive income of subsidiaries with material non-controlling interests for the year ended December 31, 2021, are as follows (before elimination of intercompany transaction):

<i>(in millions of Korean won)</i>	2021
Revenue	-
Profit for the year	282
Total comprehensive income	69,848

Summarized consolidated statements of cash flows of subsidiaries with material non-controlling interests for the year ended December 31, 2021, are as follows (before elimination of intercompany transaction):

<i>(in millions of Korean won)</i>	2021
Cash flows from operating activities	(18,751)
Cash flows from investing activities	(803,651)
Cash flows from financing activities	1,177,783
Effects of exchange rate changes on cash and cash equivalents	28,230
Net increase in cash and cash equivalents	<u>383,611</u>
Cash and cash equivalents at beginning of year	<u>87,883</u>
Cash and cash equivalents at end of year	<u>471,494</u>

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1.6 Changes in Scope for Consolidation

Subsidiaries newly included in the consolidation for the year ended December 31, 2021, are as follows:

Subsidiary	Reason
LG Chem Asia Pte. Ltd.	Newly established
LG Chem China Tech Center	Newly established
Shanjin Optoelectronics (Taiwan) Co., Ltd.	Newly established
LG Energy Solution (Taiwan), Ltd.	Newly established
Aremnuri. Co. Ltd	Newly established
LG PETRONAS CHEMICALS Malaysia Sdn.Bhd.	Newly established
LG Energy Solution Fund I LLC	Newly established
LG Chem Hangzhou Advanced Materials Co., Ltd.	Newly acquired
LG BCM	Newly established
LG Chem Ohio Petrochemical, Inc.	Newly established
FarmHannong do Brasil Limitada	Newly established

Subsidiary excluded from the consolidation for the year ended December 31, 2021, is as follows:

Subsidiary	Reason
LG Chem Display Materials (Beijing) Co.,Ltd.	Disposed
Uniseal Europe Ltd.	Liquidated
Ugimag Korea 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 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),

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- 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, 2021.

- Amendments to Korean IFRS 1116 Lease – Practical expedient for COVID-19 - Related Rent Concessions

As a 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. A lessee that makes this election shall account for any change in lease payments resulting from the rent concession the same way it would account for the change applying this Standard if the change were not a lease modification. The amendment does not have a significant impact on the financial statements.

- Amendments to Korean IFRS 1109 Financial Instruments, Korean IFRS 1039 Financial Instruments: Recognition and Measurement, Korean IFRS 1107 Financial Instruments: Disclosure, Korean IFRS 1104 Insurance Contracts and Korean IFRS 1116 Lease – Interest Rate Benchmark Reform (Phase 2 amendments)

In relation to interest rate benchmark reform, the amendments provide exceptions including adjusting effective interest rate instead of book amounts when interest rate benchmark of financial instruments at amortized costs is replaced, and applying hedge accounting without discontinuance although the interest rate benchmark is replaced in hedging relationship. The amendment does not have a significant impact on the financial statements.

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

The following new and amended accounting standards have been published that are not mandatory for December 31, 2021 reporting periods and have not been early adopted by the Group.

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

The application of the practical expedient, whereby 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 June 30, 2022. The amendment should be applied for annual periods beginning on or after April 1, 2021, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the 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

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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 amendments should be applied for annual periods beginning on or after January 1, 2022, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the 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 amendments should be applied for annual periods beginning on or after January 1, 2022, and earlier application is permitted. The Group is in review for the impact of these amendments on the financial statements.

- 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 amendments should be applied for annual periods beginning on or after January 1, 2022, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

- 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, 2023, and earlier application is permitted. The Group is in review for the impact of these amendments on the 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 IASB amended IFRS Practice Statement 2 *Disclosure of Accounting Policies* to provide guidance on how to apply the concept of materiality to accounting policy disclosures. 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 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 January 1, 2023, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

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

The amendments introduce an exception to the initial recognition exemption. Applying this exception, an entity does not apply the initial recognition exemption for transactions that give rise to equal taxable and deductible temporary differences. 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 financial statements.

- *Annual improvements to Korean IFRS 2018-2020*

Annual improvements of Korean IFRS 2018-2020 should be applied for annual periods beginning on or after January 1, 2022, and earlier application is permitted. The Group does not expect that these amendments have a significant impact on the 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 1116 *Leases* – Lease incentives
- Korean IFRS 1041 *Agriculture* – Measuring fair value

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 recorded as goodwill. If those amounts are less than the fair value of the net identifiable assets of the business acquired, the difference is

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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 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 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

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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 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 that relate to borrowings are presented in the statement of profit or loss, within finance costs. All other foreign exchange gains and losses are presented in the statement of profit or loss within 'other income or other expenses'.

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
- 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.

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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:

- **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

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comprehensive income are measured at fair value through profit or loss. A gain or loss on a debt investment that is subsequently measured at fair value through profit or loss and is not part of a hedging relationship is recognized in profit or loss and presented net in the statement of profit or loss within 'finance income / costs or other non-operating income / expenses' in the year in which it arises.

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 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 or finance 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.

(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. The Group has hedge relationships and designates certain derivatives as either:

- 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)

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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 'other non-operating income (expenses)'.

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.

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.

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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. 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 weighted 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.

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 25 ~ 50 years.

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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

The excess of consideration transferred and amount of acquisition-date fair value of any previous equity interest in the acquired entity over the fair value of the net identifiable assets acquired is recorded as goodwill. Goodwill is carried at its cost less accumulated impairment losses. Impairment losses on goodwill are not reversed.

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
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

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- 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.

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

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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.

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 Compound Financial Instruments

Compound financial instruments that the Group has issued are exchangeable bonds that can be exchanged into equity instruments at the option of the holder.

The liability component of this compound financial instrument is recognized initially at the fair value and subsequently recognized at amortized cost until conversion or maturity of the bonds. The equity component is remeasured at fair value until conversion or maturity of the bonds. Any directly attributable transaction costs are allocated to the liability and equity components in proportion to their initial carrying amounts.

2.22 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.

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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.

2.23 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.

2.24 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.

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2.25 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.

2.26 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.

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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.

2.27 Lease

Lease activities and accounting policies of the Group

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.

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

Leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the Group. 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. 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.

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

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exercise that option, and

- Payments of penalties for terminating the lease, if the lease term reflects the Group (the lessee) exercising that option

If the Group is reasonably certain to exercise a purchase option, the right-of-use asset is depreciated over the useful life of the underlying asset.

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.

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

Payments associated with short-term leases or 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. Low-value assets comprise IT-equipment and small items of office furniture.

(a) Variable lease payments

Some property leases contain variable payment terms that are linked to sales generated from a warehouse. Variable lease payments that depend on usage are recognized in profit or loss in the period in which the condition that triggers those payments occurs.

(b) 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.

The Group determines the lease term as the non-cancellable period of a lease within the period for which the contract is enforceable, 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 both lessee and lessor have the right to terminate the lease without permission from the other party, the Group considers the contractual termination payments in determining the period for which the contract is enforceable.

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. The chief operating decision-

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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.

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.

The Group has certain investments in foreign operations, whose net assets are exposed to foreign currency translation risk. Currency exposure arising from the net assets of the Group's foreign operations is managed primarily through borrowings denominated in the relevant foreign currencies.

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As at December 31, 2021 and 2020, the Group's monetary assets and liabilities denominated in currencies other than its functional currency, are as follows:

(in millions of Korean won)

	2021		2020	
	Assets	Liabilities	Assets	Liabilities
USD	5,708,219	5,741,611	4,367,761	3,805,638
EUR	441,123	4,804,639	244,382	4,479,131
JPY	18,315	96,238	20,035	303,704
CNY and others	523,907	4,131	343,749	8,199

As at December 31, 2021 and 2020, 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:

(in millions of Korean won)

	2021		2020	
	10% Increase	10% Decrease	10% Increase	10% Decrease
USD	31,708	(31,708)	77,289	(77,289)
EUR	(413,462)	413,462	(416,016)	416,016

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, 2021 and 2020, the Group entered into foreign currency forward contracts to manage risk from changes in exchange rates as follows:

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

	Contractor	Contract amount	Contract exchange rate	2021		Book amount	
				Contract inception date	Contract maturity	Assets	Liabilities
				Currency Forward ¹			
	KDB	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 ²	2021.5.12	2022.4.29	2,881	-
	SC	EUR 250	4.5861 ²	2021.5.14	2022.4.29	4,703	-
	CACIB	EUR 100	4.6055 ²	2021.8.5	2022.8.4	2,964	-
	KDB	EUR 165	4.6036 ²	2021.8.5	2022.8.4	4,925	-
	ING	EUR 100	4.7120 ²	2021.10.22	2022.10.21	1,420	-
Currency swap	SMBC	USD 200	1,118.00	2021.5.28	2024.5.28	13,556	-
	KDB	USD 130	1,135.60	2021.6.24	2025.6.24	8,817	-
	KDB	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	-

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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	USD 200	1,131.80	2021.7.7	2031.7.7	10,429	-

¹ Derivatives that are not qualified for hedge accounting.

² Cross exchange rate between PLN and EUR.

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

		2020					
		Contract amount	Contract exchange rate	Contract inception date	Contract maturity	Book amount	
Contractor						Assets	Liabilities
Currency forward	Shinhan Bank	USD 500	1,135.60	2020.10.14	2024.10.15	-	23,115
	KB Kookmin Bank	USD 500	1,102.83	2020.11.24	2029.04.16	-	18,653

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 and ASX 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, 2021 and 2020. 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.

	2021		2020	
	10% Increase	10% Decrease	10% Increase	10% Decrease
KOSDAQ	909	(909)	997	(997)
ASX	676	(676)	-	-
Total	1,585	(1,585)	997	(997)

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 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.

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<i>(in millions of Korean won)</i>	Impact on post-tax profit		Impact on equity	
	2021	2020	2021	2020
Increase	(38,741)	(36,812)	(38,741)	(36,812)
Decrease	38,741	36,812	38,741	36,812

The Group has entered into a currency interest rate swap contract amounting to USD 165 million (equivalent to ₩195,508 million) to hedge interest rate risk of variable interest rate borrowings from Korea Development Bank and others.

(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, 2021 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, 2021 (trade receivables)				
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 provision	3,152	592	1,350	5,094
December 31, 2020 (trade receivables)				
Gross carrying amount	4,835,299	493,371	3,462	5,332,132
Expected loss rate	0.0%	0.1%	54.7%	0.1%
Loss allowance provision	2,032	467	1,892	4,391

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.

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Movements in the loss allowance provision for trade receivables for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	Trade receivables	
	2021	2020
Beginning balance	4,391	5,830
Reversal of loss allowance recognized in profit or loss	(127)	(480)
Receivables written off as uncollectible	(447)	(833)
Exchange differences	1,277	(126)
Ending balance	5,094	4,391

As at December 31, 2021, the carrying amount of trade receivables representing the maximum exposure to credit risk amounts to ₩6,454,034 million (2020: ₩5,327,741 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, 2021 and 2020, are as follows:

(in millions of Korean won)

	Other receivables	
	2021	2020
Beginning balance	2,165	2,109
Increase in loss allowance recognized as 'other non-operating expenses' in profit or loss	-	2
Exchange differences	-	54
Ending balance	2,165	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.

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.

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(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.

(in millions of Korean won)

	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>

(in millions of Korean won)

	2020			
	Less than 1 year	Between 1-2 years	Between 2-5 years	Over 5 years
Non-derivative financial instruments				
Borrowings (excluding lease liabilities)	1,665,869	1,876,344	4,941,527	2,239,926
Lease liabilities	59,636	33,536	44,091	75,581
Trade and other payables ¹	8,725,500	11,756	-	171
	<u>10,451,005</u>	<u>1,921,636</u>	<u>4,985,618</u>	<u>2,315,678</u>
Derivative instruments				
Gross settlement currency forwards				
(Inflows)	-	-	(544,000)	(544,000)
Outflows	-	-	567,800	551,415
	<u>-</u>	<u>-</u>	<u>23,800</u>	<u>7,415</u>
	<u>10,451,005</u>	<u>1,921,636</u>	<u>5,009,418</u>	<u>2,323,093</u>

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¹ Included ₩301,946 million (2020: ₩2,099,936 million) of financial liabilities due to a financial institution relating to reverse factoring arrangement. 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, 2021, the Group has entered into swap contracts for which cash flow hedge accounting is applied, to avoid market price fluctuation of raw materials.

(in millions of Korean won)

	2021				
	Purpose of the contracts	Hedged items	Financial institution	Maturity	Fair value
Merchandise (raw materials) swap ¹	Cash flow hedge	Non-ferrous metal	Citi bank and SC	~2024. 12	5,785

Details of derivative assets and liabilities as at December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021		2020	
	Assets	Liabilities	Assets	Liabilities
Merchandise (raw materials) swap ¹	5,911	126	23,821	-

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).

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.

