SAMSUNG SDI CO., LTD. AND SUBSIDIARIES

Consolidated Financial Statements

December 31, 2022 and 2021

(With Independent Auditors' Report Thereon)

Contents

KPMG SAMJONG

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Independent Auditors' Report

Based on a report originally issued in Korean

To the Shareholders and Board of Directors of
Samsung SDI Co., Ltd.:

Opinion

We have audited the consolidated financial statements of Samsung SDI Co., Ltd. and its subsidiaries ("the Group"), which comprise the consolidated statements of financial position as of December 31, 2022 and 2021, the consolidated statements of comprehensive income, changes in equity and cash flows for the years then ended, and notes, comprising significant accounting policies and other explanatory information.

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

Basis for Opinion

We conducted our audits in accordance with Korean Standards on Auditing (KSAs). Our responsibilities under those standards are further described in the Auditors' 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 that are relevant to our audit of the consolidated financial statements in Republic of Korea, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

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 as of and for the year ended December 31, 2022. 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.

The existence of automotive battery revenue

1) Risk

The Group recognizes automotive battery revenue when it transfers the risk and control over the goods to the customer. The Group's automotive battery revenue is consistently increasing, and the expectations of external stakeholders are high.

As described in note 5 to the consolidated financial statements automotive battery revenue is significant, and the management has incentives to overstate that revenue, we have identified the existence of automotive battery revenue as a key audit matter.

2) How the matter was addressed in our audit

The primary procedures we performed to address this key audit matter included the following:

- Understanding the company's process related to automotive battery revenue and evaluating the internal control.
- Evaluating the adequacy of the timeliness of automotive battery revenue recognition, on a sample basis, by inspecting the revenue contracts.

- Evaluating the existence and the adequacy of the timeliness of automotive battery revenue, on a sample basis, by observing the external evidence regarding the shipment of automotive battery.

Other Matter

The procedures and practices utilized in the Republic of Korea to audit such consolidated 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 K-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, or has no realistic alternative but to do so.

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

Auditors' 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 auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with KSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

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

- Identify and assess the risks of material misstatement of the 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 Group's internal control.
- Evaluate the appropriateness of accounting policies used in the preparation of the consolidated financial statements 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 auditors' 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 auditors' 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 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 auditors' report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partner on the audit resulting in this independent auditors' report is Cha, Jeong-Hwan.

KPMG Samjong Accounting Corp.

Seoul, Korea
February 22, 2023

This report is effective as of February 22, 2023, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the accompanying consolidated financial statements and notes thereto. Accordingly, the readers of the audit report should understand that the above audit report has not been updated to reflect the impact of such subsequent events or circumstances, if any.

As of December 31, 2022 and 2021

(In thousands of won)	***Note***		**2022**	**2021**
Assets				
Cash and cash equivalents	*4,6*	₩	2,614,271,850	2,325,692,348
Trade and other receivables, net	*4,7,31*		2,933,814,799	2,195,425,599
Inventories, net	*8*		3,204,515,835	2,487,316,319
Other investments	*4,9*		534,662,104	164,541,359
Other current assets	*10*		335,800,401	258,708,109
Current derivative assets	*4,19*		28,637,386	13,223,334
Current assets			**9,651,702,375**	**7,444,907,068**
Long-term trade and other receivables, net	*4,7,31*		6,879,322	13,538,048
Investments in associates and joint venture	*11*		8,940,282,255	7,885,424,300
Property, plant and equipment, net	*5,12,30*		8,965,469,799	7,635,995,590
Intangible assets, net	*5,13*		814,931,163	798,911,068
Investment property	*5,14*		147,558,866	150,410,177
Deferred tax assets	*28*		168,913,514	140,864,869
Other non-current investments, including derivatives	*4,9,19*		1,245,883,337	1,572,410,117
Other non-current assets	*10*		137,715,011	105,884,741
Non-current derivative assets	*4,19*		6,070,438	84,847,019
Employee benefit assets	*18*		172,119,091	-
Non-current assets			**20,605,822,796**	**18,388,285,929**
Total assets		₩	**30,257,525,171**	**25,833,192,997**
Liabilities				
Trade and other payables	*4,15,30,31*	₩	4,285,754,046	3,269,446,525
Income tax payable	*28*		229,613,881	126,201,165
Advance received	*5*		230,132,847	211,277,273
Unearned revenue	*5*		78,688,354	39,131,550
Short-term borrowings	*4,16,33*		2,851,183,214	2,510,216,803
Derivative liabilities	*4,19*		57,510	2,330,250
Provisions	*17,19*		331,508,976	302,682,230
Current liabilities			**8,006,938,828**	**6,461,285,796**
Non-current trade and other payables	*4,15,30,31*		697,531,225	265,947,484
Long-term advance received	*5*		50,623,505	35,429,210
Long-term borrowings	*4,16,33*		2,297,040,000	2,107,760,803
Net employee benefit liabilities	*18*		2,005,410	9,358,262
Non-current derivative liabilities	*4,19*		82,319	10,016,687
Long-term provisions	*17,19*		91,878,306	93,311,710
Deferred tax liabilities	*28*		1,893,923,422	1,653,383,731
Non-current liabilities			**5,033,084,187**	**4,175,207,887**
Total liabilities		₩	**13,040,023,015**	**10,636,493,683**
Equity				
Share capital	*1,20*	₩	356,712,130	356,712,130
Share premium	*20*		5,001,974,693	5,001,974,693
Other components of equity	*21*		(345,131,584)	(345,131,584)
Accumulated other comprehensive income	*22*		1,003,816,893	1,174,235,558
Retained earnings	*23*		10,468,351,381	8,516,473,334
Equity attributable to owners of the Parent Company			**16,485,723,513**	**14,704,264,131**
Non-controlling interests	*32*		**731,778,643**	**492,435,183**
Total equity			**17,217,502,156**	**15,196,699,314**
Total liabilities and equity			**30,257,525,171**	**25,833,192,997**

See accompanying notes to the consolidated financial statements.

For the years ended December 31, 2022 and 2021

(In thousands of won, except per share information)	***Note***		**2022**	**2021**
Revenue	*5,31*	₩	**20,124,069,516**	**13,553,220,249**
Cost of sales	*8,18,25,31*		(15,903,322,834)	(10,475,602,069)
Gross profit			**4,220,746,682**	**3,077,618,180**
Selling, general and administrative expenses	*13,18,24,25,31*		(2,412,733,669)	(2,010,042,579)
Operating profit	*5*		**1,808,013,013**	**1,067,575,601**
Other non-operating income	*26,31*		62,998,019	51,960,888
Other non-operating expenses	*26,31*		(206,316,946)	(93,328,475)
Finance income	*27*		1,390,645,973	547,619,990
Finance costs	*27*		(1,442,761,340)	(440,534,600)
Share of income of associates and joint venture	*11*		1,039,696,670	530,041,919
Profit before income tax			**2,652,275,389**	**1,663,335,323**
Income tax expense	*28*		(612,913,941)	(412,933,762)
Profit for the year	*23,29*		**2,039,361,448**	**1,250,401,561**
Other comprehensive income				
Items that will not be reclassified to profit or loss:				
Remeasurement of net defined benefit liabilities	*18,23,28*		87,645,869	(5,968,134)
Gain (loss) on valuation of financial assets at FVOCI	*9*		(166,678,917)	312,538,061
Related tax	*28*		(3,040,696)	(74,151,288)
Items that are or may be reclassified to profit or loss:				
Gain on valuation of derivatives instruments for cash flow hedge	19		(67,984,703)	17,423,535
Change in equity of equity-method accounted investees	*11*		(9,615,209)	191,618,540
Foreign operations – foreign currency translation differences			17,859,070	238,564,516
Related tax	28		1,937,146	(50,560,667)
Other comprehensive income for the year, net of tax			**(139,877,440)**	**629,464,563**
Total comprehensive income for the year		₩	**1,899,484,008**	**1,879,866,124**
Profit attributable to:				
Owners of the Parent Company	*29*	₩	1,952,148,536	1,169,801,395
Non-controlling interests	*32*		87,212,912	80,600,166
Total comprehensive income attributable to:				
Owners of the Parent Company			1,848,403,992	1,793,592,722
Non-controlling interests	*32*		51,080,016	86,273,401
Earnings per share	*29*			
Basic earnings per share - Ordinary share (in won)		₩	29,191	17,492
Basic earnings per share - Preferred share (in won)			29,241	17,542

See accompanying notes to the consolidated financial statements.

For the years ended December 31, 2022 and 2021

(In thousands of won)		Share capital	Capital surplus	Other capital	Accumulated other comprehensive income	Retained earnings	Non-controlling interests	Total equity
Balance at January 1, 2021	₩	**356,712,130**	**5,001,974,693**	**(345,131,584)**	**545,959,020**	**7,418,101,760**	**381,310,869**	**13,358,926,888**
Comprehensive income								
Profit for the year		-	-	-	-	1,169,801,395	80,600,166	1,250,401,561
Remeasurements of the defined benefit plan		-	-	-	-	(4,485,211)	-	(4,485,211)
Gain on valuation of derivatives instruments for cash flow hedge		-	-	-	13,207,039	-	-	13,207,039
Changes in fair values of financial assets at FVOCI		-	-	-	236,903,850	-	-	236,903,850
Change in equity of equity-accounted investees		-	-	-	145,274,368	-	-	145,274,368
Foreign operations – foreign currency translation differences		-	-	-	232,891,281	-	5,673,235	238,564,516
Total comprehensive income		**-**	**-**	**-**	**628,276,538**	**1,165,316,184**	**86,273,401**	**1,879,866,123**
Transactions with shareholders directly recognized in equity								
Dividends to owners of the company		-	-	-	-	(66,944,610)	(2,390,865)	(69,335,475)
Capital contribution from non-controlling interest		-	-	-	-	-	34,860,680	34,860,680
Capital reduction of non-controlling interest		-	-	-	-	-	(406,530)	(406,530)
Foundation of subsidiaries		-	-	-	-	-	(7,212,371)	(7,212,371)
Balance at December 31, 2021	₩	**356,712,130**	**5,001,974,693**	**(345,131,584)**	**1,174,235,558**	**8,516,473,334**	**492,435,184**	**15,196,699,315**

See accompanying notes to the consolidated financial statements.

For the years ended December 31, 2022 and 2021, Continued

(In thousands of won)		Capital stock	Capital surplus	Other capital	Accumulated other comprehensive income	Retained earnings	Non-controlling interests	Total equity
Balance at January 1, 2022	₩	**356,712,130**	**5,001,974,693**	**(345,131,584)**	**1,174,235,558**	**8,516,473,334**	**492,435,184**	**15,196,699,315**
Comprehensive income								
Profit for the year		-	-	-	-	1,952,148,536	87,212,912	2,039,361,448
Remeasurements of the defined benefit plan		-	-	-	-	66,674,121	-	66,674,121
Gain on valuation of derivatives instruments for cash flow hedge		-	-	-	(52,195,555)	-	-	(52,195,555)
Changes in fair values of financial assets at FVOCI		-	-	-	(148,747,865)	-	-	(148,747,865)
Change in equity of equity-accounted investees		-	-	-	(23,467,212)	-	-	(23,467,212)
Foreign operations – foreign currency translation differences		-	-	-	53,991,967	-	(36,132,896)	17,859,071
Total comprehensive income		**-**	**-**	**-**	**(170,418,665)**	**2,018,822,657**	**51,080,016**	**1,899,484,008**
Transactions with shareholders directly recognized in equity								
Dividends to owners of the company		-	-	-	-	(66,944,610)	(2,553,942)	(69,498,551)
Capital contribution from non-controlling interest		-	-	-	-	-	191,354,614	191,354,614
Capital reduction of non-controlling interest		-	-	-	-	-	(537,230)	(537,230)
Balance at December 31, 2022	₩	**356,712,130**	**5,001,974,693**	**(345,131,584)**	**1,003,816,893**	**10,468,351,381**	**731,778,642**	**17,217,502,156**

See accompanying notes to the consolidated financial statement.

For the years ended December 31, 2022 and 2021

(In thousands of won)	***Note***		**2022**	**2021**
Cash flows from operating activities				
Profit for the year		₩	2,039,361,448	1,250,401,560
Adjustments for expense (benefit)	*33*		1,283,815,711	1,187,697,644
Changes in assets and liabilities	*33*		(368,780,788)	(24,604,442)
Interest received			34,121,360	13,573,960
Interest paid			(81,139,252)	(48,651,258)
Dividends received			12,250,892	15,385,096
Income taxes paid			(278,533,207)	(217,775,202)
Net cash provided by operating activities			**2,641,096,164**	**2,176,027,358**
Cash flows from investing activities				
Decrease in other investments			223,573,857	273,753,611
Proceeds from disposal of property, plant and equipment			20,379,233	10,692,315
Proceeds from disposal of intangible assets			1,122,015	1,746,072
Disposal of subsidiaries and affiliates			19,709,386	1,389,603
Increase in government grants			52,827,228	86,857,352
Acquisition of other investments			(408,355,803)	(42,291,984)
Acquisition of property, plant and equipment			(2,808,898,170)	(2,254,718,266)
Acquisition of intangible assets			(4,583,865)	(2,291,915)
Acquisition of subsidiaries and affiliates			(42,010,000)	(24,670,000)
Net cash used in investing activities			**(2,946,236,119)**	**(1,949,533,212)**
Cash flows from financing activities				
Proceeds from short-term borrowings			1,239,602,699	1,443,570,249
Proceeds from long-term borrowings			807,737,420	881,522,739
Capital contribution from non-controlling interest			191,354,614	34,860,680
Dividends paid			(69,498,551)	(69,335,475)
Repayment of debentures			-	(370,000,000)
Repayment of short-term borrowings			(1,508,607,082)	(1,100,904,053)
Repayment of long-term borrowings			(1,296,152)	(205,899,907)
Capital reduction from non-controlling interest			(29,750)	(6,683,614)
Repayment of lease liabilities			(30,563,962)	(24,407,220)
Net cash provided by financing activities			**628,699,236**	**582,723,399**
Net increase in cash and cash equivalents			**323,559,281**	**809,217,545**
Cash and cash equivalents at January 1			2,325,692,348	1,545,974,322
Effect of fluctuations in exchange rate on cash held			(34,979,779)	(29,499,520)
Cash and cash equivalents at December 31		₩	**2,614,271,850**	**2,325,692,347**

See accompanying notes to the consolidated financial statements.

1. Reporting Entity

Samsung SDI Co., Ltd. (the "Parent Company" or the "Company") was incorporated on January 20, 1970 under the laws of the Republic of Korea with paid-in capital of ₩200 million. The consolidated financial statements comprise the Company, its subsidiaries (together referred to as the "Group" and individually as "Group entities") and the Group's interests in associates. In 1979, the Parent Company was listed on the Korean stock exchange market and its head office is located in Gi-heung, Gyeong-gi Do.

The major business segments and locations of domestic production facilities of the Parent Company are as follows.