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The gearing ratio and debt-to-equity ratio as at December 31, 2021 and 2020, were as follows:

<i>(in millions of Korean won, except for ratios)</i>	2021	2020
Total borrowings (Note 14) (A)	14,765,734	10,186,117
Less: cash and cash equivalents (B)	<u>(3,760,834)</u>	<u>(3,274,250)</u>
Net debt (C=A+B)	11,004,900	6,911,867
Total liabilities (D)	27,925,314	22,598,454
Total equity (E)	<u>23,209,988</u>	<u>18,790,440</u>
Total capital (F=C+E)	34,214,888	25,702,307
Gearing ratio (C/F)	32.2%	26.9%
Debt-to-equity ratio (D/E)	120.3%	120.3%

3.3 Fair Value

(1) Carrying amount and fair value of financial instruments by category as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021		2020	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets (current)				
Cash and cash equivalents	3,760,834	1	3,274,250	1
Deposits held by financial institutions	64,583	1	608,039	1
Trade receivables	6,386,979	1	5,298,365	1
Other receivables (excluding deposits held by financial institutions)	983,966	1	316,264	1
Current derivative financial assets (excluding currency forward)	4,606	4,606	23,821	23,821
Current derivative financial assets (currency forward)	18,683	18,683	-	-
Financial assets (non-current)				
Deposits held by financial institutions	267,116	1	167,054	1
Trade receivables	67,055	1	29,376	1
Other receivables (excluding deposits held by financial institutions)	446,050	1	87,976	1
Other non-current financial assets (carried at fair value)				
Marketable financial assets	21,630	21,630	7,679	7,679
Non-marketable financial assets ²	340,823	340,823	73,853	73,853
Non-current derivative financial assets (currency forward)	54,918	54,918		
Non-current derivative financial assets (excluding currency forward)	88,651	88,651		
Financial liabilities (current)				
Trade and other payables	7,733,916	1	8,725,500	1
Current borrowings (excluding exchangeable bonds and lease liabilities)	3,405,215	1	1,460,926	1

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<i>(in millions of Korean won)</i>	2021		2020	
	Carrying amount	Fair value	Carrying amount	Fair value
Current borrowings (exchangeable bonds)	-	-	32,500	32,763
Current lease liabilities	71,865	³	55,389	³
Current derivative financial liabilities (exchange rights)	-	-	16,797	16,797
Financial liabilities (non-current)				
Non-current borrowings (excluding lease liabilities)	11,041,274	10,923,942	8,508,066	8,614,889
Non-current lease liabilities	247,380	³	129,236	³
Other non-current payables	15,623	¹	11,927	¹
Non-current derivative financial liabilities (excluding currency forward)	126	126		
Non-current derivative financial liabilities (currency forward)	-	-	41,768	41,768

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 Acquisition costs of these financial assets approximate their fair values.

³ Fair values for these financial assets and liabilities are not disclosed above in accordance with related Korean IFRS.

(2) Fair value for measurement and disclosure are determined based on the following method:

Fair values of financial liabilities (non-current) are based on cash outflows discounted by using Korean won currency note yield in the same credit grade with the Parent Company (AA+), and the applied discount rates as at December 31, 2021 and 2020, are as follows:

<i>(in percentage)</i>	2021	2020
Discount rate	1.77% ~ 2.99%	0.97% ~ 2.27%

(3) 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).

Fair value hierarchy classifications of the financial instruments that are measured at fair value or their fair value are disclosed as at December 31, 2021 and 2020, are as follows:

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(in millions of Korean won)

	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)	-	-	340,823	340,823
Current derivative financial assets (excluding currency forward)	-	4,606	-	4,606
Current derivative financial assets (currency forward)	-	18,683	-	18,683
Non-current derivative financial assets (currency forward)	-	54,918	-	54,918
Non-current derivative financial assets (excluding currency forward)	-	72,491	16,160	88,651
Non-current derivative financial liabilities (excluding currency forward)	-	126	-	126
Financial assets/liabilities not measured at fair value				
Non-current borrowings (excluding lease liabilities)	-	10,923,942	-	10,923,942

(in millions of Korean won)

	2020			
	Level 1	Level 2	Level 3	Total
Financial assets/liabilities measured at fair value				
Other non-current financial assets (marketable financial assets)	7,679	-	-	7,679
Other non-current financial assets (non-marketable financial assets)	-	-	73,853	73,853
Current derivative financial assets	-	23,821	-	23,821
Current derivative financial liabilities (exchange rights) ¹	-	-	16,797	16,797
Current derivative financial liabilities (currency forward)	-	41,768	-	41,768
Financial assets/liabilities not measured at fair value				
Current borrowings (exchangeable bonds)	-	-	32,763	32,763
Non-current borrowings (excluding lease liabilities)	-	8,614,889	-	8,614,889

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¹ Movements in exchange rights are as follows.

(in millions of Korean won)

	USD		EUR		Total	
	2021	2020	2021	2020	2021	2020
Beginning Balance	-	42	16,797	888	16,797	930
Exchange	-	(89,961)	(24,835)	(188,303)	(24,835)	(278,264)
Redemption	-	(70)	(2,440)	-	(2,440)	(70)
Evaluation	-	89,989	10,478	204,212	10,478	294,201
Ending Balance	-	-	-	16,797	-	16,797

(4) 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, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021				
	Fair value	Level	Valuation Technique	Inputs	Coverage of Level 3 inputs
Equity instrument					
Non-listed shares	97,121	3	Present value technique	Long-term growth rate through subsequent cash flows Weighted average cost of equity	1.00% 10.98% ~ 12.2%
Derivative instruments					
Option	16,160	3	Binominal option pricing model	Volatility	2.36 ~ 2.4%

(in millions of Korean won)

	2020				
	Fair value	Level	Valuation Technique	Inputs	Coverage of Level 3 inputs
Financial liabilities					
- Exchangeable Bond					
Exchangeable Bond	32,763	3	Binominal option pricing model	Annual rates of credit volatility	-0.5%p ~ +0.5%p
Exchange right	16,797	3	Binominal option pricing model	Annual rates of credit volatility Underlying asset (equity) volatility	-0.5%p ~ +0.5%p -5.0% ~ +5.0%

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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 estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

The spread of COVID-19 during 2021 has impacted significantly on the domestic and international economies. This may affect the company's financial position and business performance.

Significant accounting estimates and assumptions used in the preparation of financial statements may be adjusted according to fluctuations in uncertainty arising from COVID-19, and the ultimate impact of COVID-19 on the company's business, financial position, and performance is currently unpredictable.

(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

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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).

(g) Lease

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.

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5. Financial Instruments by Category

Categorizations of financial instruments as at December 31, 2021 and 2020, are as follows:

(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

(in millions of Korean won)

Financial liabilities	2021		
	Financial liabilities at amortized cost	Other financial liabilities ²	Total
Trade payables	3,742,132	-	3,742,132
Other payables	3,991,784	-	3,991,784
Borrowings (current)	3,405,215	71,865	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	22,196,028	319,371	22,515,399

(in millions of Korean won)

Financial assets	2020				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	3,274,250	-	-	-	3,274,250
Trade receivables	4,876,565	-	421,800	-	5,298,365
Non-current trade receivables	29,376	-	-	-	29,376
Other receivables	904,640	-	19,663	-	924,303
Other non-current receivables	255,030	-	-	-	255,030
Other current financial assets	-	-	-	23,821	23,821
Other non-current financial assets	-	29,316	52,216	-	81,532
Total	9,339,861	29,316	493,679	23,821	9,886,677

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(in millions of Korean won)

Financial liabilities	2020			
	Financial liabilities at fair value through profit or loss	Financial liabilities at amortized cost	Other financial liabilities ²	Total
Trade payables	-	3,458,526	-	3,458,526
Other payables	-	5,266,974	-	5,266,974
Borrowings (current)	-	1,493,426	55,389	1,548,815
Other current financial liabilities	16,797	-	-	16,797
Other non-current financial liabilities	-	-	41,768	41,768
Other non-current payables	-	11,927	-	11,927
Borrowings (non-current)	-	8,508,066	129,236	8,637,302
Total	16,797	18,738,919	226,393	18,982,109

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

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

Net gains or losses on each category of financial instruments for the three-month and nine-month periods ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021	2020
Dividend income		
Financial assets at fair value through other comprehensive income	7,376	2,562
Interest income		
Financial assets at amortized cost	75,745	35,924
Interest expense		
Financial liabilities at amortized cost	(246,716)	(231,865)
Other financial liabilities	(8,671)	(9,578)
Financial assets at amortized cost ¹	(507)	(912)
Financial assets at fair value through other comprehensive income ¹	(998)	(2,864)
Gain (loss) on valuation		
Financial assets at fair value through profit or loss	29,810	3,898
Financial assets at fair value through other comprehensive income	15,990	3,024
Derivative instruments	177,156	(322,967)
Exchange differences		
Financial assets at amortized cost	433,436	(360,456)
Financial liabilities at amortized cost	(389,776)	258
Other financial liabilities	(1,548)	(10,522)

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, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Bank deposits and cash on hand	1,943,818	1,704,420
Deposits held by financial institutions and others	1,817,016	1,569,830
Total	<u>3,760,834</u>	<u>3,274,250</u>

As at December 31, 2021, cash and cash equivalents include ₩42,483 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, 2021 and 2020, are as follows:

<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>

<i>(in millions of Korean won)</i>	2020		
	Gross amount	Provision for impairment	Carrying amount
Trade receivables	5,302,756	(4,391)	5,298,365
Non-current trade receivables	29,376	-	29,376
Other current receivables	926,468	(2,165)	924,303
Other non-current receivables	255,030	-	255,030
Total	<u>6,513,630</u>	<u>(6,556)</u>	<u>6,507,074</u>

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Details of other receivables as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Current		
Non-trade receivables	865,984	271,651
Deposits held by financial institutions	64,583	608,039
Accrued income	31,955	2,567
Loans	65,266	-
Guarantee deposits provided	20,761	42,046
	<u>1,048,549</u>	<u>924,303</u>
Non-current		
Non-trade receivables	29,195	24,910
Deposits held by financial institutions ¹	267,116	167,054
Loans	330,643	831
Guarantee deposits provided	86,212	62,235
	<u>713,166</u>	<u>255,030</u>
Total	<u>1,761,715</u>	<u>1,179,333</u>

¹ As at December 31, 2021, ₩266,100 million (2020: ₩166,100 million) is restricted from being withdrawn in relation to large, small and medium-sized companies cooperation agreement and others. In addition, ₩120 million is restricted from withdrawal in connection with maintaining checking accounts (2020: ₩928 million). 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, 2021 and 2020, is as follows:

<i>(in millions of Korean won)</i>	2021		2020	
	Trade receivables	Other receivables	Trade receivables	Other receivables
Receivables not past due	<u>6,118,779</u>	<u>1,690,123</u>	<u>4,835,299</u>	<u>1,134,863</u>
Past due but not impaired				
Up to 3 months	338,693	71,592	493,371	44,470
Between 3-6 months	236,860	70,136	333,522	41,780
Over 6 months	15,811	457	69,272	353
	<u>86,022</u>	<u>999</u>	<u>90,577</u>	<u>2,337</u>
Impaired receivables	<u>1,656</u>	<u>2,165</u>	<u>3,462</u>	<u>2,165</u>
Total	<u>6,459,128</u>	<u>1,763,880</u>	<u>5,332,132</u>	<u>1,181,498</u>

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Movements on the provision for impairment of trade and other receivables for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

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

(in millions of Korean won)

	2020			
	Trade receivables		Other receivables	
	Current	Non-current	Current	Non-current
Beginning balance	5,830	-	2,109	-
Reversal	(480)	-	2	-
Write-off	(833)	-	-	-
Exchange differences	(126)	-	54	-
Ending balance	4,391	-	2,165	-

As at December 31, 2021 and 2020, 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 ₩3,469 million at December 31, 2021 (2020: ₩168,781 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, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Other financial assets		
Financial assets at fair value through other comprehensive income (derivative instruments) (current)	4,606	23,821
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)	1,305	-
Financial assets at fair value through other comprehensive income (excluding derivative instruments) (non-current)	202,308	52,216
Financial assets at fair value through profit or loss (derivative instruments) (non-current)	142,264	-
Financial assets at fair value through profit or loss (excluding derivative instruments) (non-current)	160,145	29,316
	<u>529,311</u>	<u>105,353</u>
Other financial liabilities		
Financial liabilities at fair value through profit or loss (exchange rights) (current)	-	16,797
Financial liabilities at fair value through other comprehensive income (derivative instruments) (current)	126	-
Financial liabilities at fair value through profit or loss (derivative instruments) (non-current)	-	41,768
	<u>126</u>	<u>58,565</u>

Changes in equity and debt instruments included in other financial assets for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Beginning balance	81,532	149,463
Acquisitions / transfer	248,354	18,120
Disposals	(16,388)	(91,251)
Gain on valuation (before income tax effects) through other comprehensive income	15,990	3,024
Gain on valuation (before income tax effects) through profit or loss	29,810	3,898
Others	3,154	(1,722)
Ending balance	<u>362,452</u>	<u>81,532</u>

During the years ended December 31, 2021 and 2020, the Group did not recognize impairment for other financial assets.