Business	Major product lines	Domestic Locations
Energy solutions	Small-sized li-ion battery, Automotive battery, ESS (Energy Storage System)	Cheon-an, Ulsan
Electronic materials	Semi-conductor and display materials	Cheong-ju, Gumi

In addition to these local business locations, the Parent Company also has 19 subsidiaries operating in the United States, China, Germany, Hungary, and so on.

Under its Articles of Incorporation, the Parent Company is authorized to issue 200,000 thousand shares with par value of ₩5,000. As of December 31, 2022, 70,382,426 shares of stock (including 1,617,896 shares of preferred stock) have been issued and are outstanding, and the Parent Company's paid-in-capital amounts to ₩356,712 million. The largest shareholder of the Parent Company is Samsung Electronics Co., Ltd. (ownership: 19.13%). The Parent Company is allowed to retire its stocks through a board resolution within its profit available for dividends to its shareholders. Pursuant to the resolution made by the board of directors on October 18, 2004, the Parent Company retired 930,000 shares of ordinary stock and 30,000 shares of preferred stock, which were acquired at ₩99,333 million on December 8, 2004 by appropriating retained earnings. The par value of outstanding shares is ₩351,912 million (₩343,823 million for common stock and ₩8,089 million for preferred stock, excluding the retired shares) and it differs from the Group's paid-in-capital due to the share retirement.

Under its Articles of Incorporation, the Parent Company is authorized to issue 30,000 thousand shares of non-voting preferred stock. Holders of preferred shares issued before February 28, 1997 are entitled to receiving additional dividends of 1% of its par value per annum. As of December 31, 2022 1,617,896 shares of non-cumulative and non-voting preferred stocks are eligible for these additional dividends.

2. Basis of Preparation

The consolidated financial statements have been prepared in accordance with Korean International Financial Reporting Standards ("K-IFRS"), as prescribed in the Act on External Audits of Corporations in the Republic of Korea. The consolidated financial statements were authorized for issue by the Board of Directors on January 30, 2023 and will be submitted for approval to general shareholders meeting to be held on March 15, 2023.

(1) Basis of measurement

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

- Financial instruments measured at fair value.

- Liabilities for defined benefit plans recognized at the net of the total present value of defined benefit obligations less the fair value of plan assets.

(2) Functional and presentation currency

These consolidated financial statements are presented in Korean won, which is the Parent Company's functional currency and the currency of the primary economic environment in which the Group operates.

(3) Use of estimates and judgments

The preparation of the consolidated financial statements in conformity with K-IFRS requires management to use estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income, and expenses based on the management's best judgment. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Change in accounting estimates is recognized during the period in which the change is made and during any future periods it may affect.

Information about critical judgments in applying accounting policies that have the most significant effect on the amounts recognized in the consolidated financial statements is included in the following notes:

- Note 3: Consolidation: whether the Group has de facto control over an investee;
- Note 11: Investments in associates: whether the Group has significant influence over an investee; and
- Note 30: Lease term: whether the Group is reasonably certain to exercise extension options

Information about uncertainties of assumptions and estimation that have a significant risk of resulting in a material adjustment within the next financial year is included in the following notes:

- Note 8: Inventory Allowance for valuation - Key assumptions of net realizable value measurement
- Note 13: Intangible Assets- key assumptions underlying recoverable amounts
- Note 17: Provisions - key assumptions about likelihood and magnitude of an outflow of resources; and
- Note 18: measurement of defined benefit obligations: key actuarial assumptions

2. Basis of Preparation, Continued

(4) Fair value measurement

Group's accounting policies and disclosures require the measurement of fair values, for both financial and non-financial assets and liabilities. The Group has an established control framework with respect to the measurement of fair values. This includes a valuation team that has overall responsibility for overseeing all significant fair value measurements, including Level 3 fair values, and the results are reported directly to the CFO.

The valuation team regularly reviews significant unobservable inputs and valuation adjustments. If third party information, such as broker quotes or pricing services, is used to measure fair values, then the valuation team measures the evidence obtained from the third parties to support the conclusion that such valuations meet the requirements of K-IFRS, including the level in the fair value hierarchy in which such valuations should be classified.

Significant valuation issues are reported to the Group's Audit Committee.

When measuring the fair value of an asset or a liability, the Group uses market observable data as far as possible. Fair values are categorized into different levels in the fair value hierarchy based on the inputs used in the valuation techniques as follows.

- Level 1: quoted prices (unadjusted) in accessible active markets for identical assets or liabilities
- Level 2: inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from price)
- Level 3: inputs for the asset or liability that are not based on observable market data (unobservable inputs)

If the inputs used to measure the fair value of an asset or a liability might be categorized in different levels of the fair value hierarchy, then the fair value measurement is categorized in its entirety in the same level of the fair value hierarchy as the lowest level input that is significant to the entire measurement. The Group recognized transfers between levels of the fair value hierarchy at the end of the reporting period during which the change has occurred.

Further information about the assumptions made in measuring fair values is included in the following note:

- Note 4: Financial Risk Management

3. Significant Accounting Policies

Significant accounting policies applied by the Group in preparing its consolidated financial statements in accordance with K-IFRS are described below. The Group has consistently applied the following accounting policies to all periods presented in these consolidated financial statements.

(1) Basis of consolidation

1) Business combination

A business combination is accounted for by applying the acquisition method, unless it is a combination for entities or businesses under common control.

The consideration transferred in the acquisition is generally measured at fair value, as are the identifiable net assets acquired. Any goodwill that arises is tested annually for impairment. Any gain on a bargain purchase is recognized in profit or loss immediately. Acquisition-related costs, other than those associated with the issue of debt or equity securities recognized in accordance with K-IFRS No. 1032 and No. 1109, are expensed in the periods in which the costs are incurred and the services are provided.

The consideration transferred does not include amounts related to the settlement of pre-existing relationships. Such amounts are generally recognized in profit or loss.

Any contingent consideration payable is measured at fair value at the acquisition date. If the contingent consideration is classified as equity, then it is not re-measured and settlement is accounted for within equity. Otherwise, subsequent changes in the fair value of the contingent consideration are recognized in profit or loss.

If share-based payment awards (replacement awards) are required to be exchanged for awards held by the acquiree's replacement (acquiree's awards), then all or a portion of the amount of the acquirer's replacement awards is included in measuring the consideration transferred in the business combination. This determination is based on the market-based measure of the replacement awards compared with the market-based measure of the acquiree's awards and the extent to which the replacement awards relate to pre-combination service.

2) Non-controlling interests

Non-controlling interests ("NCI") are measured at their proportionate share of the acquiree's identifiable net assets at the acquisition date. Changes in the Group's interest in subsidiaries that do not result in a loss of control are accounted for as equity transactions.

3) Subsidiaries

Subsidiaries are entities controlled by the Group. The Group controls an entity when it is exposed, or has right to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

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 its financial statements in preparing the consolidated financial statements.

3. Significant Accounting Policies, Continued

(1) Consolidation, continued

3) Subsidiaries, continued

(i) The list of subsidiaries as of December 31, 2022 and 2021 is as follows: all subsidiaries' fiscal year end is December 31.

			Percentage of ownership(*1)	
Subsidiaries	**Location**	**Primary business**	**2022**	**2021**
Samsung SDI Japan Co., Ltd. ("SDIJ")	Japan	Supporting sales and purchase in Japan	100.0%	100.0%
Samsung SDI America, Inc. ("SDIA")	U.S.A.	Manufacturing automotive batteries Supporting sales of automotive and ESS batteries Market research of small-sized rechargeable battery	91.7%	91.7%
StarPlus Energy LLC. ("STARPLUS")(*2)	U.S.A.	Manufacturing and sales of rechargeable battery	51.0%	-
Samsung SDI Hungary Rt. ("SDIHU")	Hungary	Manufacturing and sales of automotive battery	100.0%	100.0%
Samsung SDI Europe GmbH ("SDIEU")	Germany	Supporting sales and purchase in Europe	100.0%	100.0%
Samsung SDI Battery Systems GmbH ("SDIBS")	Austria	Manufacturing and sales of automotive battery	100.0%	100.0%
Samsung SDI Vietnam Co., Ltd. ("SDIV")	Vietnam	Manufacturing and sales of rechargeable battery and electronic materials	100.0%	100.0%
Samsung SDI Energy Malaysia Sdn, Bhd. ("SDIEM")	Malaysia	Manufacturing and sales of rechargeable battery	100.0%	100.0%
Samsung SDI India Pvt. ("SDII")	India	Manufacturing and sales of rechargeable battery	100.0%	100.0%
Samsung SDI (Hong Kong) Ltd. ("SDIHK")	Hong Kong	Supporting sales of rechargeable battery	97.6%	97.6%
Subsidiary of SDIHK				
Tianjin Samsung SDI Co., Ltd. ("TSDI")	China	Manufacturing and sales of rechargeable battery	78.0%	78.0%
Samsung SDI China Co., Ltd. ("SDIC")	China	Supporting sales and purchase in China	100.0%	100.0%
Samsung SDI-ARN (Xi'An) Power Battery Co., Ltd. ("SAPB")	China	Manufacturing and sales of automotive battery	65.0%	65.0%
Samsung SDI （Tianjin） Battery Co., Ltd. ("SDITB')	China	Manufacturing and sales of rechargeable battery	80.0%	80.0%
STM Co., Ltd. ("STM")	Korea	Manufacturing and sales of cathode active material for rechargeable battery	100.0%	100.0%
Samsung SDI Wuxi Co., Ltd. ("SDIW")	China	Manufacturing and sales of electronic materials products	100.0%	100.0%
Novaled GmbH ("NOVALED")	Germany	Manufacturing and sales of electronic materials products	50.1%	50.1%
SVIC 15 Fund ("SVIC 15")	Korea	Investments in new technology venture business	99.0%	99.0%
SVIC 24 Fund ("SVIC24")	Korea	Investments in new technology venture business	99.0%	99.0%
SVIC 49 Fund ("SVIC49")	Korea	Investments in new technology venture business	99.0%	99.0%

3. Significant Accounting Policies, Continued

(1) Consolidation, continued

3) Subsidiaries, continued

(i) The list of subsidiaries as of December 31, 2022 and 2021 is as follows: all subsidiaries' fiscal year end is December 31, continued.

(*1) Effective ownership interest has been measured based on ownership of the Parent Company and its subsidiaries considering the control structure. The ownership interests of subsidiaries that do not issue shares in accordance with the relevant local laws and regulations are calculated based on the investment amounts.

(*2) STARPLUS was newly founded.

(ii) Summarized financial information of subsidiaries as of and for the year ended December 31, 2022 is as follows:

(In thousands of won)

Subsidiaries	Assets	Liabilities	Equity	Revenue	Net profit (loss)	Total comprehensive income (loss)
STM	600,631,045	216,768,332	383,862,713	1,011,458,805	38,427,994	38,761,327
SVIC24	18,885,730	12,331,492	6,554,238	-	(12,699,708)	(12,699,708)
SVIC15	23,378,276	4,404	23,373,872	-	1,816,180	1,816,180
SVIC49	46,760,736	255,256	46,505,480	-	(41,575,221)	(41,575,221)
SDIJ	8,888,580	4,547,319	4,341,261	78,122,379	739,295	507,764
SDIA	247,292,027	183,500,450	63,791,577	881,445,090	27,401,960	28,520,591
STARPLUS	387,800,105	31,677	387,768,428	-	(25,950)	(2,934,172)
NOVALED	679,096,332	32,311,397	646,784,935	192,259,743	91,752,846	93,272,504
SDIHU	6,990,807,984	5,842,295,495	1,148,512,489	5,379,223,025	41,308,766	45,506,918
SDIEU	23,198,965	13,033,386	10,165,579	41,172,871	4,541,286	4,626,117
SDIBS	285,206,605	155,225,122	129,981,483	183,078,515	10,669,039	12,252,228
SDIV	508,020,732	183,362,507	324,658,225	1,479,920,161	52,827,226	71,094,775
SDIEM	1,026,331,077	675,394,318	350,936,759	1,235,732,508	50,547,720	66,882,271
SDII	17,596,082	7,673,524	9,922,558	5,597,484	3,627,512	3,192,408
SDIW	681,002,080	206,437,165	474,564,915	1,113,428,487	37,024,037	24,148,095
TSDI	769,717,357	386,631,620	383,085,737	691,406,135	16,657,777	5,391,752
SDIHK	770,965,934	114,798,281	656,167,653	2,061,401	20,970,667	54,551,790
SDIC	15,406,692	6,021,948	9,384,744	26,771,762	3,593,305	3,231,972
SAPB	819,747,221	361,822,372	457,924,849	1,329,011,253	79,881,201	64,707,654
SDITB	1,402,680,316	940,102,216	462,578,100	2,291,123,372	53,709,576	38,853,087

3. Significant Accounting Policies, Continued

(1) Consolidation, continued

4) Loss of control

If the controlling company loses control over subsidiaries, the controlling company derecognizes the assets and liabilities of the former subsidiaries from the consolidated statement of financial position and recognizes the gain or loss associated with the loss of control attributable to the former controlling interest. Meanwhile, the controlling company recognizes any investment retained in the former subsidiaries at its fair value when the control is lost.

5) Interest in equity – accounted investees

The Group's interests in equity-accounted investees comprise interests in associates and joint venture.

Associates are those entities in which the Group has significant influence, but not control or joint control, over the financial and operating policies. A joint venture is an arrangement in which the Group has joint control, whereby the Group has rights to the net assets of the arrangement, rather than rights to its assets and obligations for its liabilities.

Interests in associates and the joint venture are accounted for using the equity method. They are initially recognized at cost, which includes transaction costs. Subsequent to initial recognition, the consolidated financial statements include the Group's share of the profit or loss and OCI of equity-accounted investees, until the date on which significant influence or joint control ceases.

6) Transactions eliminated on consolidation

Intra-group balances, including income and expenses and any unrealized income and expenses arising from intra-group transactions, are eliminated. Meanwhile, unrealized gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of the Group's interest in the investee. Unrealized losses are eliminated in the same way as unrealized gains, but only to the extent that there is no evidence of impairment.

7) Business combination under common control

Combination of entities and business under common control recognizes the acquired assets and liabilities obtained at book values of consolidated financial statements of ultimate controlling company. The Group recognizes the differences between the net book value acquired and consideration transferred in share premium.

3. Significant Accounting Policies, Continued

(2) Foreign currency

1) Foreign currency Transactions

Transactions in foreign currencies are translated to the respective functional currencies of Group entities at exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies are retranslated to the functional currency using the reporting date's exchange rate. Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are retranslated to the functional currency at the exchange rate at the date that the fair value was determined. Non-monetary items that are measured in terms of historical cost in foreign currencies are translated using the exchange rate at the date of the original transaction.

Exchange differences arising on the settlement of monetary items or on translating monetary items, except for translation differences from net investment in foreign operation and from financial liabilities designated to cash flow hedges, are recognized in profit or loss in the period in which they arise. If profit or loss from non-monetary items is regarded as other comprehensive income then the exchange rate change effects are treated as other comprehensive income, where regarded as current profit or loss then treated as current profit or loss.