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9. Inventories

Details of inventories as at December 31, 2021 and 2020, are as follows:

(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

(in millions of Korean won)

	2020		
	Gross amount	Valuation allowance	Carrying amount
Merchandise	130,457	(3,486)	126,971
Finished / Semi-finished products	3,087,998	(129,308)	2,958,690
Work-in-process	23,570	-	23,570
Raw materials	1,277,855	(17,100)	1,260,755
Supplies	188,503	-	188,503
Materials-in-transit	791,199	-	791,199
Total	5,499,582	(149,894)	5,349,688

During the year ended December 31, 2021, the cost of inventories recognized as expense and included in 'cost of sales' amounted to ₩23,888,071 million (2020: ₩17,676,619 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, 2021 and 2020, are as follows:

(in millions of
Korean won)

	2021							Ending balance
	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	
VINA Plasticizers Chemical Co., Ltd.	5,875	-	(334)	7,204	77	-	-	12,822
HL Greenpower Co., Ltd. ¹	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. ¹	2,737	-	-	(544)	652	(2,576)	(269)	-
WUXI CL New Energy Technology Ltd ¹	-	-	-	-	-	-	-	-
LG Chem Life Sciences Poland Ltd.	17	-	-	-	-	-	-	17
Combustion Synthesis Co., Ltd. ¹	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 ²	-	209,132	-	(9,201)	1,557	-	-	201,488
TL Chemical CO., Ltd ³	-	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>

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(in millions of
Korean won)

	2020							Ending balance
	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	
LG VINA Chemical Co., Ltd.	4,403	-	-	1,782	(310)	-	-	5,875
HL Greenpower Co., Ltd.	23,366	-	-	(664)	-	-	8	22,710
LG Holdings (HK) Ltd.	40,973	-	-	436	(369)	(41,040)	-	-
TECHWIN Co., Ltd.	19,376	-	(314)	1,053	(2)	-	-	20,113
SEETEC Co., Ltd	142,554	-	(10,000)	7,205	-	-	357	140,116
LG Chem BRASIL INTERMEDIACAO DE NEGOCIOS DO SETOR QUIMICO LTDA.	579	-	-	-	-	-	-	579
LG Chem Malaysia SDN.BHD	150	-	-	-	-	-	-	150
FJ Composite Materials Co., LTD.	2,171	-	-	(142)	(162)	-	870	2,737
WUXI CL New Energy Technology Ltd	-	-	-	-	-	-	-	-
LG Chem Life Sciences Poland Ltd.	17	-	-	-	-	-	-	17
Combustion Synthesis Co., Ltd.	2,042	-	-	(88)	(68)	-	(19)	1,867
HUAJIN NEW ENERGY MATERIALS(QUZHOU)C O., LTD.	67,058	22,191	-	151	125	-	-	89,525
VINFAST LITHIUM BATTERY PACK LIMITED LIABILITY COMPANY	4,888	-	-	(461)	(248)	-	-	4,179
Jiangxi VL Battery Co.,Ltd	-	21,815	-	71	(425)	-	-	21,461
	<u>307,577</u>	<u>44,006</u>	<u>(10,314)</u>	<u>9,343</u>	<u>(1,459)</u>	<u>(41,040)</u>	<u>1,216</u>	<u>309,329</u>

¹ During the year ended December 31, 2021, the Group has sold all the shares of HL Greenpower Co., Ltd., FJ Composite Materials Co., LTD., WUXI CL New Energy Technology Ltd. and Combustion Synthesis Co., Ltd.

² During the year ended December 31, 2021, the Group newly acquired shares of PT.HLI Green Power for ₩209,132 million.

³ During the year ended December 31, 2021, the Group newly acquired 40% shares of TL Chemical CO., Ltd. for ₩48,544 million.

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11. Property, Plant and Equipment

Changes in property, plant and equipment for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	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)

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(in millions of Korean won)	2020											
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Others	Right-of- use assets	Construction -in-progress	Machinery -in-transit	Total
Beginning balance	1,759,528	3,890,961	957,739	6,348,867	6,261	601,958	163,470	175,122	319,620	4,210,088	160,028	18,593,642
Cost	1,796,480	4,769,924	1,583,401	17,044,880	33,056	1,457,840	467,293	378,823	380,814	4,300,788	160,028	32,373,327
Accumulated depreciation	-	(839,904)	(609,282)	(10,486,289)	(26,648)	(843,955)	(301,041)	(197,978)	(61,119)	-	-	(13,366,216)
Accumulated impairment	(36,952)	(39,059)	(16,380)	(209,724)	(147)	(11,927)	(2,782)	(5,723)	(75)	(90,700)	-	(413,469)
Acquisitions/ transfer	14,436	1,137,678	106,976	3,243,373	6,365	282,554	87,682	39,256	109,307	5,168,221	258,957	10,454,805
Disposals/ transfer	(681)	(18,922)	(1,655)	(66,721)	(38)	(25,298)	(4,352)	(2,398)	(8,165)	(5,421,750)	(72,815)	(5,622,795)
Exchange differences	(1,244)	29,214	887	(63,136)	(192)	(873)	108	1	(1,353)	(55,703)	-	(92,291)
Depreciation	-	(145,120)	(60,365)	(1,510,695)	(2,390)	(190,550)	(51,930)	(99,491)	(70,534)	-	-	(2,131,075)
Impairment	-	(5,542)	(8,639)	(47,769)	(57)	(10,148)	(627)	(195)	(86)	(2,716)	(259)	(76,038)
Reversal of impairment	-	-	-	-	-	-	-	-	-	220	-	220
Transfer to assets held for sale	-	(67,255)	(9,753)	(330,903)	(29)	(12,302)	(9,138)	-	(117,935)	(11,678)	-	(558,993)
Ending 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)

During the year ended December 31, 2021, the Group capitalized ₩45,890 million of borrowing costs (2020: ₩46,992 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 1.32% (2020: 1.39%).

Line items including depreciation in the consolidated statements of profit or loss for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)	2021	2020
Cost of sales	2,368,588	1,897,393
Selling and administrative expenses	243,430	191,128
Others	1,024	2,250
Discontinued operations	4,416	40,304
Total	2,617,458	2,131,075

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Lease

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

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

<i>(in millions of Korean won)</i>	2021	2020
Right-of-use assets ¹		
Real-estate	329,920	183,136
Machinery	23,258	26,541
Vehicles	21,475	17,026
Tools	2,083	3,535
Equipment	473	616
	<u>377,209</u>	<u>230,854</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, 2021, were ₩217,014 million (2020: ₩109,307 million).

<i>(in millions of Korean won)</i>	2021	2020
Lease liabilities ¹		
Current	71,865	55,389
Non-current	247,380	129,236
	<u>319,245</u>	<u>184,625</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>	2021	2020
Depreciation of right-of-use assets		
Real-estate	57,959	50,449
Machinery	5,698	5,051
Vehicles	14,320	13,578
Tools	1,461	962
Equipment	433	494
	<u>79,871</u>	<u>70,534</u>
Interest expense relating to lease liabilities (included in finance cost)	8,671	9,578
Expense relating to short-term leases (included in cost of goods sold and administrative expenses)	27,051	30,164

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Expense relating to leases of low-value assets that are not short-term leases (included in cost of goods sold and administrative expenses)	12,931	14,304
Expense relating to variable lease payments not included in lease liabilities (included in cost of goods sold and administrative expenses)	-	-

The total cash outflow for leases during the year ended December 31, 2021, was ₩124,438 million (2020: ₩97,774 million).

12. Intangible Assets

Changes in intangible assets for the years ended December 31, 2021 and 2020, are as follows:

<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
Separate 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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<i>(in millions of Korean won)</i>	2020						Total
	Development costs	Software	Industrial property rights	Goodwill	Memberships	Others	
Beginning balance	56,832	267,377	569,129	1,010,534	47,329	255,028	2,206,229
Separate acquisitions/ transfer	-	302,054	123,062	-	867	9,336	435,319
Additions – internal development	4,282	-	-	-	-	-	4,282
Disposals/transfer	-	(1,976)	(4,098)	-	(16,611)	(7,900)	(30,585)
Exchange differences	-	4,885	(864)	(11,711)	4	(32)	(7,718)
Amortization	(5,257)	(102,989)	(50,710)	-	-	(22,017)	(180,973)
Impairment	-	(26)	(26,735)	(111,786)	-	-	(138,547)
Transfer to assets held for sale (Note 34)	-	(2,967)	(5,123)	-	-	-	(8,090)
Ending balance	55,857	466,358	604,661	887,037	31,589	234,415	2,279,917

Line items including amortization of intangible assets for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Cost of sales	54,620	45,972
Selling and administrative expenses	168,398	134,365
Discontinued operations	160	636
Total	223,178	180,973

The Group recognized total research and development costs of ₩1,357,398 million (2020: ₩1,116,080 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	9,405	9,430	9,430	9,343	9,343	46,951

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Changes in greenhouse gas emission permits during the year ended December 31, 2021 and 2020, are as follows:

<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

<i>(in thousands of tons and millions of Korean won)</i>	2020							
	2019		2020		2021		2022	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance /Allocation with nil consideration	8,554	4,375	7,548	-	9,371	-	9,371	-
Purchase/Sale	138	3,525	-	-	-	-	-	-
Borrowings/Carry forwards between years	41	-	(41)	-	-	-	-	-
Surrendered to the government	(8,733)	(7,900)	-	-	-	-	-	-
Ending balance	-	-	7,507	-	9,371	-	9,371	-

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(in thousands of tons and millions of Korean won)	2020							
	2023		2024		2025		Total	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Beginning balance								
/Allocation with nil consideration	9,371	-	9,283	-	9,283	-	62,781	4,375
Purchase/Sale	-	-	-	-	-	-	138	3,525
Borrowings/Carry forwards between years	-	-	-	-	-	-	-	-
Surrendered to the government	-	-	-	-	-	-	(8,733)	(7,900)
Ending balance	9,371	-	9,283	-	9,283	-	54,186	-

During the year ended December 31, 2021 and 2020, there are no greenhouse gas emission permits held for short-term trading purpose.

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, 2021 and 2020, are as follows:

(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	-	-	-	-	-	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 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 Company has sold PSAA business.

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

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

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Korean won)

	2020						
	Acquisition of NanoH2O Co., Ltd.	Acquisition of FarmHannong Co., Ltd.	Acquisition of LG Life Sciences, Ltd.	Acquisition of Uniseal, Inc.	Acquisition of Ugimag Korea Co., Ltd.	Others	Total
Petrochemicals							
NCC	-	-	-	-	-	2,639	2,639
ABS	-	-	-	-	-	15,209	15,209
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	102,286	-	-	-	-	-	102,286
PSAA	-	-	-	-	-	4,112	4,112
Life Sciences							
Life sciences	-	-	686,229	-	-	-	686,229
Common and others							
FarmHannong Co.,Ltd. ²	-	3,091	-	-	-	-	3,091
Adhesive ^{1,3}	-	-	-	44,167	-	-	44,167
Total	102,286	3,091	686,229	44,167	-	51,264	887,037

¹ Included changes resulting from foreign currency translation.

² Goodwill resulting from the acquisition of FarmHannong Co., Ltd. has been impaired and recognized as impairment losses for ₩83,765 million in 2020.

³ Goodwill resulting from the acquisition of Uniseal, Inc. has been impaired and recognized as impairment losses for ₩28,021 million in 2020.

The recoverable amounts of CGUs have been determined based on value-in-use or fair value less cost of disposal calculations. 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. Discount rates applied by the management are the pre-tax discount rates reflecting specific risks relating to the relevant operating segments. Taking into account the uncertainties relating to COVID-19, discount rate have been determined based on average values of input parameters (e.g. market risk premium) for longer observable period than before.

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During 2021, 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>	2021	
	Pre-tax discount rate	Growth rate for subsequent years after five years
Acquisition of LG Petrochemical Co., Ltd.	9.0%	0.0%
Acquisition of SAP business	9.0%	0.0%
Acquisition of NanoH2O, Inc	10.6%	1.0%
Acquisition of FarmHannong	13.1%	1.0%
Acquisition of LG Life Sciences	12.8%	3.0%
Acquisition of Uniseal, Inc.	13.9%	2.0%
Consolidation of LG Chem(HUIZHOU) Petrochemical Co., Ltd	8.9%	0.0%

The results of the sensitivity analysis for the fair value less cost 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 fair value	(95,850)	109,362
Growth rate		
Increase(decrease) in fair value	69,525	(61,005)

Had the discount rate been 0.5% higher than the management's estimate, the Group should have recognized additional impairment loss of ₩95,850 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 additional impairment loss of ₩61,005 million for the carrying value of goodwill.

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:

<i>(in millions of Korean won)</i>	2020			
	Development costs	Industrial property rights	Other intangible assets	Total
FarmHannong ¹	-	-	25,283	25,283
	-	-	25,283	25,283

¹ During 2020, the Group has performed impairment test for FarmHannong and recognized ₩25,283 million of impairment losses.