2) Foreign Operations

If the presentation currency of the Group is different from a foreign operation's functional currency, the financial statements of the foreign operation are translated into the presentation currency using the following methods:

The assets and liabilities of foreign operations, whose functional currency is not the currency of a hyperinflationary economy, are translated to presentation currency at exchange rates at the reporting date. The income and expenses of foreign operations are translated to functional currency at exchange rates at the dates of the transactions. Foreign currency differences are recognized in other comprehensive income.

Any goodwill arising on the acquisition of a foreign operation and any fair value adjustments to the carrying amounts of assets and liabilities arising on the acquisition of that foreign operation is treated as assets and liabilities of the foreign operation. Thus, they are expressed in the functional currency of the foreign operation and translated at the closing rate.

When a foreign operation is disposed of, the cumulative amount in the translation reserve related to the foreign operation is reclassified to profit or loss as part of the gain or loss on disposal. On the partial disposal of a subsidiary that includes a foreign operation, the relevant proportion of such cumulative amount is reattributed to non-controlling interest. In any other partial disposal of a foreign operation, the relevant proportion is reclassified to profit or loss.

3) Translation of net investment in the foreign operation

Foreign exchange gains or losses arising from a monetary item receivable from or payable to a foreign operation, the settlement of which is neither planned nor likely to occur in the foreseeable future and which in substance is considered to form part of the net investment in the foreign operation, are recognized in other comprehensive income in the translation reserve.

3. Significant Accounting Policies, Continued

(3) Cash and cash equivalents

Cash and cash equivalents comprise cash balances and call deposits with maturities of three months or less from the acquisition date that are subject to an insignificant risk of changes in their fair value are used by the Group in the management of its short-term commitments. Equity investments are excluded from cash equivalents unless they are, in substance, cash equivalents, for example in the case of preferred shares when it has a short maturity with a specified redemption date.

(4) Financial instruments

1) Recognition and initial measurement

Trade receivables and debt securities issued are initially recognized when they are originated. All other financial assets and financial liabilities are initially recognized when the Group becomes a party to the contractual provisions of the instrument.

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

2) Classification and subsequent measurement

On initial recognition, a financial asset is classified as measured at: amortized cost; FVOCI – debt investment; FVOCI – equity investment; or FVTPL. Financial assets are not reclassified subsequent to their initial recognition unless the Group changes its business model for managing financial assets, in which case all affected financial assets are reclassified on the first day of the first reporting period following the change in the business model.

A financial asset is measured at amortized cost if it meets both of the following conditions and is not designated as at FVTPL:
- it is held within a business model whose objective is to hold assets to collect contractual cash flows; and
- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding

A debt investment is measured at FVOCI if it meets both of the following conditions and is not designated as at FVTPL:
- it is held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets; and
- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

On initial recognition of an equity investment that is not held for trading, the Group may irrevocably elect to present subsequent changes in the investment's fair value in OCI. This election is made on an investment-by-investment basis.

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

3. Significant Accounting Policies, Continued

(4) Financial instruments, continued

3) Business model assessment

The Group assesses the objective of the business model in which a financial asset is held at a portfolio level that best reflects the way the business is managed, and information is provided to management. The information considered includes:

- the stated policies and objectives for the portfolio and the operation of those policies in practice. These include whether management's strategy focuses on earning contractual interest income, maintaining a particular interest rate profile, matching the duration of the financial assets to the duration of any related liabilities or expected cash outflows or realizing cash flows through the sale of the assets;
- how the performance of the portfolio is evaluated and reported to the Group's management;
- the risks that affect the performance of the business model (and the financial assets held within that business model) and how those risks are managed;
- how managers of the business are compensated – e.g. whether compensation is based on the fair value of the assets managed or the contractual cash flows collected; and
- the frequency, volume and timing of sales of financial assets in prior periods, the reasons for such sales and expectations about future sales activity.

Transfers of financial assets to third parties in transactions that do not qualify for derecognition are not considered sales for this purpose, consistent with the Group's continuing recognition of the assets.
Financial assets that are held for trading or are managed and whose performance is evaluated on a fair value basis are measured at FVTPL.

4) Assessment whether contractual cash flows are solely payments of principal and interest

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

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

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

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

3. Significant Accounting Policies, Continued

(4) Financial instruments, continued

5) Subsequent measurement and gains and losses

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

6) Derecognition

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

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

7) Interest rate indicator reform

If the standard for calculating contractual cash flows for financial assets or financial liabilities measured at amortized cost is changed as a result of the interest rate indicator reform, the Group will adjust the effective interest rate of the financial asset or financial liability to reflect the change required in the interest rate indicator reform. A change in the contractual cash flow calculation required by the interest rate reform is only when both of the following two conditions are met:

- Changes are necessary as a direct result of the reform of the interest rate indicator.
- The new standard for calculating contractual cash flows is economically equivalent to the previous standard (i.e the standard immediately before the change).

In the event of a change in financial assets or financial liabilities in addition to the change in the contractual cash flow calculation standard required in the interest rate indicator reform, the Group firstly considers the effective interest rate of the financial asset or financial liability in order to reflect the change required in the interest rate indicator reform. Then, for additional changes, the existing accounting policy will be applied.

3. Significant Accounting Policies, Continued

(4) Financial instruments, continued

8) Offsetting

Financial assets and financial liabilities are offset, and the net amount is presented in the statement of financial position when, and only when, the Group currently has a legally enforceable right to set off the amounts and it intends either to settle them on a net basis or to realize the asset and settle the liability simultaneously.

(5) Non-derivative financial liabilities

1) Financial liabilities at FVTPL

Financial liabilities are classified as measured at amortized cost or FVTPL. A financial liability is classified as at FVTPL if it is classified as held-for-trading, it is a derivative or it is designated as such on initial recognition. Financial liabilities at FVTPL are measured at fair value and net gains and losses, including any interest expense, are recognized in profit or loss. Other financial liabilities are subsequently measured at amortized cost using the effective interest method. Interest expense and foreign exchange gains and losses are recognized in profit or loss.

2) Other financial liabilities

Non-derivative financial liabilities that are not classified as FVTPL are classified as other financial liabilities. Other financial liabilities are measured at fair value less transaction costs directly related to issuance at the time of initial recognition. Subsequently, other financial liabilities are measured at amortization value using the effective interest rate method, and interest expense is recognized by applying the effective interest rate method.

3) Derecognition of financial liabilities

The Group derecognizes a financial liability when its contractual obligations are discharged or cancelled or expire. The Group also derecognizes a financial liability when its terms are modified and the cash flows of the modified liability are substantially different, in which case a new financial liability based on the modified terms is recognized at fair value.

On derecognition of a financial liability, the difference between the carrying amount extinguished and the consideration paid (including any non-cash assets transferred or liabilities assumed) is recognized in profit or loss.

(6) Derivatives

1) Derivative financial instruments and hedge accounting

The Group holds derivative financial instruments to hedge its foreign currency and interest rate risk exposures. Embedded derivatives are separated from the host contract and accounted for separately if the host contract is not a financial asset and certain criteria are met.

Derivatives are initially measured at fair value. Subsequent to initial recognition, derivatives are measured at fair value, and changes therein are generally recognized in profit or loss.

At inception of designated hedging relationships, the Group documents the objective and strategy of the risk management for undertaking the hedge. The Group also documents the economic relationship between the hedged item and the hedging instrument, including whether the changes in cash flows of the hedged item and hedging instrument are expected to offset each other.

3. Significant Accounting Policies, Continued

(6) Derivatives, continued

2) Hedging Relationships Affected by Interest Rate Reform

The Group assumes that if there is uncertainty in the timing or amount of cash flows based on the interest rate indicator designated as an avoidance risk, the hedging item or the hedging instrument's interest rate indicator as a result of the interest rate indicator reform, the interest rate indicator does not change as a result of the interest rate indicator reform when assessing the economic relationship between the hedging item and the hedging instrument.

In addition, the Group assumes that the interest rate indicator does not change as a result of the interest rate indicator reform when determining whether the expected transaction is very likely to occur with respect to the cash flow hedging of the expected transaction, and assumes that the cash flow of the interest rate indicator designated as hedging does not change as a result of the interest rate indicator reform in order to determine whether an expected transaction that was previously designated as cash flow hedging accounting but for which cash flow hedging accounting has been discontinued is still expected to occur.

The Group no longer applies the assumption that no change will occur as a result of these interest rate indicator reforms when the following events occur:

- When uncertainty due to the reform of the interest rate indicator in the hedging item or hedging instrument no longer appears as to the timing and amount of cash flows of each target item or instrument on which the interest rate indicator is based.
- When the hedging relationship ceases

The Group changes the formal designation of the hedging relationship documented in the past to reflect such change if the change required by the interest rate indicator reform with respect to the hedging item or hedging instrument no longer exists uncertainty in the timing or amount of cash flows based on the interest rate indicator, hedging item or the interest rate indicator of the hedging instrument designated as hedging risk as a result of the reform.

Changes to this documentation will be made by the end of the reporting period, when changes to hedging risks, hedging items or hedging instruments have been made pursuant to the interest rate indicator reform, and such changes in documentation do not amount to ceasing hedging relationships or designating new hedging relationships.

If there is a change made in addition to a change in the designation of a hedging relationship or a change in the designation of a hedging relationship pursuant to the interest rate indicator reform, the Group will determine whether such additional change should discontinue hedging accounting, and if it determines that hedging accounting is not suspended, it will change the formal designation of the hedging relationship documented in the past to reflect the change required by the interest rate indicator reform.

When Group amends the description of the hedging item in the hedging accounting document to reflect the changes required by the interest rate indicator reform, it considers the accumulated cash flow hedging reserve to be based on the alternative indicator interest rate used to determine the hedging future cash flows.

In the case of similarly discontinued cash flow hedging relationships, the Group considers the accumulated amount of cash flow hedging reserves to be based on the alternative indicator interest rate on which the hedging future cash flows are based for the purpose of accounting for the accumulated cash flow hedging reserve to determine whether the hedging future cash flows are expected to occur when the interest rate indicator on which the hedging future cash flows were based changes, as required by the interest rate indicator reform.

3. Significant Accounting Policies, Continued

(6) Derivatives, continued

3) Cash flow hedges

When a derivative is designated as a cash flow hedging instrument, the effective portion of changes in the fair value of the derivative is recognized in OCI and accumulated in the hedging reserve. The effective portion of changes in the fair value of the derivative that is recognized in OCI is limited to the cumulative change in fair value of the hedged item, determined on a present value basis, from inception of the hedge. Any ineffective portion of changes in the fair value of the derivative is recognized immediately in profit or loss.

The Group designates only the change in fair value of the spot element of forward exchange contracts as the hedging instrument in cash flow hedging relationships. The change in fair value of the forward element of forward exchange contracts ('forward points') is separately accounted for as a cost of hedging and recognized in a costs of hedging reserve within equity.

When the hedged forecast transaction subsequently results in the recognition of a non-financial item such as inventory, the amount accumulated in the hedging reserve and the cost of hedging reserve is included directly in the initial cost of the non-financial item when it is recognized.
For all other hedged forecast transactions, the amount accumulated in the hedging reserve and the cost of hedging reserve is reclassified to profit or loss in the same period or periods during which the hedged expected future cash flows affect profit or loss.

If the hedge no longer meets the criteria for hedge accounting or the hedging instrument is sold, expires, is terminated or is exercised, then hedge accounting is discontinued prospectively. When hedge accounting for cash flow hedges is discontinued, the amount that has been accumulated in the hedging reserve remains in equity until, for a hedge of a transaction resulting in the recognition of a non-financial item, it is included in the non-financial item's cost on its initial recognition or, for other cash flow hedges, it is reclassified to profit or loss in the same period or periods as the hedged expected future cash flows affect profit or loss.

If the hedged future cash flows are no longer expected to occur, then the amounts that have been accumulated in the hedging reserve and the cost of hedging reserve are immediately reclassified to profit or loss.

3. Significant Accounting Policies, Continued

(7) Share capital

Ordinary shares are classified as equity. Incremental costs directly attributable to the capital transactions are recognized as a deduction from equity, net of any tax effects.

Preference shares are classified as equity if it is non-redeemable, or redeemable only at the Group's option, and any dividends are discretionary. Dividends thereon are recognized as distributions within equity upon approval by the Group's shareholders.

When the Group repurchases its share capital, the amount of the consideration paid is recognized as a deduction from equity and classified as treasury shares. The profits or losses from the purchase, disposal, reissue, or retirement of treasury shares are not recognized as current profit or loss.

(8) Property, plant and equipment

1) Recognition and measurement

Items of property, plant and equipment are measured at cost, which includes capitalized borrowing costs, less accumulated depreciation and any accumulated impairment losses. The cost of property, plant and equipment includes costs directly related to bringing the asset to the place and condition necessary to operate it in the manner intended by management, and the estimated cost of dismantling, removing or restoring the site.

If significant parts of an item of property, plant and equipment have different useful lives, then they are accounted for as separate items of property, plant and equipment.

Any gain or loss on disposal of an item of property, plant and equipment is recognized in profit or loss.

2) Subsequent costs

Subsequent costs are recognized in the carrying amount of property, plant and equipment at cost or, if appropriate, as separate items if it is probable that future economic benefits associated with the item will flow to the Group and the cost of the item can be measured reliably. At this time, the book value of the replaced portion is removed. Other costs incurred due to regular maintenance and repairs are recognized in profit or loss at the time of accrual.

3. Significant Accounting Policies, Continued

(8) Property, plant and equipment, continued

3) Depreciation

Property, plant and equipment, except for land, are depreciated on a straight-line basis over estimated useful lives that appropriately reflect the pattern in which the asset's future economic benefits are expected to be consumed.

If the cost of a part of property, plant and equipment is significant compared to the cost of property, plant and equipment as a whole, and has a different useful life, that part of the cost should be accounted for as a separate item and is depreciated over its separate useful life.

The estimated useful lives of the Group's property, plant and equipment are as follows:

	Useful lives (years)
Buildings	10 ~ 60
Structures	10 ~ 40
Machineries	5 ~ 10
Tools, furniture, and fixtures	4 ~ 5
Vehicles	4 ~ 5

Depreciation methods, useful lives and residual values are reviewed at the end of each reporting date and adjusted, if appropriate. The change is accounted for as a change in an accounting estimate.

(9) Borrowing costs

The Group capitalizes borrowing costs directly attributable to the acquisition, construction, or production of a qualifying asset as part of the cost of that asset. Other borrowing costs are recognized in expense as incurred. A qualifying asset is an asset that requires a substantial period to get ready for its intended use or sale. Financial assets and inventories that are manufactured or otherwise produced over a short period of time are not qualifying assets. Assets that are ready for their intended use or sale when acquired are not qualifying assets.

To the extent that the Group borrows funds specifically for the purpose of obtaining a qualifying asset, the Group determines the amount of borrowing costs eligible for capitalization as the actual borrowing costs incurred on that borrowing during the period less any investment income on the temporary investment of those borrowings. To the extent that the Group borrows funds generally and uses them for the purpose of obtaining a qualifying asset, the Group shall determine the amount of borrowing costs eligible for capitalization by applying a capitalization rate to the expenditures on that asset. The capitalization rate shall be the weighted average of the borrowing costs applicable to the borrowings of the Group that are outstanding during the period, other than borrowings made specifically for the purpose of obtaining a qualifying asset. The amount of borrowing costs that the Group capitalizes during a period shall not exceed the amount of borrowing costs incurred during that period.

3. Significant Accounting Policies, Continued

(10) Intangible asset

Intangible assets are measured initially at cost and, subsequently, are carried at cost less accumulated amortization and accumulated impairment losses.

Amortization of intangible assets except for goodwill is calculated on a straight-line basis over the estimated useful lives of intangible assets from the date that they are available for use. The residual value of intangible assets is zero.

The estimated useful lives of the group's assets are as follows:

	Useful lives (years)
Industrial property rights	5 ~10
Others intangible assets	4 ~20

Amortization periods and the amortization methods for intangible assets with finite useful lives are reviewed at each end of reporting period. If appropriate, the changes are accounted for as changes in accounting estimates.

Expenditures on research activities, undertaken with the prospect of gaining new scientific or technical knowledge and understanding, is recognized in profit or loss as incurred. Development expenditures are capitalized only if development costs can be measured reliably, the product or process is technically and commercially feasible, future economic benefits are probable, and the Group intends to and has sufficient resources to complete development and to use or sell the asset. Other development expenditures are recognized in profit or loss as incurred.

Subsequent expenditure is capitalized only when it increases the future economic benefits embodied in the specific asset to which it relates. All other expenditure, including expenditure on internally generated goodwill and brands, is recognized in profit or loss as incurred.

(11) Investment property

Property held for the purpose of earning rentals or benefiting from capital appreciation is classified as investment property. Investment property is measured initially at its cost and transaction costs are included in the initial measurement. Subsequently, investment property is carried at depreciated cost less any accumulated impairment losses.

Subsequent costs are recognized in the carrying amount of investment property at cost or, if appropriate, as separate items if it is probable that future economic benefits associated with the item will flow to the Group and the cost of the item can be measured reliably. The carrying amount of the replaced part is derecognized. The costs of the day-to-day servicing are recognized in profit or loss as incurred.

Investment property, except for land, are depreciated on a straight-line basis over estimated useful lives that appropriately reflect the pattern in which the asset's future economic benefits are expected to be consumed.

Depreciation methods, useful lives and residual values are reviewed at the end of each reporting date and adjusted, if appropriate. The change is accounted for as a change in an accounting estimate.

3. Significant Accounting Policies, Continued

(12) Inventories

The cost of inventories is based on specific method for materials in transit, moving average method for raw materials and sub-materials and gross average method (monthly moving average method) for all the other inventories, and includes expenditures for acquiring the inventories, production or conversion costs and other costs incurred in bringing them to their existing location and condition. In the case of manufactured inventories and work in progress, cost includes an appropriate share of production overheads based on normal operating capacity.

In the period of recognizing revenue from the sale of inventories, the cost of goods sold is recognized at the book value of inventories. Inventories are measured at the lower of cost and net realizable value. Net realizable value is the estimated selling price in the ordinary course of business, less the estimated costs of completion and selling expenses. The amount of any write-down of inventories to net realizable value and all losses of inventories are recognized as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories, arising from an increase in net realizable value, are recognized as a reduction in the amount of inventories recognized as an expense in the period in which the reversal occurs.

(13) Impairment

1) Impairment of financial assets

The Group recognizes loss allowances for ECLs on:
- financial assets measured at amortized cost;

The Group measures loss allowances at an amount equal to lifetime ECLs, except for the following, which are measured at 12-month ECLs:
- debt securities that are determined to have low credit risk at the reporting date; and
- other debt securities and bank balances for which credit risk (i.e. the risk of default occurring over the expected life of the financial instrument) has not increased significantly since initial recognition.

Loss allowances for trade receivables and contract assets are always measured at an amount equal to lifetime ECLs.

When determining whether the credit risk of a financial asset has increased significantly since initial recognition and when estimating ECLs, the Group considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis, based on the Group's historical experience and informed credit assessment and including forward-looking information.

The Group assumes that the credit risk on a financial asset has increased significantly if it is more than 30 days past due.

The Group considers a financial asset to be in default when:
- the borrower is unlikely to pay its credit obligations to the Group in full, without recourse by the Group to actions such as realizing security (if any is held); or
- the financial asset is more than 90 days past due.

Lifetime ECLs are the ECLs that result from all possible default events over the expected life of a financial instrument. 12-month ECLs are the portion of ECLs that result from default events that are possible within the 12 months after the reporting date (or a shorter period if the expected life of the instrument is less than 12 months). The maximum period considered when estimating ECLs is the maximum contractual period over which the Group is exposed to credit risk.

3. Significant Accounting Policies, Continued

(13) Impairment, continued

1) Impairment of financial assets, continued

① Measurement of ECLs

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

② Credit-impaired financial assets

At each reporting date, the Group assesses whether financial assets carried at amortized cost and debt securities at FVOCI are credit-impaired. A financial asset is 'credit-impaired' when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred.

Evidence that a financial asset is credit-impaired includes the following observable data:
- significant financial difficulty of the borrower or issuer;
- a breach of contract such as a default or being more than 90 days past due;
- the restructuring of a loan or advance by the Group on terms that the Group would not consider otherwise;
- it is probable that the borrower will enter bankruptcy or other financial restructuring; or
- the disappearance of an active market for a security because of financial difficulties.

③ Presentation of allowance for ECL in the statement of financial position

Loss allowances for financial assets measured at amortized cost are deducted from the gross carrying amount of the assets.

For debt securities at FVOCI, the loss allowance is charged to profit or loss and is recognized in OCI.

④ Write-off

The gross carrying amount of a financial asset is written off when the Group has no reasonable expectations of recovering a financial asset in its entirety or a portion thereof. For individual customers, the Group has a policy of writing off the gross carrying amount when the financial asset is 180 days past due based on historical experience of recoveries of similar assets. For corporate customers, the Group individually makes an assessment with respect to the timing and amount of write-off based on whether there is a reasonable expectation of recovery. The Group expects no significant recovery from the amount written off. However, financial assets that are written off could still be subject to enforcement activities in order to comply with the Group's procedures for recovery of amounts due.

3. Significant Accounting Policies, Continued

(13) Impairment, continued

2) Impairment of non-financial assets

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

The Group estimates the recoverable amount of an individual asset, if it is impossible to measure the individual recoverable amount of an asset, then the Group estimates the recoverable amount of cash-generating unit ("CGU"). A CGU is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets. The recoverable amount of an asset or CGU is the greater of its value in use and its fair value less costs to sell. The value in use is estimated by applying a pre-tax discount rate that reflect current market assessments of the time value of money and the risks specific to the asset or CGU for which estimated future cash flows have not been adjusted, to the estimated future cash flows expected to be generated by the asset or CGU.

An impairment loss is recognized if the carrying amount of an asset or its CGU exceeds its estimated recoverable amount. Impairment losses are recognized in profit or loss.

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

(14) Employee benefits

1) Short-term employee benefits

Short-term employee benefits are employee benefits that are due to be settled within 12 months after the end of the period in which the employees render the related service. When an employee has rendered service to the Group during an accounting period, the Group recognizes the undiscounted amount of short-term employee benefits expected to be paid in exchange for that service.

2) Other long-term employee benefits

Other long-term employee benefits include employee benefits that are settled beyond 12 months after the end of the period in which the employees render the related service and are calculated at the present value of the amount of future benefit that employees have earned in return for their service in the current and prior periods, less the fair value of any related assets. The present value is determined by discounting the expected future cash flows using the interest rate of high-quality corporate bonds that have maturity dates approximating the terms of the Group's obligations and that are denominated in the same currency in which the benefits are expected to be paid. Any actuarial gains and losses are recognized in profit or loss in the period in which they arise.

3. Significant Accounting Policies, Continued

(14) Employee benefits, continued

3) Defined contribution plans

When an employee has rendered service to the Group during a period, the Group recognizes the contribution payable to a defined contribution plan in exchange for that service as a liability (accrued expense), after deducting any contribution already paid. If the contribution already paid exceeds the contribution due for service before the end of the reporting period, the Group recognizes that excess as an asset (prepaid expense) to the extent that the prepayment will lead to a reduction in future payments or a cash refund.

4) Defined benefit plans

The Group's net obligation in respect of defined benefit plans is calculated by estimating the amount of future benefit and that benefit is discounted to determine its present value deducted by the fair value of plan assets.

The calculation is performed annually by an independent actuary using the projected unit credit method. When the fair value of plan assets exceeds the present value of the defined benefit obligation, the Group recognizes an asset, to the extent of the present value of any economic benefits available in the form of refunds from the plan or reduction in the future contributions to the plan.

Re-measurement of the net defined benefit liability comprise actuarial gains and losses, the return on plan assets excluding amounts included in net interest on the net defined benefit liability, and any change in the effect of the asset ceiling, excluding amounts included in net interest on the net defined benefit liability and recognized in other comprehensive income. The Group determines net interests on net defined benefit liability (asset) by multiplying discount rate determined at the beginning of the annual reporting period and considers changes in net defined benefit liability (asset) from contributions and benefit payments. Net interest costs and other costs relating to the defined benefit plan are recognized through profit or loss.

When the plan amendment or curtailment occurs, gains or losses on amendment or curtailment in benefits for the past service provided are recognized through profit or loss. The Group recognizes gain or loss on a settlement when the settlement of defined benefit plan occurs.

5) Termination benefits

The Group recognizes a liability and expense for termination benefits at the earlier of the period when the Group can no longer withdraw the offer of those benefits and the period when the Group recognizes costs for a restructuring. If benefits are payable more than 12 months after the reporting period, then they are discounted to their present value.

3. Significant Accounting Policies, Continued

(15) Provisions

Provisions are recognized when the Group has a present legal or constructive obligation as a result of a past event, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation.

The risks and uncertainties that inevitably surround many events and circumstances are taken into account in reaching the best estimate of a provision. Where the effect of the time value of money is material, provisions are determined at the present value of the expected future cash flows.

Where some or all of the expenditures required to settle a provision are expected to be reimbursed by another party, the reimbursement shall be recognized when, and only when, it is virtually certain that reimbursement will be received if the entity settles the obligation. The reimbursement shall be treated as a separate asset.

Provisions are reviewed at the end of each reporting period and adjusted to reflect the current best estimates. If it is no longer probable that an outflow of resources embodying economic benefits will be required to settle the obligation, the provision is reversed.

A provision shall be used only for expenditures for which the provision was originally recognized.

(16) Revenue from contracts with customers

The main profits of the Group are generated by the energy solution business sector, which sells small batteries, medium and large batteries, and the electronic materials business unit, which sells semiconductor and display materials.

The Group's accounting policies for revenue stream are as follows:

Type of product / service	Nature, timing of satisfaction of performance obligation, significant payment terms
Sales of Goods	Control is transferred at the time product is delivered to and is taken over by the customer. Revenue is recognized when control is transferred and invoices are issued. Under K-IFRS No.1115, revenue is recognized only to the extent that it is highly probable that no significant reduction in cumulative revenue will occur. Since certain customers are eligible for price discounts such as sales incentives based on their purchase volume, revenue is recognized as the amount reflecting those estimated price discounts in accordance with contract terms.
Royalty	The Group provides customers with licenses, including patented technology, and receives royalties monthly or quarterly, depending on the volume of production (or sales) of products using the technology. Under K-IFRS No.1115, royalty based on sales volume or production is recognized when subsequent sales or production activities occur.
Development Service	The Group provides services for developing products that meet customer requirements. Intangible outputs generated by such development services are identified as separate performance obligations, and control is transferred to the customer at the time of final approval of the customer. Therefore, costs associated revenue from the contract with the customer are recognized when the deliverables promised to the customer are delivered.

3. Significant Accounting Policies, Continued

(17) Government grants

Government grants are not recognized unless there is reasonable assurance that the Group will comply with the grant's conditions and that the grant will be received. Government grants which are intended to compensate the Group for expenses incurred are recognized as other income (government grants) in profit or loss over the periods in which the Group recognizes the related costs as expenses. If the Group has received government grants whose primary condition is that the Group purchase, construct or otherwise acquire long-term assets, the amounts are deducted in calculating the carrying amount of the asset. The grant is recognized in profit or loss over the life of a depreciable asset as a reduction to depreciation expense.

(18) Finance income and costs

Finance income comprises interest income on funds invested (including available-for-sale financial assets),

The Group's finance income and finance costs include:
- interest income;
- interest expense;
- the net gain or loss on financial assets at FVTPL;
- the foreign currency gain or loss on financial assets and financial liabilities;
- impairment losses (and reversals) on investments in debt securities carried at amortized cost or FVOCI;
- the net gain or loss on the disposal of financial assets measured at amortized cost;
- hedge ineffectiveness recognized in profit or loss; and

Interest income or expense is recognized using the effective interest method. The 'effective interest rate' is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial instrument to:
- the gross carrying amount of the financial asset; or
- the amortized cost of the financial liability.

In calculating interest income and expense, the effective interest rate is applied to the gross carrying amount of the asset (when the asset is not credit-impaired) or to the amortized cost of the liability. However, for financial assets that have become credit-impaired subsequent to initial recognition, interest income is calculated by applying the effective interest rate to the amortized cost of the financial asset. If the asset is no longer credit-impaired, then the calculation of interest income reverts to the gross basis.

3. Significant Accounting Policies, Continued

(19) Income taxes

Income tax expense comprises current and deferred tax. It is recognized in profit or loss except to the extent that it relates to a business combination, or items recognized directly in equity or in OCI.

The Group has determined that interest and penalties related to income taxes, including uncertain tax treatments, do not meet the definition of income tax, and therefore accounted for them under K-IFRS No.1037 'Provision, Contingent Liability, Contingent Assets'.

1) Current tax

Current income tax is calculated on the basis of taxable income for the current period. Taxable income is different from profit and loss on the consolidated statement of comprehensive income as the income before tax on the consolidated statement of comprehensive income excludes gains and losses to be added or deducted in other taxable periods and non-taxable items or non-deductible items. Income tax payable related to the Group's current tax is calculated using the enacted or substantively enacted tax rate.

Current tax assets and liabilities are offset only if they meet all the following conditions:
- Has a legally enforceable right to set off the recognized amount
- Intended to settle the liability at the same time as net or realizing the asset

2) Deferred tax

When measuring deferred income tax assets and deferred income tax liabilities, the income tax effect of the method in which the Group expects to collect or settle the carrying amounts of the related assets and liabilities at the end of the reporting period is reflected.

For taxable temporary differences with respect to investment interests in subsidiaries and associates, deferred tax liabilities are recognized except for the cases when the Group has control over the timing of the expiration of the temporary difference and the temporary difference is not probable to expire in the foreseeable future. In addition, deferred tax assets arising from deductible temporary differences are recognized when it is probable that the temporary differences will dissipate in the foreseeable future, and it is probable that taxable income will be generated during the period in which the temporary differences can be used.