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13. Other Current and Non-Current Assets

Details of other current and non-current assets as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Current		
Prepayments to suppliers and prepaid expenses	201,019	174,885
Prepaid value added tax	465,660	428,303
Others	82,353	39,964
Total	<u>749,032</u>	<u>643,152</u>
Non-current		
Net defined benefit assets	45,050	-
Long-term prepayments and long-term prepaid expenses	70,775	87,247
Others	96	98
Total	<u>115,921</u>	<u>87,345</u>

14. Borrowings

Borrowings as at December 31, 2021 and 2020, consist of:

<i>(in millions of Korean won)</i>	2021	2020
Current		
Short-term borrowings	1,688,383	879,757
Current portion of long-term borrowings of bank loans	1,056,963	341,203
Current-portion of debentures	659,869	272,466
Finance lease liabilities	71,865	55,389
	<u>3,477,080</u>	<u>1,548,815</u>
Non-current		
Long-term borrowings	3,628,563	3,131,254
Debentures	7,412,711	5,376,812
Lease liabilities	247,380	129,236
	<u>11,288,654</u>	<u>8,637,302</u>
Total	<u>14,765,734</u>	<u>10,186,117</u>

Details of short-term borrowings as at December 31, 2021 and 2020, are as follows:

<i>General borrowings (in millions of Korean won)</i>	Bank	Latest maturity date	Interest rate(%) as at December 31, 2021	2021	2020
Bank loans	CITI and others	June 24, 2022	0.92 and others	1,237,430	879,757
Negotiated borrowings in foreign currency ¹	Kookmin Bank and others	March 27, 2022	Libor + 0.30 and others	450,953	-
Total				<u>1,688,383</u>	<u>879,757</u>

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¹ Accounted for as collateralized borrowings for trade receivables.

Details of long-term borrowings as at December 31, 2021 and 2020, are as follows:

(in millions of Korean won)	2021				
	Bank	Annual interest rate (%)	Amount in Korean won	Current	Non-current
Borrowings in Korean won	KDB	3.05	300,000	-	300,000
	BOA	1.95	150,000	-	150,000
Borrowings in foreign currencies	HSBC	USD: 3M LIBOR + 1.40 CNY: PBOC ×0.95, LPR(5Y)-0.3375	8,313	8,313	-
	SMBC	USD : 1.3 EUR : 3M EURIBOR + 0.8, 0.32~0.48	451,478	10,076	441,402
	Construction Bank of China	PBOC ×0.90	8,305	8,305	-
	Agriculture Bank of China	LPR(1Y)+0.7	74,504	4,470	70,034
	CITI	EUR: 3M EURIBOR + 0.62~0.70 PLN: 3M Wibor+0.85	246,807	-	246,807
	ING	6M EURIBOR + 0.70 ~0.83	161,224	67,177	94,047
	EBRD	6M EURIBOR+0.62	322,448	67,177	255,271
	MUFG	6M EURIBOR + 0.60~0.80	134,354	67,177	67,177
	Industrial and Commercial Bank of China	PBOC ×1.00	39,666	14,785	24,881
	KEB Hana Bank	3M EURIBOR + 0.62	268,706	-	268,706
	KDB	USD: 3M LIBOR+ 0.77~0.95 EUR: 3M EURIBOR + 0.75~1.50	964,255	366,118	598,137
	The Export-Import Bank of Korea	3M EURIBOR + 0.75~1.50	517,479	295,577	221,902
	NongHyup Bank	3M EURIBOR + 0.75~1.50	258,739	147,788	110,951
	EIB	3M EURIBOR + 0.47	644,895	-	644,895
DBS	6M EURIBOR + 0.60	134,353	-	134,353	
Total			4,685,526	1,056,963	3,628,563

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<i>(in millions of Korean won)</i>		2020			
	Bank	Annual interest rate (%)	Amount in Korean won	Current	Non-current
Borrowings in Korean won	KDB ¹	(1Y) + 1.45~1.99	6,622	1,597	5,025
	Kookmin Bank	24M MOR + 1.89	2,000	980	1,020
Borrowings in foreign currencies	HSBC	USD: 3M LIBOR + 0.95~1.40 CNY: PBOC ×0.95, LPR(5Y)-0.3375	87,806	60,541	27,265
	SMBC	3M LIBOR + 0.32~0.48	202,142	-	202,142
	Construction Bank of China	LPR(1Y)+0.36~0.46	81,673	35,315	46,358
	Communications Bank of China	PBOC ×1.00	5,676	5,676	-
	CITI	USD: 3M LIBOR + 0.95 EUR: EURIBOR +0.62~0.70	241,354	39,212	202,142
	ING	6M EURIBOR + 0.70 ~0.83	161,714	-	161,714
	Standard Chartered Bank	USD: 3M LIBOR + 1.20 CNY: PBOC ×0.95	92,036	79,514	12,522
	CNOOC Finance	PBOC ×0.90	10,018	10,018	-
	EBRD	6M EURIBOR+0.62	336,903	-	336,903
	Bank of China	3M LIBOR +1.15	5,475	5,475	-
	MUFG	EUR:3M EURIBOR + 0.60~0.80	134,761	-	134,761
	Industrial and Commercial Bank of China	PBOC ×1.00	46,024	10,473	35,551
	CIMB	3M LIBOR + 1.50	49,021	49,021	-
	KEB Hana Bank	3M EURIBOR + 0.62	269,523	-	269,523
	KDB	USD: 3M LIBOR + 0.93 EUR: 6M EURIBOR +1.50	513,380	43,381	469,999
	The Export-Import Bank of Korea	6M EURIBOR + 1.50	296,475	-	296,475
NongHyup Bank	6M EURIBOR + 1.50	148,238	-	148,238	
EIB	3M EURIBOR + 0.47	646,855	-	646,855	
DBS	6M EURIBOR + 0.60	134,761	-	134,761	
Total			<u>3,472,457</u>	<u>341,203</u>	<u>3,131,254</u>

¹ Manufacturing facilities are pledged as collaterals for the above long-term borrowings (Note 18).

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Details of debentures as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>		2021				
Financial institution	Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current	Non-current	
50-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.28	2022.5.19	400,000	400,000	-
50-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.53	2024.5.19	280,000	-	280,000
51-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.88	2023.2.20	240,000	-	240,000
51-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.07	2025.2.20	270,000	-	270,000
51-4th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.29	2028.2.20	300,000	-	300,000
52-1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.02	2022.3.13	160,000	160,000	-
52-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.11	2024.3.13	240,000	-	240,000
1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.21	2026.3.13	200,000	-	200,000
52-4th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.40	2029.3.13	400,000	-	400,000
53-1st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.57	2023.2.19	350,000	-	350,000
53-2nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.65	2025.2.19	250,000	-	250,000
53-3rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.72	2027.2.19	50,000	-	50,000
53-4th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.91	2030.2.19	250,000	-	250,000
54-1st Debenture (non-guaranteed/public)	KB Securities Co., Ltd and others	1.14	2024.2.19	350,000	-	350,000
54-2nd Debenture (non-guaranteed/public)	KB Securities Co., Ltd and others	1.51	2026.2.19	270,000	-	270,000
54-3rd Debenture (non-guaranteed/public)	KB Securities Co., Ltd and others	1.76	2028.2.19	200,000	-	200,000
54-4th Debenture (non-guaranteed/public)	KB Securities Co., Ltd and others	2.14	2031.2.19	260,000	-	260,000
54-5th Debenture (non-guaranteed/public)	KB Securities Co., Ltd and others	2.22	2036.2.19	120,000	-	120,000
USD foreign currency debenture with maturity in 2024	Citi and others	3.25	2024.10.15	592,750	-	592,750
USD foreign currency debenture with maturity in 2029	Citi and others	3.63	2029.4.15	592,750	-	592,750
EUR foreign currency debenture with maturity in 2023	Citi and others	0.50	2023.4.15	671,170	-	671,170
5Y USD Green Bond (non-guaranteed/private)	Citi Securities and others	1.38	2026.7.7	592,750	-	592,750
10Y USD Green Bond (non-guaranteed/private)	Citi Securities and others	2.38	2031.7.7	592,750	-	592,750
1-2nd EUR Overseas Exchangeable bonds¹	Credit Suisse	-	2021.1.14	-	-	-

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		2021				
Financial institution		Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current	Non-current
Debtures in Korean won (non-guaranteed)	NH Investment & Securities Co., Ltd.	2.26	2022.2.16	100,000	100,000	-
	NH Investment & Securities Co., Ltd.	3.00	2023.3.02	40,000	-	40,000
	NH Investment & Securities Co., Ltd.	1.95	2023.2.14	80,000	-	80,000
	NH Investment & Securities Co., Ltd.	2.22	2025.2.14	30,000	-	30,000
	NH Investment & Securities Co., Ltd.	1.56	2024.2.08	70,000	-	70,000
55-1 st Debenture (non-guaranteed/private)	KB Securities Co., Ltd and others	2.39	2031.5.7	90,000	-	90,000
55-2 nd Debenture (non-guaranteed/private)	KB Securities Co., Ltd and others	2.52	2036.5.7	60,000	-	60,000
Less: discount on debtures				(29,590)	(131)	(29,459)
Total				8,072,580	659,869	7,412,711

(in millions of Korean won)

		2020				
Financial institution		Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current	Non-current
50-2 nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.28	2022.5.19	400,000	-	400,000
50-3 rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.53	2024.5.19	280,000	-	280,000
51-1 st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.56	2021.2.20	190,000	190,000	-
51-2 nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.88	2023.2.20	240,000	-	240,000
51-3 rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.07	2025.2.20	270,000	-	270,000
51-4 th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	3.29	2028.2.20	300,000	-	300,000
52-1 st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.02	2022.3.13	160,000	-	160,000
52-2 nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.11	2024.3.13	240,000	-	240,000
52-3 rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.21	2026.3.13	200,000	-	200,000
52-4 th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	2.40	2029.3.13	400,000	-	400,000
53-1 st Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.57	2023.2.19	350,000	-	350,000
53-2 nd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.65	2025.2.19	250,000	-	250,000
53-3 rd Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.72	2027.2.19	50,000	-	50,000
53-4 th Debenture (non-guaranteed/public)	NH Investment & Securities Co., Ltd. and others	1.91	2030.2.19	250,000	-	250,000
USD foreign currency debenture with maturity in 2024	Citi and others	3.25	2024.10.15	544,000	-	544,000
USD foreign currency debenture with maturity in 2029	Citi and others	3.63	2029.4.15	544,000	-	544,000

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(in millions of Korean won)

		2020				
	Financial institution	Annual interest rate (%)	Latest maturity date	Amount in Korean won	Current	Non-current
EUR foreign currency debenture with maturity in 2023	Citi and others	0.50	2023.4.15	669,120	-	669,120
1-1st USD Overseas Exchangeable bonds^{1,2}	Credit Suisse	-	2020.10.7	-	-	-
1-2nd EUR Overseas Exchangeable bonds^{1,3}	Credit Suisse	-	2021.1.14	32,787	32,787	-
Debentures in Korean won (non-guaranteed)	NH Investment & Securities Co., Ltd.	2.26	2022.2.16	100,000	-	100,000
	NH Investment & Securities Co., Ltd.	2.71	2021.3.02	50,000	50,000	-
	NH Investment & Securities Co., Ltd.	3.00	2023.3.02	40,000	-	40,000
	NH Investment & Securities Co., Ltd.	1.95	2023.2.14	80,000	-	80,000
	NH Investment & Securities Co., Ltd.	2.22	2025.2.14	30,000	-	30,000
Less: discount on debentures				(20,629)	(321)	(20,308)
Total				<u>5,649,278</u>	<u>272,466</u>	<u>5,376,812</u>

¹ As the conditions for the execution of call options have been satisfied during the year ended December 31, 2020, exchangeable bonds of USD 219,800,000 were exchanged with 509,113 treasury shares and the remaining exchangeable bonds of USD 200,000 have been early repaid on October 7, 2020. Also, exchangeable bonds of EUR 290,700,000 were exchanged with 714,856 treasury shares. During the year ended December 31, 2021, exchangeable bonds of EUR 22,300,000 were additionally exchanged with 54,834 treasury shares and the remaining exchangeable bonds of EUR 2,200,000 have been early repaid.

² Details of 1-1st USD overseas exchangeable bonds are as follows:

	Details
Aggregate principal amount	USD 220,000,000
Issue price	USD 220,000,000
Coupon rate (%)	0.00
Issue date	April 16, 2018
Maturity date	April 16, 2021
Redemption	- Redemption at maturity: Outstanding bond principal, which is not repaid early or which call option is not exercised on, is repaid at maturity as a lump sum. - Prepayment: The issuer has a call option.
Underlying shares	509,606 registered ordinary shares (treasury shares)
Exchange price (Korean won/shares)	460,000
Exchange period	From May 27, 2018 to April 6, 2021
Call option by the issuer	- Share price (based on closing price) is higher than 130% of exchange price for more than 20 trading days during 30 consecutive trading days in a row, after 1 year from the closing date. - The amount of outstanding bonds is less than 10% in aggregate principal amount of the bonds originally issued (clean up call). - As a result of changes relating to tax laws in Korea, the issuer becomes obliged to pay any additional amounts.