Deferred tax assets are recognized for unused tax losses, unused tax credits and deductible temporary differences to the extent that it is probable that future taxable profits will be available against which they can be used. Future taxable profits are determined based on the reversal of relevant taxable temporary differences. If the amount of taxable temporary differences is insufficient to recognize a deferred tax asset in full, then the reversal of existing temporary differences and the Group's business plan are taken into account in future taxable income.

The carrying amount of the deferred tax asset is reviewed at the end of each reporting period and the carrying amount of the deferred tax asset is reduced when it is no longer probable that sufficient taxable income will be generated to use the benefits from the deferred tax asset.

Deferred tax assets and liabilities are measured using the tax rates expected to be applied in the reporting period when the assets are realized, or the liabilities are paid in accordance with tax laws enacted or substantively enacted at the end of the reporting period.

Deferred tax assets and liabilities are corporate tax levied by the same taxation authority and are offset only when the Group has the legal right to offset the recognized amount and intends to settle current tax liabilities and assets on a net basis.

3. Significant Accounting Policies, Continued

(20) Earnings per share

The Group presents basic and diluted earnings per share (the "EPS") data for its ordinary shares. Basic EPS is calculated by dividing the profit or loss attributable to ordinary shareholders of the Parent Company by the weighted average number of ordinary shares outstanding during the period, adjusted for own shares held. Diluted EPS is determined by adjusting the profit or loss attributable to ordinary shareholders and the weighted average number of ordinary shares outstanding, adjusted for the effects of all dilutive potential ordinary shares, which comprise share options granted to employees.

(21) Operating segment

The Group consists of energy solution segment and electronic materials segment, each being the strategic sales unit of the Group. Strategic sales units are operated separately because each segment is manufacturing different products respectively and requires different technologies and marketing strategies.

The performance of the operating segment is assessed based on profit attributable to owners of the Parent Company of each segment, which is considered to be useful for the management to compare the Group's performance in a specific segment with other companies in the same industry.

(22) Non-current assets held-for-sale and discontinued operations

If the carrying amount of non-current assets held for sale or disposal group is highly probable to be recovered through sale other than from continuing operation, those assets are classified as non-current assets held for sale. The asset (or, disposal group) must be available for immediate sale and the sale is highly probable to be classified as held for sale. Immediately before the initial classification of the asset (or, disposal group) as held for sale, the carrying amount of the asset will be measured at the lower of carrying amount and fair value less costs to sell.

Any subsequent decrease in fair value less costs to sell of an asset, recognized impairment loss at the time of classification as held for sale, may result in an immediate charge to profit or loss and gain for any subsequent increase in fair value less costs to sell of an asset can be recognized in the profit or loss to the extent that it is not in excess of the cumulative impairment loss that has been recognized previously.

Non-current assets or disposal groups that are classified as held for sale are not depreciated.

A discontinued operation is a component of the Group's business that represents a separate major line of business or geographical area of operations that has been disposed of or is held for sale, or is a subsidiary acquired exclusively with a view to resale. When an operation is classified as a discontinued operation, the comparative consolidated statement of comprehensive income is re-presented as if the operation had been discontinued from the start of the comparative year.

3. Significant Accounting Policies, Continued

(23) Lease

At inception of a contract, the Group assesses whether a contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period in exchange for consideration.

1) As a lessee

At commencement or on modification of a contract that contains a lease component, the Group allocates the consideration in the contract to each lease component based on its relative stand-alone prices. However, for the leases of property the Group has elected not to separate non-lease components and account for the lease and non-lease components as a single lease component. The Group recognizes a right-of-use asset and a lease liability at the lease commencement date. The right-of-use asset is initially measured at cost, which comprise the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus ant initial direct costs incurred and an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, less any lease incentives received.

The right-of-use asset is subsequently depreciated using the straight-line method from the commencement date to the end of the lease term, unless the lease transfers ownership of the underlying asset to the Group by the end of the lease term or the cost of the right-of-use asset reflects that the Group will exercise a purchase option. In that case the right-of-use asset will be depreciated over the useful life of the underlying asset, which is determined on the same basis as those of property and equipment. In addition, the right-of-use asset is periodically reduced by impairment losses, if any, and adjusted for certain remeasurements of the lease liability. The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, the Group's incremental borrowing rate.

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

The lease liability is measured at amortized cost using the effective interest method. It is remeasured when there is a change in future lease payments arising from a change in an index or rate, if there is a change in the Group's estimate of the amount expected to be payable under a residual value guarantee, if the Group changes its assessment of whether it will exercise a purchase, extension or termination option or if there is a revised in-substance fixed lease payment. When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset or is recorded in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero.

From January 1, 2021, if the calculation standard for future lease payments is changed due to the reform of the interest rate indicator, the Group will remeasure the lease liability by discounting the adjusted lease payment with the revised discount rate that reflects the change in the alternative interest rate indicator.

3. Significant Accounting Policies, Continued

(23) Lease, continued

The Group has elected not to recognize right-of-use assets and lease liabilities for leases of low-value assets and short-term leases. The Group recognize the lease payments associated with these leases as an expense on a straight-line basis over the lease term. The Group presents right-of-use assets that do not meet the definition of investment property in 'property, plant and equipment' and lease liabilities in trade and other payables' in the statement of financial position.

2) As a lessor

At inception or on modification of a contract that contains a lease component, the Group allocates the consideration in the contract to each lease component based on their relative stand-alone prices. When the Group acts as a lessor, it determines at lease inception whether each lease is a finance lease or an operating lease. To classify each lease, the Group makes an overall assessment of whether the lease transfers substantially all the risks and rewards incidental to ownership of the underlying asset. If this is the case, then the lease is a finance lease; if not, then it is an operating lease. As part of this assessment, the Group considers certain indicators such as whether the lease is for the major part of the economic life of the asset.

(24) Emissions Rights

The Company accounts for greenhouse gases emission right and the relevant liability as below pursuant to the Act on Allocation and Trading of Greenhouse Gas Emission.

1) Greenhouse Gases Emission Right

Greenhouse Gases Emission Right consists of emission allowances which are allocated from the government free of charge or purchased from the market. Free allocation allowances are measured and recognized at zero and purchased emission permits are recognized at acquisition cost by adding other costs directly related to the acquisition and normally incurred.

Emission rights held for the purpose of performing the obligation is classified as intangible asset and is initially measured at cost and after initial recognition, are carried at cost less accumulated impairment losses. Parts to be submitted to the government within one year from the end of the reporting period are classified as current assets.

Emission rights held for short-swing profits are classified as current asset and are measured at fair value with any changes in fair value recognized as profit or loss in the respective reporting period.

The Group derecognizes an emission right asset when the emission allowance is unusable, disposed or submitted to government in which the future economic benefits are no longer expected to be probable.

2) Emission liability

Emission liabilities are present obligations to submit emission permits to the government, and are measured by adding up the carrying amount of the emission permits and the estimated expenditure required to meet the obligations for excess emission. Emission liabilities are derecognized when submitted to the government.

3. Significant Accounting Policies, Continued

(25) New standards and interpretations not yet adopted

The following new standard has been published but is not mandatory for the Group for annual period beginning on January 1, 2022, and the Group has not early adopted them:

- K-IFRS 1012 'Corporate Tax' - Deferred tax on assets and liabilities arising from a single transaction
- K-IFRS 1001 ‘Presentation of Financial Statements’- Current/non-current classification of liabilities.

The following new and amended standards are not considered to have any significant impact on the Group:

- K-IFRS No. 1117 'Insurance contract' and its amendments
- Disclosure of accounting policies (K-IFRS No. 1001 'Presentation of financial statements')
- Definition of accounting estimate (K-IFRS No. 1008 'Accounting Policy, Changes in Accounting Estimates and Errors')

4. Financial Risk Management

The Group has exposure to the credit risk, liquidity risk and market risk. This note presents information about the Group's exposure to each of the above risks, the Group's objectives, policies, and processes for measuring and managing risk, and the Group's management of capital. Further quantitative disclosures are included throughout these consolidated financial statements.

(1) Credit risk

Credit risk is the risk of financial loss to the Group if a customer or counterparty to a financial instrument fails to meet its contractual obligations. The Group's exposure to credit risk is influenced mainly by the individual characteristics of each customer. Most customers have been transacting with the Group for many years and impairment loss has not occurred very often. In addition, the Group reviews credit rating of new customers prior to the determination of payment terms and also re-examines the credit rating of existing customers on a regular basis.

The Group sets allowances for estimated losses from accounts receivable and financial assets. In addition, the Group reports present conditions and countermeasures of delayed recovery for the financial assets and takes reasonable steps depending on the reasons for delay in order to manage the credit risk. In addition, the Group hedges credit risks by entering into insurance contracts for some financial assets.

1) Exposure to credit risk

The carrying amount of financial assets represents the maximum credit exposure. The Group limits its exposure to credit risk by depositing cash and cash equivalents in financial institutions that have a high credit rate. The maximum exposure to credit risk at the reporting date as of December 31, 2022 and 2021 is summarized as follows:

(In thousands of won)		2022	2021
Cash and cash equivalents	₩	2,612,660,171	2,324,218,667
Trade and other receivables, net		2,824,178,592	2,094,325,582
Government bonds		232,805	929,235
Non-derivative financial instruments		483,088,601	107,106,337
Guarantee deposits		92,869,643	96,436,145
Total	₩	6,013,029,812	4,623,015,966

4. Financial Risk Management, Continued

(1) Credit risk, continued

2) Impairment loss

The aging of trade and other receivables and respective impaired amounts as of December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022			2021		
		Gross	Not-impaired	Impairment	Gross	Not-impaired	Impairment
Not past due	₩	2,732,455,088	2,732,455,088	-	2,080,585,677	2,080,585,677	-
Past due 1-30 days		91,736,918	91,700,098	36,820	13,541,609	13,541,609	-
Past due 31-60 days		22,058	22,058	-	165,581	165,242	339
Past due over 61 days		1,655	1,348	307	162,690	33,054	129,636
Total	₩	2,824,215,719	2,824,178,592	37,127	2,094,455,557	2,094,325,582	129,975

(2) Liquidity risk

Liquidity risk is the risk that the Group will encounter difficulty in meeting the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Group's approach to managing liquidity is to ensure, as far as possible, that it will always have enough liquidity to meet its liabilities when due, under both normal and stressed conditions, without incurring unacceptable losses or risking damage to the Group's reputation.

The Group monitors its cash flows through long-term and short-term management strategies and ensures it has sufficient cash on demand to meet expected operational expenses. This excludes the potential impact of extreme circumstances that cannot reasonably be predicted.

The Group establishes short-term and long-term cash management plans to manage liquidity risk. The Group matches maturity structures of financial assets and liabilities through analyzing and reviewing cash flow budget and actual cash flow. Management believes that the Group can redeem its financial liabilities through operating cash flows and cash inflows of financial assets.

Maturity analysis of financial liabilities as of December 31, 2022 is as follows:

(In thousands of won)		Carrying amount	Contractual Cash flow	1 Year or less	More than 1 year and less than 5 years	More than 5 years
Trade and other payable(*)	₩	4,535,542,047	4,581,327,820	3,838,492,806	697,236,037	45,598,977
Short-term borrowings		2,851,183,214	2,876,287,926	2,876,287,926	-	-
Long-term borrowings		2,297,040,000	2,417,852,481	42,371,605	2,375,480,876	-
Derivative financial liabilities		139,830	139,830	57,510	82,320	-
Total	₩	9,683,905,091	9,875,608,057	6,757,209,847	3,072,799,233	45,598,977

(*) Trade and other payable includes cash flows related to lease liabilities. More details are included in Note 30 Lease.

4. Financial Risk Management, Continued

(3) Market risk

Market risk is the risk that changes in market prices, such as foreign exchange rates, interest rates and equity prices will affect the value of its holdings of financial instruments or risk of fluctuations in cash flows. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimizing the return.

1) Exchange rate risk

The Group has exposure to the exchange rate risk for the sale, purchase, and borrowing of currencies not denominated in functional currency. Main currencies used for these transactions are EUR, USD, JPY and etc. The Group continuously monitors changes in future exchange rates and manages them to minimize the impact of foreign exchange risk on the Group.

Carrying amounts of monetary assets and liabilities expressed as other than functional currency as of December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022			2021		
		USD	EUR	JPY, etc.	USD	EUR	JPY, etc.
Financial assets:							
Cash and cash equivalents	₩	621,676,581	11,692,082	121,364,257	337,710,380	1,077,405	143,991,575
Trade and other receivables		4,500,574,704	309,392,883	188,552,679	2,777,183,951	188,707,468	284,664,418
Other investments		-	10,134	1,075,991	5,571,270	-	1,036,430
Total	₩	5,122,251,285	321,095,099	310,992,927	3,120,465,601	189,784,873	429,692,423
Financial liabilities:							
Trade and other payables	₩	3,780,120,532	49,670,572	238,893,534	2,285,161,842	15,490,732	240,274,135
Borrowings		1,299,368,793	173,826,793	126,721,332	1,574,894,769	124,816,629	232,892,682
Total	₩	5,079,489,325	223,497,365	365,614,866	3,860,056,611	140,307,361	473,166,817

The following exchange rates were applied during the years ended December 31, 2022 and 2021:

(In Won)		Average rate		Reporting date spot rate	
Currency		2022	2021	2022	2021
USD	₩	1,291.15	1,143.89	1,267.30	1,185.50
EUR		1,357.35	1,353.19	1,351.20	1,342.34
JPY		9.85	10.42	9.53	10.30

Effects on income (loss) after income taxes as a result of change in exchange rate as of December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022		2021	
Currency		If increased by 5%	If decreased by 5%	If increased by 5%	If decreased by 5%
USD	₩	1,573,640	(1,573,640)	(28,030,499)	28,030,499
EUR		3,591,597	(3,591,597)	1,875,198	(1,875,198)
JPY, etc.		(2,010,087)	2,010,087	(1,647,680)	1,647,680

4. Financial Risk Management, Continued

(3) Market risk, continued

2) Interest rate risk

The Group entered interest rate swaps contracts in order to hedge the interest rate fluctuation risk for certain borrowings.

(i) The interest rate profiles of the Group's interest-bearing financial instruments as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Fixed interest rate:			
Short-term borrowings	₩	1,472,578,128	1,435,628,723
Long-term borrowings		405,360,000	421,113,471
Sub-total		1,877,938,128	1,856,742,194
Variable interest rate:			
Short-term borrowings	₩	1,378,605,086	1,074,588,080
Long-term borrowings		1,891,680,000	1,686,647,332
Sub-total		3,270,285,086	2,761,235,412
Total		5,148,223,214	4,617,977,606

(ii) Fair value sensitivity analysis for fixed rate instruments

Debentures at amortized cost bear fixed interest rates. Therefore, change in interest rates at the reporting date would not affect the Group's profit or loss.

(iii) Cash flow sensitivity analysis for variable rate instruments

Under assumption that all other variables remain constant, change of one percent point in interest rate would have increased (decreased) income after income taxes by the amounts shown below as of December 31, 2022 and 2021.

(In thousands of won)		2022		2021	
		If increased by 1%	If decreased by 1%	If increased by 1%	If decreased by 1%
Variable rate instruments	₩	(24,069,298)	24,069,298	(20,930,164)	20,930,164

4. Financial Risk Management, Continued

(3) Market risk, continued

3) Other market price risk

Market price risk arises from the equity instruments at fair value that the Group possesses. Major investments within the portfolio are managed separately and the approval of the Board of Directors is necessary for significant acquisition or disposal decisions.

The effect on other comprehensive income (gains/losses on valuation of FVOCI/FVPL equity instruments) when the price of listed equity financial assets that the Group possesses changed by five percent points as of December 31, 2022 is as follows:

(In thousands of won)

		If increased by 5%	If decreased by 5%
Net Assets	₩	40,227,290	(40,227,290)

(4) Capital management

The Group's capital management is to maintain a sound capital structure and to maximize shareholders' profit. The Group uses financial ratios such as debt ratio and net borrowings ratio as a capital management indicator to achieve the optimum capital structure. Debt to equity ratio is calculated as total debt divided by total equity and net borrowings to equity ratio is calculated as net borrowings divided by total equity.

(In thousands of won)		2022	2021
Debt to equity ratio:			
Total liabilities	₩	13,040,023,015	10,636,493,682
Total equity		17,217,502,156	15,196,699,315
Debt to equity ratio		75.74%	69.99%
Net borrowings to equity ratio:			
Borrowings	₩	5,148,223,214	4,617,977,606
Less: Cash and cash equivalents		(2,614,271,850)	(2,325,692,348)
Less: Short-term financial instruments		(483,069,101)	(107,066,897)
Net borrowings		2,050,882,263	2,185,218,361
Net borrowings to equity ratio		11.91%	14.38%

4. Financial Risk Management, Continued

(5) Fair values

1) Fair value versus carrying amounts

The fair values of financial assets and liabilities, together with the carrying amounts shown in the statement of financial position, as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		**2022**		**2021**	
		Carrying amount	**Fair value**	**Carrying amount**	**Fair value**
Financial assets:					
Assets carried at fair value					
Equity instruments	₩	1,204,354,393	1,204,354,393	1,532,479,758	1,532,479,758
Derivative financial assets		34,707,824	34,707,824	98,070,353	98,070,353
Subtotal		1,239,062,217	1,239,062,217	1,630,550,111	1,630,550,111
Cash and cash equivalents		2,614,271,850	2,614,271,850	2,325,692,348	2,325,692,348
Trade receivables and other receivables		2,824,178,592	2,824,178,592	2,094,325,582	2,094,325,582
Government bonds		232,805	232,805	929,235	929,235
Financial instruments		483,088,601	483,088,601	107,106,337	107,106,337
Guarantee deposits		92,869,643	92,869,643	96,436,145	96,436,145
Subtotal		6,014,641,491	6,014,641,491	4,624,489,647	4,624,489,647
Total financial assets	₩	7,253,703,708	7,253,703,708	6,255,039,758	6,255,039,758
Financial liabilities:					
Liabilities carried at fair value					
Derivative financial liabilities	₩	139,830	139,830	12,346,936	12,346,936
Liabilities carried at amortized cost					
Borrowings		5,148,223,214	4,879,797,802	4,617,977,606	4,614,566,108
Trade and other payables(*)		4,535,542,047	4,535,542,047	3,174,693,844	3,174,693,844
Subtotal		9,683,765,261	9,415,339,849	7,792,671,450	7,789,259,952
Total financial liabilities	₩	9,683,905,091	9,415,479,679	7,805,018,386	7,801,606,888

(*) including lease liabilities

2) Interest rates used for determining fair value

The interest rates used to discount estimated cash flows, when applicable, are based on the treasury bond yield curve at the reporting date plus an adequate credit spread, and were as follows:

	2022	**2021**
Borrowings	5.12%	2.37%

4. Financial Risk Management, Continued

(5) Fair values, continued

3) Fair value hierarchy

The Group classifies consolidated financial instruments carried at fair value in the statement of financial position according to fair value hierarchy which reflects significance of input variables used. The different levels of fair value hierarchy have been defined as follows:

"Level 1" indicates quoted prices in active markets for identical assets or liabilities. Instruments included in "Level 1" are composed of listed equity securities that are classified as FVOCI financial assets.

The Group uses a valuation technique to estimate fair values of financial instruments which are not traded in an active market. If the significant inputs which are required for a fair value measurement are observable directly or indirectly in a market, the fair value input is classed as "Level 2". The Group trades derivatives such as currency forwards and commodity futures and measures the fair value of the derivatives using changes in prices that are directly or indirectly observable in the market. The Group includes the fair value of these derivatives as "Level 2".

On the other hand, if the significant inputs are not based on observable market data, the fair value input for that instrument is classed as "Level 3".

Among unlisted equity securities, the fair values of Samsung Venture Investment Corporation, iMarket Asia, the Korea Economic Daily Co., Ltd., and PMGROW Corp. are calculated using discounted cash flow model within the income approach method. These unlisted equity securities are classed as "Level 3".

The valuation techniques used in measuring Level 3 fair value, as well as the significant unobservable inputs used are as follows:

	Valuation techniques	Significant unobservable inputs	Inter-relationship between key unobservable inputs and fair value measurement
Financial assets at FVPL	Discounted cash flow method	Discount rate, Perpetual growth rate	The estimated fair value would increases (decreases) if the discount rates were lower (higher).

4. Financial Risk Management, Continued

(5) Fair values, continued

The fair values of financial instruments based on the fair value hierarchy as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		Level 1	Level 2	Level 3	Total
December 31, 2022:					
Financial assets					
Equity instruments	₩	1,093,132,877	-	111,221,516	1,204,354,393
Derivative assets		-	34,707,824	-	34,707,824
Financial liabilities					
Derivative liabilities		-	139,830	-	139,830
December 31, 2021:					
Financial assets					
Equity Instruments		1,303,224,702	-	229,255,056	1,532,479,758
Derivative assets		-	98,070,353	-	98,070,353
Financial liabilities					
Derivative liabilities		-	12,346,936	-	12,346,936

(6) Transfer of financial assets and others

The Group received cash and transferred trade receivables to financial institutions. As the Group continues to retain substantially all the risks and rewards of ownership, the trade receivables have not been derecognized from the statement of financial position. The amount received at the time of transfer was recognized as short-term borrowings. Financial assets transferred but not derecognized as of December 31, 2022 and 2021, are as follows:

(In thousands of won)		Trade receivables in foreign currencies	
		2022	2021
Carrying amount of assets	₩	1,252,676,717	1,393,463,188
Carrying amount of associated liabilities		1,252,676,717	1,393,463,188

5. Segments Information

(1) Operating segments

1) The main businesses by segment are as follows:

Segment	Main business
Energy solutions	Other businesses including manufacturing and sales of secondary batteries
Electronic material	Semi-conductor and display materials

2) The operating segments of the consolidated group are decided by management, which is established for strategic decision making. Management reviews the operating income for each operating segment in order to allocate resources to each segment and assess the segments' performance. Sales consist mostly of sales of goods. The following table provides information for each reportable segment for the years ended December 31, 2022 and 2021.

(i) 2022

(In thousands of won)		Energy solutions	Electronic material	Total
Revenues	₩	17,566,241,978	2,557,827,538	20,124,069,516
Depreciation		1,313,658,924	94,441,455	1,408,100,379
Amortization		49,053,277	6,179,599	55,232,876
Operating profit	₩	1,253,824,677	554,188,336	1,808,013,013

(ii) 2021

(In thousands of won)		Energy solutions	Electronic material	Total
Revenues	₩	10,946,907,576	2,606,312,673	13,553,220,249
Depreciation		1,074,636,503	98,481,482	1,173,117,985
Amortization		53,383,590	25,662,178	79,045,768
Operating profit	₩	537,589,582	529,986,018	1,067,575,600

Total assets and total liabilities of each segment are not presented separately since the information is not provided to the management on a regular basis.

3) As of December 31, 2022, contract liabilities resulting from contracts with customers amounted to ₩353,217 million, and among the contract liabilities for the year ended December 31, 2021, the amount recognized as revenue in the year ended December 31, 2022 was ₩204,470 million.

5. Segments Information, Continued

(2) Geographical information

The Group operates in global markets such as Republic of Korea (the Parent Company's domicile), North America, Europe, China, Southeast Asia, and so on. The following table provides revenue and major non-current assets for each geographical region as of and for the years ended December 31, 2022 and 2021.

(In thousands of won)

		2022		2021	
		Revenue(*1)	Non-current Assets(*2)	Revenue(*1)	Non- current Assets(*2)
Korea	₩	1,172,464,784	2,963,135,659	980,570,569	2,973,798,815
North America		4,814,339,872	278,019,037	2,890,401,325	55,592,928
Europe		8,456,642,422	4,968,470,511	4,884,677,983	3,744,385,067
China		2,661,620,010	1,840,598,259	3,164,771,187	2,135,061,707
Southeast Asia and etc.		3,019,002,428	598,394,076	1,632,799,185	420,139,094
Consolidation adjustments		-	(720,657,714)	-	(743,660,774)
Total	₩	20,124,069,516	9,927,959,828	13,553,220,249	8,585,316,837

(*1) The external customer accounting for more than 10% of the group's sales is a single customer related to the European automotive battery sector, and the sales from the customer during the period is ₩2,936,140 million(prior period: ₩1,090,974 million).

(*2) Non-current assets include carrying amount of property, plant and equipment, intangible assets and investment property.

6. Cash and Cash Equivalents

Cash and cash equivalents as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Cash on hand	₩	1,611,679	1,473,681
Demand deposits		1,442,661,935	1,073,514,437
Other cash equivalents		1,169,998,236	1,250,704,230
Total	₩	2,614,271,850	2,325,692,348

7. Trade and Other Receivables

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

(In thousands of won)		2022		2021	
		Current	**Non-current**	**Current**	**Non-current**
Loans	₩	4,411,368	6,854,298	5,986,570	13,523,119
Present value discount		-	(4,049)	-	(23,836)
Other account receivables		289,836,029	29,074	126,671,970	38,765
Allowance		-	-	(11,285)	-
Accrued income		10,091,932	-	2,477,703	-
VAT receivables		116,515,530	-	114,638,065	-
Trade account receivables (Receivables)		2,419,225,985	-	1,945,781,266	-
Trade account receivables (Contract Assets)		93,771,082	-	-	-
Allowance		(37,127)	-	(118,690)	-
Total	₩	2,933,814,799	6,879,323	2,195,425,599	13,538,048

(2) Changes in allowance for trade and other receivables for the years ended December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Balance at beginning	₩	129,975	62,204
Write-off		-	(1,417)
(Reversal of) Bad debt expense		(90,503)	155,706
Exchange rate fluctuation		(2,345)	(86,518)
Balance at ending	₩	37,127	129,975

8. Inventories

(1) Inventories as of December 31, 2022 and 2021 are summarized as follows:

1) 2022

(In thousands of won)		Acquisition cost	Allowance for valuation	Book value
Finished goods	₩	373,378,560	(16,379,688)	356,998,872
Semi-finished goods		1,248,028,764	(30,172,256)	1,217,856,508
Raw materials		1,001,839,614	(27,312,516)	974,527,098
Supplies		55,584,671	-	55,584,671
Materials-in-transit		599,548,686	-	599,548,686
Total	₩	3,278,380,295	(73,864,460)	3,204,515,835

8. Inventories, Continued

(1) Inventories as of December 31, 2022 and 2021 are summarized as follows, continued:

2) 2021

(In thousands of won)		Acquisition cost	Allowance for valuation	Book value
Finished goods	₩	701,032,354	(34,841,239)	666,191,115
Semi-finished goods		822,569,015	(16,714,543)	805,854,472
Raw materials		714,079,501	(12,057,548)	702,021,953
Supplies		45,161,473	-	45,161,473
Materials-in-transit		268,087,306	-	268,087,306
Total	₩	2,550,929,649	(63,613,330)	2,487,316,319

(2) The amounts of inventories expensed as cost of sales and loss on valuation of inventories for the years ended December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022	2021
Inventories recognized as cost of sales	₩	15,893,496,809	10,458,192,411
(Reversal of) loss on valuation of inventories		9,826,025	17,409,658
Total	₩	15,903,322,834	10,475,602,069

9. Other Investments

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

(In thousands of won)		2022			2021		
		Current	Non-current	Total	Current	Non-current	Total
Government bonds	₩	31,560	201,245	232,805	704,700	224,535	929,235
Equity instruments		-	1,204,354,393	1,204,354,393	-	1,532,479,758	1,532,479,758
Financial instruments		483,069,101	19,500	483,088,601	107,066,897	39,440	107,106,337
Guarantee deposits		51,561,444	41,308,199	92,869,643	56,769,762	39,666,383	96,436,145
Total	₩	534,662,105	1,245,883,337	1,780,545,442	164,541,359	1,572,410,116	1,736,951,475

9. Other Investments, Continued

(2) Available-for-sale financial assets as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)

			Unrealized gain (loss)			
		Acquisition cost	Beginning balance	Changes in unrealized gain or loss	Ending balance	Carrying amount
December 31, 2022						
FVOCI						
Listed equity instruments	₩	703,754,183	377,994,346	(141,971,051)	236,023,295	939,777,478
Unlisted equity instruments		18,658,588	34,428,502	16,244,265	50,672,767	69,331,355
Tax effect			(99,806,330)	24,118,569	(75,687,760)	
FVTPL						
Listed equity instruments	₩	39,799,982	85,096,266	28,459,151	113,555,417	153,355,399
Unlisted equity instruments		16,041,663	31,470,852	(5,622,354)	25,848,498	41,890,161
Total	₩	778,254,416	528,989,966	(102,889,989)	426,099,977	1,204,354,393
December 31, 2021						
FVOCI						
Listed equity instruments	₩	732,430,101	263,768,228	307,026,373	570,794,601	1,303,224,702
Unlisted equity instruments		18,658,588	28,916,814	5,511,688	34,428,502	53,087,090
Tax effect			(70,829,781)	(75,634,211)	(146,463,992)	
FVTPL						
Unlisted equity instruments		33,115,500	43,700,288	99,352,178	143,052,466	176,167,966
Total	₩	784,204,189	336,385,330	411,890,239	748,275,569	1,532,479,758

During the current period, part of equity securities of Ganfeng Lithium Co., Ltd. held by the Group were disposed.