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Call option by bondholders	- The shares cease to be listed or admitted to trading or are suspended for a period equal to or exceeding 30 consecutive trading days. - The occurrence of a change of control
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³ Details of 1-2nd EUR overseas exchangeable bonds are as follows:

	Details
Aggregate principal amount	EUR 315,200,000
Issue price	EUR 315,200,000
Coupon rate (%)	0.00
Issue date	April 16, 2018
Maturity date	April 16, 2021
Redemption	- Redemption at maturity: Outstanding bond principal, which is not repaid early or which call option is not exercised on, is repaid at maturity as a lump sum. - Prepayment: The issuer has a call option.
Underlying shares	775,128 registered ordinary shares (treasury shares)
Exchange price (Korean won/shares)	533,600
Exchange period	From May 27, 2018 to April 6, 2021
Call option by the issuer	- Share price (based on closing price) is higher than 130% of exchange price for more than 20 trading days during 30 consecutive trading days in a row, after 1 year from the closing date. - The amount of outstanding bonds is less than 10% in aggregate principal amount of the bonds originally issued (clean up call). - As a result of changes relating to tax laws in Korea, the issuer becomes obliged to pay any additional amounts.
Call option by bondholders	- The shares cease to be listed or admitted to trading or are suspended for a period equal to or exceeding 30 consecutive trading days. - The occurrence of a change of control

Details of lease liabilities as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021				
	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Leaser					
Hyundai Oil Bank and others	1.98 ~ 3.01	2068.3.31	319,245	71,865	247,380

<i>(in millions of Korean won)</i>	2020				
	Annual interest rate (%)	Latest maturity date	Total amount	Current	Non-current
Leaser					
Hyundai Oil Bank and others	1.98 ~ 3.01	2068.3.31	184,625	55,389	129,236

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15. Provisions

Changes in provisions for other liabilities and charges for the years ended December 31, 2021 and 2020, as follows:

(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 38)	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	2,110,180	79	15,642	83,807	2,209,708
Less: current portion	(1,532,356)	(79)	-	(40,320)	(1,572,755)
Total	577,824	-	15,642	43,487	636,953

(in millions of Korean won)

	2020				Total
	Warranty ¹	Greenhouse gas emission ²	Legal claims ³	Restoration ⁴	
Beginning balance	596,251	25,157	370	114,950	736,728
Additions (reversal)	942,425	(12,382)	8,885	22,112	961,040
Used	(294,659)	(7,900)	(969)	(24,233)	(327,761)
Ending balance	1,244,017	4,875	8,286	112,829	1,370,007
Less: current portion	(1,000,312)	(4,875)	-	(36,264)	(1,041,451)
Total	243,705	-	8,286	76,565	328,556

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, 2021, the above warranty provision included ₩2,103,880 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, 2021 amounts to 8,266 thousand tons (December 31, 2020: 8,437 thousand tons).

³ Lawsuit provisions have been accrued for certain pending cases.

⁴ As at December 31, 2021, 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 recognized in the consolidated statements of financial position as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Present value of defined benefit obligations ¹	1,616,781	1,454,596
Fair value of plan assets	<u>(1,643,709)</u>	<u>(1,336,637)</u>
Liabilities in the consolidated statement of financial position	<u>(26,928)</u>	<u>117,959</u>

¹ The present value of retirement benefit obligations is net of existing contributions to the National Pension Plan of ₩708 million as at December 31, 2021 (2020: ₩734 million).

The amounts recognized in the consolidated statements of profit or loss for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Current service cost ¹	191,482	196,654
Interest cost	<u>2,059</u>	<u>4,006</u>
Total, included in employee benefit expenses	<u>193,541</u>	<u>200,660</u>

¹ The above amounts excluded ₩2,456 million (2020: ₩5,622 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, 2021, amounted to ₩9,533 million (2020: ₩8,109 million).

Post-employment benefits recognized in the consolidated statements of profit or loss for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Cost of sales	118,525	131,628
Selling and administrative expenses	84,241	74,762
Discontinued operations	<u>308</u>	<u>2,379</u>
Total	<u>203,074</u>	<u>208,769</u>

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Movements in the present value of defined benefit obligations for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Beginning balance	1,454,596	1,343,553
Increase in defined benefit obligations		
due to business combination	54,897	-
Transfer in	39,334	7,190
Transfer out	(8,314)	(1,690)
Current service cost	193,938	202,276
Interest expense	37,257	31,313
Remeasurements:		
Actuarial loss from change in demographic assumptions	4,586	7,943
Actuarial gain from change in financial assumptions	(76,261)	(28,735)
Actuarial loss (gain) from experience adjustments	9,142	(10,239)
Others	11,336	617
Exchange differences	(4,600)	(13,820)
Payments from plans	(99,130)	(83,812)
Ending balance	<u>1,616,781</u>	<u>1,454,596</u>

Movements in the fair value of plan assets for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Beginning balance	1,336,637	1,164,393
Increase in plan assets due to business combination	45,275	-
Transfer in	1,135	-
Transfer out	(1,238)	(725)
Interest income	35,198	27,307
Remeasurements:		
Return on plan assets (excluding amounts included in interest income)	(13,326)	(5,069)
Contributions:		
Employers	332,299	227,555
Payments from plans	(89,445)	(76,458)
Administrative costs	(2,826)	(366)
Ending balance	<u>1,643,709</u>	<u>1,336,637</u>

The actual return on plan assets for the year ended December 31, 2021, was ₩21,872 million (2020: ₩22,238 million).

The significant actuarial assumptions as at December 31, 2021 and 2020, are as follows:

	2021	2020
Discount rate	2.9% ~ 3.0%	2.4% ~ 2.5%
Salary growth rate	5.0%	4.0% ~ 5.0%

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The sensitivity analysis for changes in key actuarial assumptions as at December 31, 2021, 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	(126,031)	143,559
Salary growth rate:		
Increase (decrease) in defined benefit obligations	139,400	(124,631)

A decrease in corporate bond yields may lead most significantly 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, 2021 and 2020, consist of:

<i>(in millions of Korean won)</i>	2021		2020	
	Amount	Composition (%)	Amount	Composition (%)
Insurance contracts with guaranteed yield	1,629,239	99.1	1,314,072	98.3
Equity linked bonds	12,988	0.8	20,855	1.6
Time deposits	1,482	0.1	1,710	0.1
	<u>1,643,709</u>	<u>100.0</u>	<u>1,336,637</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 12.62 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, 2021, are ₩160,568 million.

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17. Other Current and Non-Current Liabilities

Details of other current and non-current liabilities as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Current		
Advances from customers	373,356	203,507
Withholdings	143,600	128,754
Unearned revenues	104,121	62,286
Accrued expenses	699,592	393,482
Total	<u>1,320,669</u>	<u>788,029</u>
Non-current		
Long-term accrued expenses	73,880	63,019
Long-term unearned revenues	99,169	14,952
Long-term advanced received	16,829	68,935
Total	<u>189,878</u>	<u>146,906</u>

18. Commitments and Contingencies

- (1) The Parent Company is jointly and severally liable for liabilities of LG Energy Solution, Ltd. as at December 1, 2020, a newly established company through the split-off from the Parent Company.
- (2) As at December 31, 2021, the Parent Company and certain subsidiaries have been guaranteed from Seoul Guarantee Insurance Company for the execution of contracts and others.
- (3) As at December 31, 2021, 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 Group		Certain Overseas Subsidiaries						
	KRW	USD	KRW	USD	CNY	EUR	PLN	INR	THB
Limit of bank overdraft	20,400		8,700	228	2,000	104	-	-	10
Limit of the letter of credit	22,000	336	-	345	2,224	-	-	763	-
Limit of discount of notes from export	-	452	-	731	2,900	-	-	-	-
Limit of guaranteed payments in other foreign currency	-	181	-	122	400	-	-	-	-
Limit of loan arrangements	800,000	760	268,000	3,369	3,631	2,865	155	4,521	-
Forward foreign exchange	-	-	-	118	-	-	-	-	-
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 ₩5,000 million) and USD 300 million. Certain subsidiaries entered into factoring agreements with limit of KRW 230,000 million and USD 175 million.

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- (4) As at December 31, 2021, the Parent Company and certain subsidiaries have B2B purchase arrangements with several financial institutions with limit of ₩227,000 million and ₩150,000 million, respectively.
- (5) As at December 31, 2021, the Parent Company has reverse factoring agreements, and utilized the facility for ₩171,760 million provided by Shinhan Card and utilized the facility for ₩130,186 million provided by Woori Card.
- (6) As at December 31, 2021, 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 814 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.
- (7) As at December 31, 2021, in relation to price fixing of mobile batteries, the consumers in Israel have filed one class action against the Parent Company and certain overseas subsidiaries. However, the ultimate outcome of these cases cannot be determined at the reporting date.
- (8) As at December 31, 2021, 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.
- (9) In addition, as at December 31, 2021, the Parent Company and certain subsidiaries have been named as a plaintiff in 9 and 20 legal actions, respectively, involving ₩29,979 million and ₩10,127 million in claims, respectively. They have been named as a defendant in 13 and 151 legal actions, respectively, with ₩43,095 million and ₩3,856 million in claims, respectively. The ultimate outcome of these cases cannot be determined at the reporting date.
- (10) As at December 31, 2021, the Parent Company is under investigation by the related authorities in relation to the manipulation of the emission of fine dust-causing substance in the Yeosu Industrial Complex, and the final outcome of these investigations cannot be determined at the reporting date. As at December 31, 2021, the Parent Company shut down the relevant production facilities.
- (11) The Parent Company has entered into manufacture and production technical contracts with ExxonMobil and others.
- (12) 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.
- (13) As at December 31, 2021, the Parent Company has entered into payment guarantee contract of USD 150 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 certain installed products. Also, certain subsidiaries have entered into payment guarantee contract of CNY 280 million with financial institutions in relation to custom of imported raw materials.

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(14) As at December 31, 2021 and 2020, assets pledged as collateral for the borrowings are as follows:

<i>(in millions of Korean won)</i>	2021			Secured party
	Secured amount	Borrowings / Loan	Limit	
Factory	-	Current and non-current borrowings	-	KDB
	-		-	

The collateral provided for a subsidiary has been removed due to the disposal of the subsidiary during the year ended December 31, 2021.

<i>(in millions of Korean won)</i>	2020			Secured party
	Secured amount	Borrowings / Loan	Limit	
Factory	20,880	Current and non-current borrowings	6,622	KDB
	20,880		6,622	

(15) Capital expenditure arrangement that has not incur at the end of the reporting period is as follows:

<i>(in millions of Korean won)</i>	2021	2020
Property, plant and equipment	3,822,461	2,428,411

(16) As of December 31, 2021, the Group has entered into an agreement with General Motors (GM) regarding joint investment in 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.

(17) As of December 31, 2021, Stellantis, the Group's customer, has recalled Chrysler PHEV vehicles over a potential fire risk. There has been no confirmed root cause of fires in the Stellantis vehicles that are subject to the recall.

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19. Share Capital

Changes in share capital and share premium for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won and in shares)</i>	Ordinary shares		Preferred shares		Share premium
	Number of shares	Share capital	Number of shares	Share capital	
January 1, 2020	70,592,343	352,962	7,688,800	38,444	2,014,036
December 31, 2020	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

Changes in treasury shares for the years ended December 31, 2021 and 2020, 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, 2020	1,652,417	16,367	354,945	13,855
Treasury shares reduction due to the exercise of exchange rights	(1,187,575)	-	(319,246)	417,865
Others	-	1		
December 31, 2020	464,842	16,368	35,699	431,720
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	463,808

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.

20. Retained Earnings

Retained earnings as at December 31, 2021 and 2020, consist of:

<i>(in millions of Korean won)</i>	2021	2020
Legal reserve ¹	540,492	401,574
Discretionary reserve ²	12,945,537	13,780,609
Retained earnings before appropriation	4,605,920	993,121
Total	18,091,949	15,175,304

¹ The Commercial Code of the Republic of Korea requires the Parent Company to appropriate for

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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 Group 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, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Treasury shares (Note 19)	(18,011)	(35,699)
Capital transactions within the Group ¹	(19,299)	(19,299)
Total	<u>(37,310)</u>	<u>(54,998)</u>

¹ Includes gain or loss on disposal of investments and investment differences due to changes in equity, net of deferred tax.