10. Other Current Assets and Non-current Assets

Other current and non-current assets as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022		2021	
		Current	Non-current	Current	Non-current
Advance payments	₩	167,439,358	18,000,640	150,027,322	8,507,317
Prepaid expenses		152,050,078	119,714,371	105,728,714	97,377,424
Prepaid income tax		16,310,966	-	2,952,073	-
Total	₩	335,800,402	137,715,011	258,708,109	105,884,741

11. Investments in Associates

(1) The equity-method accounted investees of the Group as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)				2022		2021	
Associates:	Country	Date of financial statements	Primary business	Percentage of ownership	Carrying amount	Percentage of ownership	Carrying amount
Samsung Display Ltd.("SDC")(*1)	Korea	December 31	Manufacturing and sale of OLED	15.20%	8,760,865,210	15.2%	7,765,314,543
Samsung Global Research Co., Ltd.("SERI")	Korea	December 31	Management advisory consulting	29.60%	23,964,873	29.6%	26,146,557
Intellectual Keystone Technology ("IKT")	U.S.A	December 31	Investing in new technology	41.00%	9,137,212	41.0%	11,180,577
Sungrow Energy Storage Technology Co., Ltd. ("SEST")(*2)	China	December 31	Manufacturing ESS products	-	-	13.0%	19,533,878
SD Flex Co., Ltd.	Korea	December 31	Manufacturing printed-circuit board	50.00%	12,982,344	50.0%	13,306,754
ECOPRO EM Co., Ltd. (*3)	Korea	December 31	Anode material manufacturing	40.00%	125,156,333	40.0%	44,457,379
Philenergy Co., Ltd.	Korea	December 31	Stack Equipment	20.00%	5,506,831	20.0%	4,814,612
Secondary Battery Growth Fund(*4)	Korea	December 31	Investing in secondary battery R&D	33.30%	2,669,452	33.3%	670,000
Total					₩ 8,940,282,255		₩ 7,885,424,300

(*1) Although the Group owns less than 20% of its shares and voting rights, the Group has classified the shares equity-accounted investees due to the fact that the Group has representations in the board of directors of SDC.

(*2) During the current period, equity securities of Sungrow Energy Storage Technology Co., Ltd.("SEST") held by the Group were disposed.

(*3) During the current period, the Group made an additional investment of ₩40,000 million to ECOPRO EM.

(*4) During the current period, the Group made an additional investment of ₩2,010 million to the Secondary Battery Growth Fund.

11. Equity-accounted Investees, Continued

(2) The financial information of equity-accounted investees as of and for the years ended December 31, 2022 and 2021 is summarized as follows:

1) 2022

(In thousands of won)		SDC	SERI	IKT	SDFLEX
Current assets	₩	42,082,412,387	113,024,754	21,114,966	21,422,255
Non-current assets		23,070,657,947	65,781,408	1,170,704	6,616,255
Current liabilities		6,294,310,360	82,723,644	-	2,052,247
Non-current liabilities		1,220,097,025	15,120,109	-	21,576
Revenue		34,298,283,448	228,696,932	-	20,495,032
Operating profit (loss)		5,883,246,706	2,351,801	(6,994,635)	3,752,772
Net income (loss)		6,614,496,361	241,375	(6,994,635)	3,345,275
Other comprehensive income (loss)		(67,942,352)	(7,638,018)	-	-
Total comprehensive income (loss)		6,546,554,009	(7,396,643)	(6,994,635)	3,345,275
Dividends received from associates		-	-	-	2,000,000

(In thousands of won)		ECOPROEM	Philenergy	Secondary Battery Growth Fund.
Current assets	₩	728,334,706	127,323,049	1,401,999
Non-current assets		435,237,418	22,480,853	6,608,947
Current liabilities		651,423,402	87,158,797	2,590
Non-current liabilities		199,358,922	34,011,504	-
Revenue		2,005,446,165	189,709,754	21,950
Operating profit (loss)		125,212,107	16,948,720	(29,818)
Net income (loss)		101,703,395	7,737,807	(29,818)
Other comprehensive income (loss)		-	-	-
Total comprehensive income (loss)		101,703,395	7,737,807	(29,818)
Dividends received from associates		-	-	-

11. Equity-accounted Investees, Continued

2) 2021

(In thousands of won)		SDC	SERI	IKT	SEST
Current assets	₩	35,220,984,652	107,199,582	20,215,987	455,628,828
Non-current assets		24,773,119,538	67,202,194	7,053,713	29,741,257
Current liabilities		7,539,402,392	69,704,639	-	332,782,938
Non-current liabilities		1,359,478,868	16,364,175	-	2,974,450
Revenue		31,557,504,085	191,460,964	303,130	255,424,717
Operating profit (loss)		4,364,684,967	(215,142)	(5,881,210)	16,793,626
Net income (loss)		3,511,314,245	164,222	(6,261,305)	13,752,800
Other comprehensive income (loss)		1,256,902,356	8,338,754	-	-
Total comprehensive income (loss)		4,768,216,601	8,502,976	(6,261,305)	13,752,800
Dividends received from associates		-	-	-	-

(In thousands of won)		SDFLEX	ECOPROEM	Philenergy	Secondary Battery Growth Fund
Current assets	₩	22,380,729	95,255,053	111,661,027	2,010,000
Non-current assets		7,514,683	177,072,347	9,228,338	-
Current liabilities		2,520,218	98,178,418	81,611,700	-
Non-current liabilities		761,686	64,736,571	17,260,568	-
Revenue		22,402,547	11,859,340	165,151,952	-
Operating profit (loss)		4,673,351	(9,942,474)	6,846,864	-
Net income (loss)		4,221,597	(9,904,097)	7,366,419	-
Total comprehensive income (loss)		4,221,597	(9,904,097)	7,366,419	-
Dividends received from associates		3,000,000	-	-	-

11. Equity-accounted Investees, Continued

(3) The comparison between carrying amount of the investments and the investees' net assets based on the Group's percentage of ownership as of December 31, 2022 and 2021 is summarized as follows:

1) 2022

(In thousands of won)		SDC	SERI	IKT	SDFLEX
Net assets(a)(*)	₩	57,637,271,122	80,962,410	22,285,881	25,964,688
Percentage of ownership(b)		15.2%	29.6%	41.0%	50.0%
Equity to net assets(axb)		8,760,865,210	23,964,873	9,137,212	12,982,344
Difference of Investments		-	-	-	-
Carrying amount	₩	8,760,865,210	23,964,873	9,137,212	12,982,344

(In thousands of won)		ECOPROEM	Philenergy	Secondary Battery Growth Fund.
Net assets(a)(*)	₩	312,890,831	18,399,974	8,016,372
Percentage of ownership(b)		40.0%	20.0%	33.3%
Equity to net assets(axb)		125,156,333	3,679,994	2,669,452
Difference of Investments		-	1,826,837	-
Carrying amount	₩	125,156,333	5,506,831	2,669,452

(*) Net assets are the net assets of associates minus non-controlling interests.

2) 2021

(In thousands of won)		SDC	SERI	IKT	SEST
Net assets(a)(*)	₩	51,020,463,491	88,332,963	27,269,700	150,260,600
Percentage of ownership(b)		15.2%	29.6%	41.0%	13.0%
Equity to net assets(axb)		7,765,314,543	26,146,557	11,180,577	19,533,878
Difference of Investments		-	-	-	-
Carrying amount	₩	7,765,314,543	26,146,557	11,180,577	19,533,878

(In thousands of won)		SDFLEX	ECOPROEM	Philenergy	Secondary Battery Growth Fund
Net assets(a)(*)	₩	26,613,508	111,107,560	14,938,877	2,010,000
Percentage of ownership(b)		50.0%	40.0%	20.0%	33.3%
Equity to net assets(axb)		13,306,754	44,457,379	2,987,775	670,000
Difference of Investments		-	-	1,826,837	-
Carrying amount	₩	13,306,754	44,457,379	4,814,612	670,000

(*) Net assets are the net assets of associates minus non-controlling interests.

11. Equity-accounted Investees, Continued

(4) Changes in investments in equity-accounted investees for the years ended December 31, 2022 and 2021 are as follows:

1) 2022

(In thousands of won)

Company		January 1, 2022	Acquisition	Share of profits(loss)	Other capital movements	Disposal	Removal of Dividends	December 31, 2022
SDC	₩	7,765,314,543	-	1,005,587,406	(10,036,739)	-	-	8,760,865,210
SERI		26,146,557	-	79,169	(2,260,853)	-	-	23,964,873
IKT		11,180,577	-	(2,867,800)	824,435	-	-	9,137,212
SEST		19,533,878	-	(6,296,889)	1,996,518	(15,233,507)	-	-
SDFLEX		13,306,754	-	1,675,590	-	-	(2,000,000)	12,982,344
ECOPROEM		44,457,379	40,000,000	40,929,961	(231,007)	-	-	125,156,333
Philenergy		4,814,612	-	599,781	92,438	-	-	5,506,831
Secondary Battery Growth Fund		670,000	2,010,000	(10,548)	-	-	-	2,669,452
Total	₩	7,885,424,300	42,010,000	1,039,696,670	(9,615,208)	(15,233,507)	(2,000,000)	8,940,282,255

2) 2021

(In thousands of won)

Company		January 1, 2021	Acquisition	Share of profits(loss)	Other capital movements	Gain (Loss) on disposal of equity method investment	Removal of Dividends	December 31, 2021
SDC	₩	7,045,372,622	-	533,018,355	186,923,566	-	-	7,765,314,543
SERI		23,586,914	-	91,372	2,468,271	-	-	26,146,557
IKT		12,702,754	-	(2,654,642)	1,132,465	-	-	11,180,577
SEST		18,951,070	-	791,678	1,094,238	(1,303,108)	-	19,533,878
SDFLEX		14,191,946	-	2,114,808	-	-	(3,000,000)	13,306,754
ECOPROEM		23,777,031	24,000,000	(3,319,652)	-	-	-	44,457,379
Philenergy		4,814,612	-	-	-	-	-	4,814,612
Secondary Battery Growth Fund		-	670,000	-	-	-	-	670,000
Total	₩	7,143,396,949	24,670,000	530,041,919	191,618,540	(1,303,108)	(3,000,000)	7,885,424,300

(5) None of the equity-accounted investees is a listed company as of December 31, 2022.

(6) No significant restriction exists on the Group's ability to transfer money from equity-accounted investees and redemption of borrowings or advances to equity-accounted investees. In addition, no contingent liabilities related to interests in associates has been identified.

12. Property, Plant and Equipment

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

(1) 2022

(In thousands of won)

	Land	Buildings and structures	Machinery	Tools, furniture and fixtures	Right of use assets	Construction in progress	Total
Beginning balance	₩ 345,320,013	2,137,880,321	2,778,631,970	196,380,942	35,235,220	2,142,547,123	7,635,995,589
Acquisition cost	345,320,013	4,076,457,298	6,655,250,486	790,459,938	83,079,072	2,142,547,123	14,093,113,930
Accumulated depreciation (including impairment and government grants)	-	(1,938,576,977)	(3,876,618,516)	(594,078,996)	(47,843,852)	-	(6,457,118,341)
Acquisitions and capital expenditure	32,418	9,521,205	39,322,934	46,112,588	64,185,474	2,543,530,776	2,702,705,395
Depreciation	-	(160,258,777)	(1,085,544,173)	(136,735,623)	(25,375,751)	-	(1,407,914,324)
Disposals	(19,605)	(5,515,413)	(100,130,393)	(5,284,074)	(1,288,492)	(4,904,215)	(117,142,192)
Impairment losses	-	-	(25,886,445)	(4,135,486)	-	(1,063,595)	(31,085,526)
Other	7,263,166	535,581,045	1,569,316,452	142,112,660	(3,568,425)	(2,067,794,041)	182,910,857
Ending balance	₩ 352,595,992	2,517,208,381	3,175,710,345	238,451,007	69,188,026	2,612,316,048	8,965,469,799
Acquisition cost	352,595,992	4,621,115,978	7,830,524,099	884,204,089	99,237,957	2,612,316,048	16,399,994,163
Accumulated depreciation (including impairment and government grants)	-	(2,103,907,597)	(4,654,813,754)	(645,753,082)	(30,049,931)	-	(7,434,524,364)

Other amounts include reclassification of construction-in-progress to appropriate accounts such as investment property, property, plant and equipment, and expense accounts. Also, they include exchange rate fluctuation and changes in government grants.

12. Property, Plant and Equipment, Continued

(2) 2021

(In thousands of won)

	Land	Buildings and structures	Machinery	Tools, furniture and fixtures	Right-of-use assets	Construction in progress	Total
Beginning balance	₩339,680,202	1,931,581,665	2,553,596,430	193,566,215	44,679,008	1,064,995,651	6,128,099,171
Acquisition cost	339,680,202	3,695,400,271	5,724,090,598	704,861,657	70,310,663	1,064,995,651	11,599,339,042
Accumulated depreciation (including impairment and government grants)	-	(1,763,818,606)	(3,170,494,168)	(511,295,442)	(25,631,655)	-	(5,471,239,871)
Acquisitions and capital expenditure	46,070	239,653,357	785,884,940	62,445,888	16,595,868	1,449,104,088	2,553,730,211
Depreciation	-	(130,364,153)	(888,471,340)	(129,158,394)	(24,938,021)	-	(1,172,931,908)
Disposals	-	(4,727,092)	(29,750,468)	(7,845,969)	(2,936,853)	(21,608,121)	(66,868,503)
Impairment losses	-	-	(11,662,400)	(74,515)	-	-	(11,736,915)
Other	5,593,741	101,736,544	369,034,808	77,447,717	1,835,218	(349,944,495)	205,703,533
Ending balance	₩ 5,593,741	2,137,880,321	2,778,631,970	196,380,942	35,235,220	2,142,547,123	7,635,995,589
Acquisition cost	345,320,013	4,076,457,298	6,655,250,486	790,459,938	83,079,072	2,142,547,123	14,093,113,930
Accumulated depreciation (including impairment and government grants)	345,320,013	(1,938,576,977)	(3,876,618,516)	(594,078,996)	(47,843,852)	-	(6,457,118,341)

Other amounts include reclassification of construction-in-progress to appropriate accounts such as investment property, property, plant and equipment, and expense accounts. Also, they include exchange rate fluctuation, and liquidation of subsidiaries.

13. Intangible Assets

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

(1) 2022

(In thousands of won)		Industrial property	Development costs	Others	Goodwill	Total
Beginning balance	₩	63,471,064	-	126,123,771	609,316,233	798,911,068
Acquisition cost		161,516,938	6,331,931	910,797,533	638,639,214	1,717,285,616
Accumulated depreciation and impairment		(98,045,874)	(6,331,931)	(784,673,762)	(29,322,981)	(918,374,548)
Acquisitions		1,987,067	-	2,596,799	-	4,583,866
Amortization		(11,442,845)	-	(43,790,031)	-	(55,232,876)
Disposals		(313,604)	-	(1,126,850)	-	(1,440,454)
Impairment losses		-	-	(3,128)	-	(3,128)
Other		8,366,390	-	59,027,278	719,019	68,112,687
Ending balance	₩	62,068,072	-	142,827,839	610,035,252	814,931,163
Acquisition cost		171,556,792	6,331,931	971,294,760	639,358,233	1,788,541,716
Accumulated depreciation and impairment		(109,488,720)	(6,331,931)	(828,466,921)	(29,322,981)	(973,610,553)

Other amounts include reclassification of long-term prepaid expenses to industrial property rights and of construction-in-progress to other intangible assets. Also, they include the changes incurred due to exchange rate fluctuation.