22. Selling and Administrative Expenses

Selling and administrative expenses for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Wages and salaries	1,233,911	942,273
Post-employment benefits (Note 16)	84,241	74,762
Employee benefits	241,853	196,180
Travel expense	44,418	34,492
Water & utilities	69,364	56,135
Packaging expense	7,826	7,134
Rental expenses	124,487	87,943
Commission expenses	905,359	690,666
Depreciation	244,726	192,289
Advertising expense	39,055	27,413
Freight expenses	936,075	598,042
Training expense	28,373	16,012
Amortization (Note 12)	168,398	134,365
Sample expense	20,953	21,472
Development costs	255,150	217,778
Others	1,788,655	1,215,172
Total	<u>6,192,844</u>	<u>4,512,128</u>

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23. Breakdown of Expenses by Nature

Cost of sales, and selling and administrative expenses by nature for the years ended December 31, 2021 and 2020, consist of:

<i>(in millions of Korean won)</i>	2021	2020
Changes in inventories of merchandise, finished goods, semi-finished goods and work in process	(1,600,081)	(361,876)
Raw materials and consumables used	24,101,478	16,780,471
Purchase of merchandise	1,386,674	1,258,024
Employee benefit expenses (Note 24)	3,577,932	2,899,535
Advertising expenses	40,404	28,463
Freight expenses	980,393	636,678
Commission expenses	1,532,813	1,121,416
Depreciation and amortization	2,836,332	2,270,019
Rent expenses and usage fee	82,591	59,613
Other expenses	4,690,720	3,561,170
Total	<u>37,629,256</u>	<u>28,253,513</u>

24. Employee Benefit Expenses

Details of employee benefit expenses for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Salaries	3,047,389	2,419,496
Post-employment benefits – Defined benefit plan (Note 16)	193,233	198,404
Post-employment benefits – Defined contribution plan (Note 16)	9,533	7,986
Others	327,777	273,649
Total	<u>3,577,932</u>	<u>2,899,535</u>

25. Finance Income and Costs

Details of finance income and costs for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Finance income		
Interest income ¹	75,745	35,924
Dividend income	7,376	289
Exchange differences	368,489	377,350
Gain on derivative instruments	203,344	-
Others	31,730	3,898
Total	<u>686,684</u>	<u>417,461</u>
Finance costs		
Interest expense ²	211,002	198,155
Exchange differences	441,274	585,307
Loss on derivative instruments	8,104	325,417
Others	409	-
Total	<u>660,789</u>	<u>1,108,879</u>

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¹ Details of interest income for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Deposits held by financial institutions	31,222	24,973
Other loans and receivables	44,523	10,951
Total	<u>75,745</u>	<u>35,924</u>

² Details of interest expense for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Interest on financial institutions	45,600	48,846
Interest on lease liabilities	8,671	9,578
Interest on debentures	166,433	149,987
Other interest expenses	36,188	36,808
Capitalized interest for qualifying assets	(45,890)	(47,064)
Total	<u>211,002</u>	<u>198,155</u>

26. Other Non-Operating Income

Details of other non-operating income for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Exchange differences	699,130	762,310
Gain on disposal of property, plant and equipment	36,207	3,452
Gain on disposal of intangible assets	5,266	104
Gain on disposal of investments in associates (Note 10)	8,152	312,080
Insurance income	62,648	9,046
Others	91,752	68,137
Total	<u>903,155</u>	<u>1,155,129</u>

27. Other Non-Operating Expenses

Details of other non-operating expenses for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Exchange differences	584,233	925,073
Loss on disposal of property, plant and equipment	65,022	80,763
Loss on disposal of intangible assets	2,358	1,776
Impairment loss on property, plant and equipment (Note 11)	29,362	73,964
Impairment loss on intangible assets (Note 12)	298,849	138,484
Loss on disposal of investments in associates	2,054	-
Donations	17,308	13,627
Others	58,069	93,129
Total	<u>1,057,255</u>	<u>1,326,816</u>

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28. Tax Expense and Deferred Tax

Details of income tax expense for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Current tax on profit for the years	1,735,744	119,273
Adjustments in respect of prior years	20,296	6,287
Deferred tax - movement in temporary differences	(424,316)	433,353
Deferred tax – tax credit carryforwards	(20,096)	(12,578)
	<u>1,311,628</u>	<u>546,335</u>
Deferred tax charged directly to equity	17,534	(7,882)
Current tax charged directly to equity	(13,304)	(185,744)
Others	(80,068)	15,130
Income tax expense	<u>1,235,790</u>	<u>367,839</u>

The aggregate current and deferred tax charged directly to equity (other comprehensive income) for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Current tax		
Gain on disposal of financial assets at fair value through other comprehensive income	138	(5,262)
Gain on disposal of treasury shares	(13,442)	(180,482)
Total	<u>(13,304)</u>	<u>(185,744)</u>
Deferred tax		
Remeasurements of net defined benefit liabilities	(10,717)	(6,640)
Loss on valuation of derivative instruments	6,459	(674)
Exchange differences on translation of foreign operations	25,003	(4,998)
Gain (loss) on valuation of financial assets at fair value through other comprehensive income	(3,211)	4,430
Total	<u>17,534</u>	<u>(7,882)</u>

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

(in millions of Korean won)

	2021						Ending balance
	Beginning balance	Business combination	Profit (loss) for the year	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
	<u>672,144</u>	<u>(3,851)</u>	<u>403,205</u>	<u>(7,469)</u>	<u>10,902</u>	<u>25,750</u>	<u>1,100,681</u>
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)	<u>719,940</u>	<u>(3,851)</u>	<u>426,878</u>	<u>17,534</u>	<u>4,755</u>	<u>26,030</u>	<u>1,191,286</u>

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	2020						Ending balance
	Beginning balance	Business combination	Profit (loss) for the year	Increase (decrease)			
				Other comprehensive income	Others	Exchange differences	
Net defined benefit liabilities	358,940	-	29,572	115	-	(18)	388,609
Plan assets	(317,845)	-	(48,231)	16	-	-	(366,060)
Provision for impairment on receivables	1,106	-	(693)	-	-	16	429
Property, plant and equipment	116,316	-	19,514	-	36,498	2,686	175,014
Intangible assets	(42,115)	-	574	-	-	-	(41,541)
Investments in subsidiaries, associates and joint ventures	(30,109)	-	(56,435)	-	-	-	(86,544)
Accrued income	(218)	-	(36)	-	-	(1)	(255)
Others	271,183	-	(356,171)	(3,015)	694,776	(4,281)	602,492
	357,258	-	(411,906)	(2,884)	731,274	(1,598)	672,144
Exchange differences on translation of foreign operations	2,161	-	-	(4,998)	-	-	(2,837)
Tax credit carryforwards	20,687	-	12,578	-	(16,775)	(1,240)	15,250
Tax loss carryforwards	84,688	-	(13,565)	-	(34,234)	(1,506)	35,383
Deferred tax assets (liabilities)	464,794	-	(412,893)	(7,882)	680,265	(4,344)	719,940

The reconciliations between income tax expense and accounting profit for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021	2020
Profit before income tax expense¹	5,266,838	1,106,549
Tax at domestic tax rates applicable to profits in the respective countries²	1,487,382	495,467
Tax effects of:	(251,592)	(127,628)
Income not subject to tax	(34,084)	(36,733)
Expenses not deductible for tax purposes	107,755	29,198
Unrecognized deferred income tax for temporary differences in the current year	(115,428)	749,185
Tax credit	(304,633)	(173,716)
Others	94,798	(695,562)
Income tax expense	1,235,790	367,839
Effective tax rate (income tax expense/profit before income tax)	23.46%	33.24%

¹ The amount before regarding profit from discontinued operations

² The weighted average applicable tax rate on profit before income tax for the year ended December 31, 2021, is 28.24% (2020: 44.78%).

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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, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020	
Investments in subsidiaries, associates and joint ventures	(104,860)	(161,065)	Permanently re-invested income not distributed as dividend
Goodwill	5,582,080	5,737,439	No possibility of disposal
Land	(424,726)	(694,422)	
Unused tax loss carryforwards	<u>373</u>	<u>488</u>	
	<u>333,647</u>	<u>345,652</u>	Uncertainty of future tax income

The maturity of unused loss 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
2021 Tax loss carryforwards	21	3,154	9,961	451,065
2020 Tax loss carryforwards	165	2,497	14,501	480,651

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, 2021 and 2020, are computed as follows:

Basic earnings per ordinary share from continuing operations

<i>(in millions of Korean won and in number of shares)</i>	2021	2020
Profit from continuing operations attributable to ordinary shares ¹	3,038,302	372,308
Weighted average number of ordinary shares outstanding ²	<u>70,218,611</u>	<u>69,177,128</u>
Basic earnings per ordinary share from continuing operations <i>(in won)</i>	<u>43,269</u>	<u>5,382</u>

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Basic earnings per ordinary share

<i>(in millions of Korean won and in number of shares)</i>	2021	2020
Profit attributable to ordinary shares ¹	3,307,880	461,109
Weighted average number of ordinary shares outstanding ²	70,218,611	69,177,128
Basic earnings per ordinary shares <i>(in won)</i>	<u>47,108</u>	<u>6,666</u>

Basic earnings per preferred share from continuing operations

<i>(in millions of Korean won and in number of shares)</i>	2021	2020
Profit from continuing operations attributable to preferred share ¹	332,443	41,676
Weighted average number of preferred shares outstanding ²	7,674,271	7,672,433
Basic earnings per preferred share from continuing operations <i>(in won)</i>	<u>43,319</u>	<u>5,432</u>

Basic earnings per preferred share

<i>(in millions of Korean won and in number of shares)</i>	2021	2020
Profit attributable to preferred shares ¹	361,906	51,525
Weighted average number of preferred shares outstanding ²	7,674,271	7,672,433
Basic earnings per preferred shares <i>(in won)</i>	<u>47,158</u>	<u>6,716</u>

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

<i>(in millions of Korean won)</i>	2021	2020
Profit from continuing operations attributable to the equity holders of the Parent Company	3,370,745	413,984
Ordinary shares dividends (A)	842,623	691,771
Preferred shares dividends (B)	92,475	77,108
Undistributed earnings from continuing operation for the period	2,435,647	(354,895)
Undistributed earnings available for ordinary shares (C)	2,195,679	(319,463)
Undistributed earnings available for preferred shares (D)	239,968	(35,432)
Profit from continuing operations for the period attributable to ordinary shares (A+C)	3,038,302	372,308
Profit from continuing operations for the period attributable to preferred shares (B+D)	332,443	41,676
<i>(in millions of Korean won)</i>	2021	2020
Profit attributable to the equity holders of the Parent Company	3,669,787	512,634
Ordinary shares dividends (A)	842,624	691,771
Preferred shares dividends (B)	92,475	77,108
Undistributed earnings for the period	2,734,688	(256,245)
Undistributed earnings available for ordinary shares (C)	2,465,257	(230,662)
Undistributed earnings available for preferred shares (D)	269,431	(25,583)
Profit for the period attributable to ordinary shares (A+C)	3,307,880	461,109
Profit for the period attributable to preferred shares (B+D)	361,907	51,525

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² Weighted average numbers of shares are calculated as follows:

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
	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
	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

Ordinary shares outstanding	2020			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2020. 1. 1 – 2020 12. 31	68,939,926	366	25,232,012,916
Conversion of treasury shares	2020. 8. 1 - 2020. 12. 31	47,277	153	7,233,381
	2020. 9. 1 - 2020. 12. 31	446,115	122	54,426,030
	2020. 10. 1 - 2020. 12. 31	16,212	92	1,491,504
	2020. 11. 1 - 2020. 12. 31	50,658	61	3,090,138
	2020. 12. 1 - 2020. 12. 31	663,707	31	20,574,917
Total				25,318,828,886

Weighted average number of ordinary shares outstanding: 25,318,828,886 / 366 = 69,177,128 shares

Preferred shares outstanding	2020			
	Period	Number of shares	Number of days	Number of shares x days
Beginning balance	2020. 1. 1 - 2020. 12. 31	7,672,433	366	2,808,110,478
Total				2,808,110,478

Weighted average number of preferred shares outstanding: 2,808,110,478 / 366 = 7,672,433 shares

For the years ended December 31, 2021 and 2020, the Parent Company did not calculate diluted earnings per share due to anti-dilutive 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, 2021 and 2020, are as follows:

<i>(in Korean won)</i>	2021	2020
Basic earnings per ordinary share from discounted operations	3,839	1,284
Basic earnings per preferred share from discounted operations	3,839	1,284
Diluted earnings per ordinary share from discounted operations	3,839	1,284
Diluted earnings per preferred share from discounted operations	3,839	1,284

30. Dividends

Details of dividends of the Parent Company as at December 31, 2021 and 2020, are as follows:

	2021	2020
Number of shares entitled to dividends: shares issued and outstanding (par value per share: ₩5,000)		
Ordinary shares	70,224,814	70,127,501
Preferred shares	7,682,759	7,672,432
Dividend per share <i>(in Korean won, %)</i>		
Ordinary shares: cash	12,000 (240%)	10,000 (200%)
Preferred shares: cash	12,050 (241%)	10,050 (201%)
Cash dividends to distribute <i>(in millions of Korean won)</i>		
Ordinary shares	842,698	701,275
Preferred shares	92,577	77,108
	<u>935,275</u>	<u>778,383</u>

Dividend payout ratios of the Parent Company for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Dividends (A)	935,275	778,383
Profit attributable to equity holders of the Parent Company (B)	3,669,787	512,634
Dividend payout ratio (A/B)	<u>25.48%</u>	<u>41.98%</u>

Dividend yield ratios of the Parent Company for the years ended December 31, 2021 and 2020, are as follows:

<i>(in Korean won)</i>	2021		2020	
	Ordinary shares	Preferred Shares	Ordinary shares	Preferred Shares
Dividend per share (A)	12,000	12,050	10,000	10,050
Market value at the end of year (B) ¹	628,500	298,875	808,750	377,375
Dividend yield ratio (A/B)	<u>1.91%</u>	<u>4.03%</u>	<u>1.24%</u>	<u>2.66%</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.

LG Chem, Ltd. and Subsidiaries

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31. Related Party Transactions

As at December 31, 2021 and 2020, 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, 2021 and 2020, 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
S&I Corp.	S&I CM	S&I CM NANJING Co., Ltd. and others	Subsidiary of LG Corp.
LG CNS Co., Ltd.	Biz Tech Partners 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 Holdings Japan	-	-	Subsidiary of LG Corp.
LG Display Co., Ltd.	-	LG Display (China) Co., Ltd. and others	LG Enterprise group ¹
LG Electronics Inc.	LG Innotek Co., Ltd. and others	Inspur LG Digital Mobile Communications Co., Ltd. and others	LG Enterprise group ¹
LX International Corp.	LX Pantos Co., Ltd. and others	LX International (Japan) Ltd. and others	LG Enterprise group ¹
LX Hausys, Ltd.	-	LX Hausys Tianjin Co., Ltd. and others	LG Enterprise group ¹
LG Household & Health Care Ltd.	Coca-Cola Beverage Co. and others	-	LG Enterprise group ¹
LX Semicon Co., Ltd.	-	-	LG Enterprise group ¹
LX MMA Corporation ²	-	-	LG Enterprise group ¹
LG Uplus Corp.	LG HelloVision Corp.	-	LG Enterprise group ¹
G II R Inc.	HS AD Inc.	Beijing Yuanzhimeng Advertising Co., Ltd.	LG Enterprise group ¹

¹ 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.

² During the year ended December 31, 2021, due to the spin-off of LG Corp., its shares were transferred to LX Holdings Corp., a new company, and then the classification criteria for related parties have been changed.

LG Chem, Ltd. and Subsidiaries
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Sales and purchases with related parties for the years ended December 31, 2021 and 2020, are as follows:

(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	89,480
Associates and joint ventures						
SEETEC Co., Ltd.	66,149	180,001	654	94	419	69,220
TECWIN Co., Ltd.	10	182	5,513	-	-	192
HL Greenpower Co., Ltd. ¹	470,525	440	-	-	-	-
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	804	161,775	-	-	-	33
Others	26,727	10,949	-	-	-	2,697
Other related parties						
S&I 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	194,814
Others	156	-	-	-	-	32,485
Others						
LG Display Co., Ltd. and its subsidiaries	634,886	151	-	-	15	21
LG Electronics Inc. and its subsidiaries ²	1,170,195	918,280	312,448	-	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	-	-	681
LX MMA Corporation ³	159,877	191,431	-	-	-	4,408
Others	10,943	34,215	2,590	9	63	9,144
Total	2,932,001	2,134,377	1,497,959	13,161	749	2,075,674

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(in millions of Korean won)

	2020					
	Purchase and others					
	Sales 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.	14	-	-	-	167	60,718
Associates and joint ventures						
SEETEC Co., Ltd.	56,396	135,799	10	618	86	78,908
TECWIN Co., Ltd.	25	318	4,662	-	-	211
HL Greenpower Co., Ltd.	853,423	-	-	-	-	3,530
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	-	857	-	-	-	-
Others	54	3,821	-	-	-	2,482
Other related parties						
LX MMA Corporation ³	84,486	136,506	-	-	-	3,320
S&I Corp. and its subsidiaries	337	30,472	618,098	-	-	87,470
LG CNS Co., Ltd. and its subsidiaries	13,156	4,524	397,358	-	16	107,325
Others	14	-	-	583	2	16,470
Others						
LG Display Co., Ltd. and its subsidiaries	861,285	98	879	891	6	314
LG Electronics Inc. and its subsidiaries	1,187,949	822,786	326,358	1,910	10	110,628
LX International Corp. and its subsidiaries	57,992	324,691	148,452	1,181	4	465,694
LX Hausys, Ltd. and its subsidiaries	171,063	1,861	5,665	-	1	6,227
Others	7,847	22,830	2,236	1,605	29	6,960
Total	3,294,041	1,484,563	1,503,718	6,788	321	950,257

¹ This entity has been excluded from the related parties since the Company sold its shares in 2021.

Transactions with this entity until the sale of shares have been included in the above information.

² The consideration transferred for the acquisition of CEM business has been included in other purchase from LG Electronics Inc. and its subsidiaries (Note 38).

³ Net sales and purchase amounts after offsetting for Raffinate transactions with LX MMA Corporation.

LG Chem, Ltd. and Subsidiaries
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Balances of receivables and payables arising from sales and purchases of goods and services as at December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021			
	Receivables			Total
	Trade receivables and others	Loan receivables	Other receivables	
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				
S&I Corp. and its subsidiaries 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 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
Others	23	-	1,773	1,796
Total	477,238	-	59,684	536,922

(in millions of Korean won)

	2021			
	Payables			Total
	Trade payables	Borrowings	Lease liabilities	
Entity with a significant influence over the Group				
LG Corp.	-	-	11,866	23,609
Associates and joint ventures				
SEETEC Co., Ltd.	17,164	-	24,653	10,310
TECWIN Co., Ltd.	317	-	-	16,116
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	48,054	-	-	-
Others	-	-	-	410
Other related parties				
S&I Corp. and its subsidiaries ¹	-	-	-	282,691
LG CNS Co., Ltd. and its subsidiaries	233	-	1,192	316,160
Others	-	-	-	715
Others				
LG Display Co., Ltd. and its subsidiaries	32	-	595	2,942
LG Electronics Inc. and its subsidiaries ²	59,289	-	18,694	148,185
LX International Corp. and its subsidiaries	18,467	-	-	182,716
LX Hausys, Ltd. and its subsidiaries	-	-	-	5,501
LX MMA Corporation	15,960	-	-	-
Others	3,226	-	3,479	8,583
Total	162,742	-	60,479	997,938

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(in millions of Korean won)

	2020			
	Receivables			Total
	Trade receivables and others	Loan receivables	Other receivables	
Entity with a significant influence over the Group				
LG Corp.	-	-	12,420	12,420
Associates and joint ventures				
SEETEC Co., Ltd.	3,820	-	201	4,021
TECWIN Co., Ltd.	-	-	-	-
HL Greenpower Co., Ltd.	277,326	-	-	277,326
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	-	-	-	-
Others	-	-	22	22
Other related parties				
LX MMA Corporation	3,186	-	534	3,720
S&I Corp. and its subsidiaries ¹	6	-	8,783	8,789
LG CNS Co., Ltd. and its subsidiaries	7,048	-	85	7,133
Others	606	-	4,360	4,966
Others				
LG Display Co., Ltd. and its subsidiaries	152,152	-	27,792	179,944
LG Electronics Inc. and its subsidiaries ²	245,176	-	111,549	356,725
LX International Corp. and its subsidiaries	4,710	-	-	4,710
LX Hausys, Ltd. and its subsidiaries	34,977	-	31	35,008
Others	128	-	1,163	1,291
Total	729,135	-	166,940	896,075

(in millions of Korean won)

	2020				
	Payables				Total
	Trade payables	Borrowings	Lease liabilities	Other payables	
Entity with a significant influence over the Group					
LG Corp.	-	-	11,934	4,013	15,947
Associates and joint ventures					
SEETEC Co., Ltd.	14,977	-	26,014	9,884	50,875
TECWIN Co., Ltd.	-	-	-	6,105	6,105
HL Greenpower Co., Ltd.	-	-	-	330	330
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO., LTD.	70	-	-	-	70
Others	124	-	-	272	396
Other related parties					
LX MMA Corporation	13,272	-	-	-	13,272
S&I Corp. and its subsidiaries ¹	30	-	-	265,647	265,677
LG CNS Co., Ltd. and its subsidiaries	4	-	1,206	164,632	165,842
Others	-	-	92	289	381
Others					
LG Display Co., Ltd. and its subsidiaries	-	-	703	115	818
LG Electronics Inc. and its subsidiaries ²	133,330	-	1,792	254,868	389,990
LX International Corp. and its subsidiaries	23,654	-	575	74,267	98,496
LX Hausys, Ltd. and its subsidiaries	-	-	-	3,965	3,965
Others	1,869	-	1,101	6,224	9,194
Total	187,330	-	43,417	790,611	1,021,8

¹ Other receivables to S&I Corp. include the amount of deposits which are classified as memberships in the financial statements of the Group.

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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, 2021 and 2020, are as follows:

(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	11,956
Associates and joint ventures							
SEETEC Co., Ltd.	10,000	-	-	-	-	94	8,017
LG Vina Chemical	334	-	-	-	-	-	-
TL Chemical CO., Ltd	-	-	48,544	-	-	-	-
PT. HLI Greenpower ²	-	-	209,132	-	-	-	-
Other related parties							
LG CNS Co., Ltd.	-	-	-	-	-	1,192	3,471
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.	-	-	-	-	-	-	571
LG HOUSEHOLD & HEALTH CARE LTD	-	-	-	-	-	9	1,579
Total	10,334	235,342	257,676	-	-	30,834	26,931

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(in millions of Korean won)

	2020						
	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.	-	47,068	-	-	-	167	14,699
Associates and joint ventures							
SEETEC Co., Ltd.	10,000	-	-	-	-	86	3,506
TECWIN Co., Ltd.	314	-	-	-	-	-	-
HUAJIN NEW ENERGY MATERIALS(QUZHOU) CO.,Ltd	-	-	22,191	-	-	-	-
WUXI CL New Energy Technology	-	-	(1,178)	-	-	-	-
Other related parties							
LG CNS Co., Ltd.	-	-	-	-	-	16	1,190
LG Holdings Japan Co.,Ltd.	-	-	-	-	-	583	482
Others							
LG Display America, Inc.	-	-	-	-	-	891	85
Pantos Logistics (China) Co., Ltd.	-	-	-	-	-	-	21
Pantos Logistics France	-	-	-	-	-	854	415
Pantos Logistics Spain S.L.	-	-	-	-	-	328	159
LG Electronics Deutschland GmbH	-	-	-	-	-	1,910	4,390
LG Hausys, Ltd.	-	-	-	-	-	56	8
LG HOUSEHOLD & HEALTH CARE LTD	-	-	-	-	-	29	697
Total	10,314	47,068	21,013	-	-	4,920	25,652

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

² The entity name has been changed from PT. HKML Battery Indonesia to PT. HLI Greenpower for the year ended December 31, 2021.

Compensation for key management of the Group for the years ended December 31, 2021 and 2020, consists of:

(in millions of Korean won)	2021	2020
Short-term employee benefits	108,507	92,430
Post-employment benefits	19,714	7,005
Total	128,221	99,435

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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, 2021 and 2020; therefore, there are no impairment losses recognized against the receivables from related parties for the years ended December 31, 2021 and 2020.

As at December 31, 2021, there are no payment guarantees provided by the Group for related parties.

32. Cash Flows

Cash generated from operations for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Profit before income tax	5,266,838	1,106,548
Profit before income tax from continuing operations	4,890,652	951,597
Profit before income tax from discontinued operations	376,186	154,951
Adjustments for:		
Depreciation	2,617,730	2,129,986
Amortization	223,178	180,973
Post-employment benefits	193,541	200,660
Finance income	(416,499)	(55,302)
Finance costs	457,412	790,030
Foreign exchange differences	(29,881)	10,363
Loss (gain) on valuation of inventories	113,954	(7,756)
Gain on disposal of property, plant and equipment	(44,466)	(17,506)
Gain on disposal of intangible assets	(5,266)	(104)
Gain on disposal of other assets	-	(2,771)
Loss on disposal of property, plant and equipment	65,072	81,402
Loss on disposal of intangible assets	2,401	1,776
Reversal of impairment loss on property, plant and equipment	-	(220)
Impairment loss on property, plant and equipment	29,925	76,037
Impairment loss on intangible assets	298,849	138,547
Impairment loss on other assets	-	23
Gain on disposal of investments in associates	(6,098)	(312,080)
Gain on disposal of business	(371,125)	(32,085)
Additions to provisions	1,501,556	961,040
Other income	66,748	10,668
Increase in inventories	(2,816,268)	(565,687)
Increase in trade receivables	(653,921)	(3,181,776)
Increase in other receivables	(567,365)	(142,121)
Decrease (increase) in other current assets	(27,789)	53,343
Settlement of derivative instrument transactions	-	(733)
Increase in trade payables	289,248	3,651,513
Increase in other payables	1,512,613	1,583,217
Increase in other current liabilities	267,640	340,058
Decrease in provisions	(664,261)	(319,861)
Decrease in net defined benefit liabilities	(308,035)	(228,316)
Other cash flows from operations	(38,552)	76,778
Cash generated from operations	6,957,179	6,526,644

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

<i>(in millions of Korean won)</i>	2021						
	At January 1, 2021	Cash flows from financing activities	Lease liabilities	Amortization	Reclassification of current portion	Others	At December 31, 2021
Short-term borrowings	1,276,349	(28,019)	-	-	1,206,091	362,790	2,817,211
Long-term borrowings	3,260,490	1,854,965	200,308	-	(1,206,091)	(233,729)	3,875,943
Debentures	5,649,278	2,293,691	-	6,646	-	122,965	8,072,580
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	200,308	6,646	-	2,018,932	15,065,379

The significant non-cash transactions for the years ended December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Reclassification of construction-in-progress	6,309,583	5,421,750
Reclassification of machinery-in-transit	378,865	72,815
Reclassification of long-term borrowings into current portion	1,865,862	1,662,047
Other payables related to acquisitions of property, plant and equipment and intangible assets	2,041,805	1,786,346
Reclassification of other payables under the reverse factoring arrangement	1,783,703	2,802,825
Exchange of treasury stocks such as exchangeable bonds	54,383	917,592
Transfer of non-current assets held for sale	-	777,695
Transfer of non-current liabilities held for sale	-	130,383

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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 ¹	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 ²	Mobile batteries, Automotive batteries, Electricity storage batteries and others	Hewlett-Packard Co., General Motors Corp., and others
Advanced materials ¹	Automotive components, LCD Photoresist, OLED materials, Battery materials and others	LG Display Co., Ltd., Samsung Display Co., Ltd., BOE, AUO and others
Life sciences ¹	Growth hormone, Vaccine, Antidiabetic, agricultural chemicals and others	HUADONG NINGBO, UNICEF, Intervet 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 Certain divisions have been regrouped to reflect the reorganization of the Group. The information for the comparative period has been restated to reflect these changes.

² During the year ended December 31, 2020, LG Energy Solution was established through the split-off of battery business segment from the LG Chem, Ltd.

The segment information on revenue, profit and loss for the years ended December 31, 2021 and 2020, are as follows:

<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	854,972	44,987,975
Inter-segment revenue	584,097	16,838	1,589,375	70,011	72,932	2,333,253
Revenue from external customers ¹	20,175,492	17,803,863	3,202,981	690,346	782,040	42,654,722
Operating profit (loss) ²	4,081,476	771,121	235,900	66,991	(130,022)	5,025,466
<i>(in millions of Korean won)</i>	2020					
	Petro-chemicals	LG Energy Solution	Advanced materials	Life sciences	Common and others ³	Total
Total segment revenue	14,176,847	12,363,633	3,792,986	653,463	768,454	31,755,383
Inter-segment revenue	540,198	109	1,047,274	3,086	105,844	1,696,511
Revenue from external customers ¹	13,636,649	12,363,524	2,745,712	650,377	662,610	30,058,872
Operating profit (loss) ²	1,936,413	(165,634)	203,003	53,746	(222,169)	1,805,359

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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, 2021 and 2020, are as follows:

<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

<i>(in millions of Korean won</i>	2020					
	Petro-chemicals	LG Energy Solution	Advanced materials	Life sciences	Common and others	Total
Reportable segment asset ¹	11,668,671	19,577,416	3,137,926	1,928,129	5,076,752	41,388,894
Investments in associates and joint ventures	6,604	48,350	89,525	17	164,833	309,329
Reportable segment liability ¹	3,544,622	12,024,260	1,182,052	211,806	5,635,714	22,598,454

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, 2021 and 2020, and as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	Sales		Non-current assets ¹	
	2021	2020	2021	2020
Korea ²	10,164,222	8,270,238	16,157,398	14,656,257
China	12,130,895	8,913,290	4,688,935	3,690,486
Asia	5,178,242	3,283,064	147,809	34,876
America	4,309,768	2,601,486	1,692,631	656,190
Europe	10,351,454	6,662,579	4,192,086	3,859,016
Others	520,141	328,215	-	-
Total	42,654,722	30,058,872	26,878,859	22,896,825

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.

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There is no single external customer who contributes over 10% of the Group's revenue for the years ended December 31, 2021 and 2020.

34. Assets and Liabilities Held for Sale and Discontinued Operations

34.1 Assets and Liabilities Held for Sale

Upon the approval of management, the Group decided to dispose of six lines of small pouch assembly facilities and others (June 2019), acrylic film business (December 2020), LCD polarizer business (June 2020). As a result, the related assets and liabilities were reclassified as assets and liabilities held for sale. The disposal of acrylic film business and land acquired as part of acquisition of Farm Hannong Co., Ltd. is expected to be completed in the first half of FY2022. The disposal of LCD polarizer business, small pouch assembly facility business have been completed in February 2021, June 2021, respectively.

Details of assets and liabilities of disposal group classified as held for sale as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Assets of disposal group		
Inventories	-	185,693
Property, plant and equipment	5,364	570,374
Intangible assets	-	8,086
Others	-	24,919
Total	<u>5,364</u>	<u>789,072</u>
Liabilities of disposal group		
Borrowings and others	-	130,383
Total	<u>-</u>	<u>130,383</u>

Assets of the disposal group were measured at net fair value immediately before the initial classification as assets as held for sale and there are no other non-operating expenses (income) recognized from the measurement for the years ended December 31, 2021 and 2020.

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 of 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. 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.

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Comprehensive income information from discontinued operation for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021			
	LCD polarizer	Glass substrate	Ugimag	Total
Revenue	614,306	10,026	11,609	635,941
Expense	(210,869)	(8,230)	(40,656)	(259,755)
Gain (loss) before income tax of discontinued operation	403,437	1,796	(29,047)	376,186
Income tax benefits (expense)	(85,496)	(443)	8,795	(77,144)
Gain (loss) after income tax of discontinued operations	317,941	1,353	(20,252)	299,042

(in millions of Korean won)

	2020			
	LCD polarizer	Glass substrate	Ugimag	Total
Revenue	1,312,590	43,901	17,761	1,374,252
Expense	(1,109,989)	(83,646)	(25,666)	(1,219,301)
Gain (loss) before income tax of discontinued operation	202,601	(39,745)	(7,905)	154,951
Income tax benefits (expense)	(64,213)	7,912	-	(56,301)
Gain (loss) after income tax of discontinued operations	138,388	(31,833)	(7,905)	98,650

Net cash flows from discontinued operations for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)

	2021			
	LCD polarizer	Glass substrate	Ugimag	Total
Net cash inflow (outflow) from operating activities	231,214	(7,266)	6,022	229,970
Net cash inflow from investing activities	1,277,759	10,923	27,964	1,316,646
Net cash outflow from financing activities	(1,521,473)	(3,657)	(33,985)	(1,559,115)

(in millions of Korean won)

	2020			
	LCD polarizer	Glass substrate	Ugimag	Total
Net cash inflow (outflow) from operating activities	216,331	(3,963)	9,039	221,407
Net cash inflow (outflow) from investing activities	119,019	33,111	(1,499)	150,631
Net cash outflow from financing activities	(323,171)	(29,148)	(7,540)	(359,859)

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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, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Contract assets	-	-
Total contract assets	-	-
Contract liabilities		
Advances in relation to revenue from the Group's main business activities	376,487	265,688
Expected services to be transferred	-	-
Expected customer incentives	5,636	5,394
Unearned revenue	167,151	26,036
Total contract liabilities	549,274	297,118

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>	2021	2020
Revenue recognized in the current period from the contract liabilities balance at the beginning of the period	205,125	179,431
Advances in relation to revenue from the Group's main business activities	200,987	162,509
Unearned revenue	4,138	13,422
Expected services to be transferred	-	3,500
Revenue recognized from performance obligations satisfied in previous periods	-	-

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36. Investment Properties

Details of investment properties as at December 31, 2021 and 2020, are as follows:

(in millions of Korean won)	2021				2020			
	Cost	Accumulated depreciation	Accumulated impairment	Book amount	Cost	Accumulated depreciation	Accumulated impairment	Book amount
Land	4,211	-	-	4,211	4,211	-	-	4,211
Buildings	65,542	(13,409)	(47)	52,086	54,457	(9,225)	(10)	45,222
Total	69,753	(13,409)	(47)	56,297	58,668	(9,225)	(10)	49,433

Changes in investment properties for the years ended December 31, 2021 and 2020, are as follows:

(in millions of Korean won)	2021			2020		
	Land	Building	Total	Land	Building	Total
Beginning balance	4,211	45,222	49,433	4,368	48,960	53,328
Acquisitions/transfers	-	8,233	8,233	-	2,644	2,644
Disposals/transfers	-	(73)	(73)	(157)	(5,221)	(5,378)
Depreciation	-	(1,296)	(1,296)	-	(1,161)	(1,161)
Ending balance	4,211	52,086	56,297	4,211	45,222	49,433

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, 2021, is ₩66,861 million (2020: ₩51,625 million).

Rental income from investment properties under operating lease is ₩6,752 million (2020: ₩6,819 million), and operating expenses incurred for investment properties that generated rental income (including maintenance and repair expenses) are ₩1,283 million (2020: ₩1,149 million). Operating expenses incurred for investment properties that do not generate rental income (including maintenance and repair expenses) are ₩12 million (2020: ₩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 are reflected in the fair value of investment properties.

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The future minimum lease payments expected to be received in relation to the above operating lease agreement for investment properties as at December 31, 2021 and 2020, are as follows:

<i>(in millions of Korean won)</i>	2021	2020
Within one year	6,874	503
Within two years	6,016	172
Within five years	-	500
Total	<u>12,890</u>	<u>1,175</u>

37. Revenue from Contracts with Customers

- (a) On February 11, 2021, the U.S. International Trade Commission (ITC) issued its final determination that SK Innovation had infringed the Group's trade secrets. On May 15, 2021, the Group and SK Innovation entered into an agreement to settle all legal disputes relating to the trade secret infringement. As a consideration for the settlement, SK Innovation agreed to pay the Group lump-sum payments of KRW 1 trillion and running royalties of KRW 1 trillion based on certain percentage of annual revenues of SK Innovation for certain periods in the future.
- (b) In accordance with the agreement, the Group and SK Innovation agreed to grant permanent licenses, withdraw all pending domestic and international legal disputes and also not to sue for the next 10 years. The Group determined that all payments to be received from SK Innovation are consideration in exchange for the licenses granted.
- (c) Licensing is a major operating activity of the Group and the nature of the license provided by the Group to SK Innovation is a right to use and there is no performance obligation to be provided additionally after the settlement.
- (d) As such, the Group recognized operating income of KRW 992,233 million for the lump-sum payments (discounted present value of the lump-sum payments of KRW 1 trillion) during the year ended December 31, 2021.
- (e) In October 2021, SK on Co., Ltd. was incorporated through a split-off from SK Innovation Co., Ltd. and the agreement with the Group was transferred to SK on Co., Ltd.

38. Business Combination

On November 1, 2021 the Company and its subsidiary, LG Chem Poland Sp. z o.o., acquired CEM(Chemical Electronics Material) business from LG Electronics Inc. for ₩ 524,700 million to drive competitive separator business. The 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.

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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	<u>254,432</u>	<u>76,336</u>
Goodwill	202,568	-
Gain from a bargain purchase	<u>-</u>	<u>(8,636)</u>
	<u>457,000</u>	<u>67,700</u>

¹ The fair value of trade receivables 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.

The revenue and net loss in 2021 contributed by CEM business since the acquisition were ₩ 47,860 million and ₩ 3,585 million, respectively.

Revenue and profit or loss of the Group for the year ended December 31, 2021 would have been ₩ 42,779,261 million and ₩ 3,996,273 million, respectively as though the acquisition of CEM business had occurred as of the beginning of the year ended December 31, 2021.

39. Events after the Reporting Period

(a) In January 2022, the Group disposed of 8,500,000 shares of LG Energy Solution, Ltd. (4.25% of ownership), which was classified as assets held for sale in accordance with the approval of the Board of Directors in December 2021. The percentage of ownership held by the Company over LG Energy Solution, Ltd. has decreased from 100% to 81.8% after this transaction.

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- (b) In January 2022, the Group approved the investment of the 3rd facilities in Ultium Cells LLC, a joint venture with GM in the U.S., to cope with growing demand for electric vehicle batteries in North American market.
- (c) LG Energy Solution, Ltd. has listed its shares on the Korea Exchange on January 27, 2022, to expand domestic and overseas investments.
- (d) In February 2022, the Group acquired 100% shares of NEC Energy Solution, which is Energy Saving System (ESS) integrated (SI) company, from its parent company, Japan NEC Corporation.

40. Approval of Issuance of the Financial Statements

The consolidated financial statements 2021 were approved for issue by the Board of Directors on February 22, 2022 and are subject to change with approval of shareholders at their Annual General Meeting.