13. Intangible Assets, Continued

(2) 2021

(In thousands of won)		Industrial property	Development costs	Others	Goodwill	Total
Beginning balance	₩	65,065,927	-	119,523,865	608,983,505	793,573,297
Acquisition cost		151,992,121	6,331,931	836,271,540	638,306,486	1,632,902,078
Accumulated depreciation and impairment		(86,926,194)	(6,331,931)	(716,747,675)	(29,322,981)	(839,328,781)
Acquisitions		1,161,660	-	1,130,255	-	2,291,915
Amortization		(11,119,681)	-	(67,926,087)	-	(79,045,768)
Disposals		(2,139,355)	-	(116,362)	-	(2,255,717)
Impairment losses		-	-	(31,161)	-	(31,161)
Other		10,502,513	-	73,543,261	332,728	84,378,502
Ending balance	₩	63,471,064	-	126,123,771	609,316,233	798,911,068
Acquisition cost		161,516,938	6,331,931	910,797,533	638,639,214	1,717,285,616
Accumulated depreciation and impairment		(98,045,874)	(6,331,931)	(784,673,762)	(29,322,981)	(918,374,548)

Other amounts include reclassification of long-term prepaid expenses to industrial property rights and of construction-in-progress to other intangible assets. Also, it includes the changes incurred due to Exchange rate fluctuation and liquidation of subsidiaries.

(3) Amortization expenses

Amortization expenses are classified as manufacturing cost and selling, general and administrative expenses, and the Group recognizes the manufacturing cost as cost of sales when the inventory is sold.

(4) Research and development expenses

Research and development expenses recognized as selling, general and administrative expenses for the years ended December 31, 2022 and 2021 are ₩1,076,353 million and ₩877,648 million, respectively.

(5) Impairment of CGU including goodwill

The Group performed impairment test on the goodwill allocated to electronic material business, and Novaled, a cash generating unit ("CGU") respectively.

The Group estimated recoverable amount of electronic material business and Novaled, based on its projections on 5 years' cash flow of each CGU, under assumption of terminal growth rate at 1% for both CGUs, and discount rate of 12.1% and 10.4% for electronic material business and Novaled, respectively. Fair value measurements are classified as Level 3 based on the inputs used in the valuation techniques. The Group did not recognize impairment losses for the electronic material business and Novaled as the estimated value in use exceeded its carrying amount of the cash-generating unit.

As of December 31, 2022, the Group has allocated ₩500,381 million of its goodwill to its electronic material business, and ₩109,654 million to Novaled.

14. Investment Property

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

(In thousands of won)	2022			2021		
	Land	**Buildings**	**Total**	**Land**	**Buildings**	**Total**
Beginning balance	₩ 144,786,443	5,623,734	150,410,177	144,786,443	5,715,697	150,502,140
Reclassification	(64,825)	(2,600,431)	(2,665,256)	-	94,114	94,114
Depreciation	-	(186,055)	(186,055)	-	(186,077)	(186,077)
Ending balance	₩ 144,721,618	2,837,248	147,558,866	144,786,443	5,623,734	150,410,177

As of December 31, 2022 and 2021 investment property consists of land and buildings that are leased to Samsung Electronics Co., Ltd. and etc. The rental income from investment property for the years ended December 31, 2022 and 2021 is ₩4,308 million and ₩4,205 million, respectively.

The fair value of the investment property is determined based on the value measured by an independent appraiser with experience and professional qualifications that has recently evaluated similar properties in the region in which the investment property to be assessed is located. The fair value of investment real estate of ₩460,863 million was classified as Level 3 fair value based on the inputs used in the valuation technique.

15. Trade Payables and Other Liabilities

Trade payables and other liabilities as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022		2021	
		Current	**Non-current**	**Current**	**Non-current**
Trade payables	₩	2,191,529,679	-	1,271,912,862	-
Accounts payable		1,255,375,085	34,447	1,313,277,660	33,139
Accrued expenses		598,722,297	-	484,886,099	-
Lease liabilities		27,752,325	44,352,768	16,879,385	21,681,686
Other		212,374,660	653,144,010	182,490,519	244,232,659
Total	₩	4,285,754,046	697,531,225	3,269,446,525	265,947,484

Other liabilities include withholdings, guarantee deposits received, etc.

16. Borrowings

(1) Borrowings of the Group as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Short-term borrowings			
Current portion of debentures in Korean won	₩	219,901,411	-
Current portion of long-term borrowings in foreign currency		420,059,856	275,373,299
Borrowings for Import trade		-	5,665,892
Disposals of trade receivable		1,252,676,717	1,393,463,188
Short-term borrowings in foreign currency		958,545,230	835,714,424
Sub total		2,851,183,214	2,510,216,803
Long-term borrowings			
Debentures		-	219,762,470
Long-term borrowings in foreign currency		2,297,040,000	1,887,998,333
Sub total		2,297,040,000	2,107,760,803
Total	₩	5,148,223,214	4,617,977,606

16. Borrowings, Continued

(2) Debentures issued by the Parent company as of December 31, 2022 and 2021 are as follows:

(In thousands of won)

Type	Classification	Date of maturity	Annual Interest rate (%)		2022	2021
Corporate Bonds	Unsecured	2023.09.11	2.41	₩	220,000,000	220,000,000
	Less discount on debentures				(98,589)	(237,530)
	Total			₩	219,901,411	219,762,470

(3) Short-term borrowings in foreign currency as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)

Borrower	Financial institution	Description	Annual interest rate (%)		2022	2021
SDIBS	Sumitomo Mitsui Banking	Operation fund	EURIBOR 3M+0.70	₩	-	16,913,483
SDIA	Standard Chartered Bank and others	Operation fund	LIBOR 3M+0.65~0.83		-	118,550,000
SDIHU	Citi Bank and others	Operation fund	EURIBOR 3M+0.32~0.35		673,923,203	468,261,561
TSDI	HSBC and others	Operation fund	LPR-1.25 ~ 1.15		199,348,641	155,432,650
SDITB	MIZUHO BANK and others	Operation fund	LPR-0.30 ~ 0.85		-	52,010,835
Novaled	Shinhan Bank and ohers	Operation fund	SOFR 3M+1.0 ~ 1.06		25,902,798	24,545,895
SAPB	HSBC and others	Operation fund	LPR-1.15 ~ 1.36		59,370,588	-
Total				₩	958,545,230	835,714,424

16. Borrowings, Continued

(4) Long-term borrowings in foreign currency as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)

Borrower	Financial institution	Description	Annual interest rate (%)		2022	2021
SDIBS	Sumitomo Mitsui Banking	Facility loan	EURIBOR 3M+0.75	₩	-	13,616,999
SAPB	KDB	Facility loan	LIBOR 3M+0.82		63,174,353	59,518,157
SDIHU	Korea Exim bank	Facility loan	EURIBOR +0.40 ~ +1.00		2,567,280,000	2,006,798,300
SDITB	KDB	Facility loan	LIBOR 3M+0.76		86,645,503	83,438,176
Sub total					2,717,099,856	2,163,371,632
Less current portion of long-term borrowings					(420,059,856)	(275,373,299)
Total				₩	2,297,040,000	1,887,998,333

17. Provisions

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

1) 2022

			Beginning balance	Provisions made	Provisions used	Ending balance
Current	Quality assurance	₩	239,980,403	197,909,269	(117,152,746)	320,736,926
	Long-term incentives		5,996,252	-	(5,996,252)	-
	Others		56,705,575	35,450,324	(81,383,849)	10,772,050
	Sub total		302,682,230	233,359,593	(204,532,847)	331,508,976
Non-current	Long-term incentives	₩	38,690,678	1,904,524	-	40,595,202
	Provision for recovery		28,980	3,200	-	32,180
	Others		54,592,052	2,784,190	(6,125,318)	51,250,924
	Sub total		93,311,710	4,691,914	(6,125,318)	91,878,306
Total		₩	395,993,940	238,051,507	(210,658,165)	423,387,282

2) 2021

			Beginning balance	Provisions made	Provisions used	Ending balance
Current	Quality assurance	₩	243,484,224	53,811,285	(57,315,106)	239,980,403
	Long-term incentives		5,996,252	5,996,252	(5,996,252)	5,996,252
	Others		52,893,059	5,875,432	(2,062,916)	56,705,575
	Sub total		302,373,535	65,682,969	(65,374,274)	302,682,230
Non-current	Long-term incentives	₩	26,396,921	18,290,009	(5,996,252)	38,690,678
	Provision for recovery		23,721	5,259	-	28,980
	Others		53,402,648	6,733,886	(5,544,482)	54,592,052
	Sub total		79,823,290	25,029,154	(11,540,734)	93,311,710
Total		₩	382,196,825	90,712,123	(76,915,008)	395,993,940

(1) The Group recognizes a warranty provision (quality assurance) for the estimated costs of future repairs and recalls as accrued expenses, based on the past experience rate. The Group also recognizes estimated costs in case of its customers' product recall from its end-users.

(2) The Group has long-term incentive plans for its executives based on three-year performance criteria and made a provision for the estimated incentive.

(3) Other than provisions stated above, the Group recognized provision for litigations. However, as stated in Note 19, details of provisions for litigations are not disclosed as it may affect the result or the progress of pending litigations.

(4) As of the end of the current term, the Group has no emission liabilities due to less greenhouse gas emissions than the number of free allocation allowances, and the number of free allocation allowances for the for the 3rd planning periods (2021-2025) are summarized as follows:

(In tCO2-eq)

For 2021	For 2022	For 2023	For 2024	For 2025
592,852	592,852	592,852	587,300	587,300

18. Employee Benefits

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

1) Present value of defined obligations

(In thousands of won)		2022	2021
Defined Benefit Obligations:			
Beginning balance	₩	719,644,106	663,731,903
Current service cost		69,897,860	68,309,989
Interest cost		23,923,815	19,322,185
Obligations transferred from related parties		(1,768,110)	3,675,119
Gross benefit payments		(27,272,570)	(23,384,587)
Actuarial gain arising from assumptions		(97,591,302)	(1,780,561)
Contribution to the defined contribution plan		(14,169,351)	(10,146,331)
Exchange rate fluctuations		(38,209)	(83,611)
Ending balance	₩	672,626,239	719,644,106
Plan Assets		(842,739,921)	(710,285,844)
Net defined benefit liability (asset)		(170,113,682)	9,358,262

2) Fair value of plan assets

(In thousands of won)		2022	2021
Beginning balance	₩	710,285,844	625,026,672
Contributions paid into plan		149,906,118	101,277,931
Obligations paid by the plan		(17,704,508)	(16,777,386)
Contribution to the defined contribution plan		(14,169,351)	(10,146,331)
Interest income		24,119,971	18,552,813
Actuarial gain arising from assumptions		(9,945,434)	(7,748,694)
Plan assets transferred to related parties		318,598	121,494
Exchange rate fluctuations		(71,317)	(20,655)
Ending balance	₩	842,739,921	710,285,844

3) Other liabilities for employee benefits as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Liabilities for paid absence	₩	82,106,251	65,376,737
Long-term incentive provisions		40,595,202	44,686,930
Other long-term employee benefits		49,667,829	50,779,259
Total	₩	172,369,282	160,842,926

18. Employee Benefits, Continued

(2) Expenses for employee benefits for the years ended December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Current service costs	₩	69,897,860	68,309,989
Interest cost		23,923,815	19,322,185
Interest income		(24,119,971)	(18,552,813)
Payment on defined contribution plans		9,109,929	7,750,434
Total	₩	78,811,633	76,829,795

(3) Fair values of plan assets as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Severance insurance bonds	₩	842,479,510	710,017,381
National pension fund		260,411	268,463
Total	₩	842,739,921	710,285,844

(4) The Group determined the discount rate based on market returns of high-quality corporate bonds consistent with currencies and estimated payment terms of defined benefit obligations as of the reporting date in order to calculate present value of the defined benefit obligations. Principal actuarial assumptions for the years ended December 31, 2022 and 2021 are summarized as follows:

(In %)	2022	2021
Expected rate of salary increase	3.25~3.98	3.30~4.12
Discount rate for defined benefit obligations	6.11~6.34	3.59~3.96

Assumptions regarding future mortality have been based on published statistics and mortality tables from Korea Insurance Development Institute.

(5) Sensitivity analysis

Reasonably possible changes at the reporting date to one of the relevant actuarial assumptions as of December 31, 2022, holding other assumptions constant, would have affected the defined benefit obligation by the amounts shown below.

(In thousands of won)		*Present value of Defined benefit obligations*	
		If increased by 1%	**If decreased by 1%**
Expected rate of salary increase	₩	43,135,614	(39,180,799)
Discount rate		(37,113,612)	41,442,765

19. Commitment and Contingencies

(1) As of December 31, 2022, the Group has been provided a guarantee of ₩37,478 million by Seoul Guarantee Insurance Co., Ltd. in relation to a court deposit and licensing procedures.

(2) The Group is a defendant in civil damage claims filed in the United States and Europe for collusion of CRTs, etc. The Group has estimated its potential loss related to the claims, but the actual compensation may differ significantly from the Group's estimation. The Group does not disclose details of on-going litigations considering the disclosure may have effect to outcome of pending litigations.

(3) Other than cases described in (2) of this note to the consolidated financial statements, the Group is defendant of 87 pending litigations in local and foreign jurisdictions. The Group does not disclose details of the on-going litigations, as the disclosure may affect the result of the pending litigations. Effect of pending litigations on the Group's consolidated financial statements cannot be estimated reliably, as timing and amount of compensations is uncertain.

(4) The Group has the following borrowing commitments as of December 31, 2022.

(In thousands of USD, In thousands of CNY, In thousands of EUR and hundred millions of won)

	Currency	Individual limit	Comprehensive limit	Name of financial institution
Bank overdrafts	KRW	55	-	Woori Bank and one other bank
General purpose loans	KRW	500	380	HANA BANK and one other bank
	USD	745,729	-	Shinhan Bank and nine other banks
	CNY	3,230,000	-	Bank of China and three other banks
	EUR	500,000	-	Citi Bank and two other banks
A/S, Usance	USD	15,000	350,000	Shinhan Bank and five other banks
Guarantee payments for foreign currency(*)	USD	307,000	250,000	Woori Bank and seven other banks
D/A, D/P, O/A	USD	1,349,000	380,000	Woori Bank and nine other banks
Loans for Import trade	USD	-	350,000	DBS and four other banks
Total	KRW	555	380	
	USD	2,416,729	1,330,000	
	CNY	3,230,000	-	
	EUR	500,000	-	

(*) Among the foreign currency guarantee payment limits, USD 250 million is contracted as an inclusive foreign currency limit, as it is overlapped with the O/A limit.

(5) In accordance with technical license agreements, the Group recorded royalty expenses of ₩19,806 million and ₩16,012 million for the years ended December 31, 2022 and 2021, respectively.

19. Commitment and Contingencies, Continued

(6) As of December 31, 2022, the Group entered into a currency forward contract with the aim of avoiding risks from changes in the exchange rate. The gain or loss on the contract fair value hedging accounting in accordance with the entity's GAAP, and the gain or loss is recognized in profit or loss.

The details of the contract are the transaction in which the foreign currency amount promised at the expiration date is delivered to the counterparty (financial institution) and the amount converted into the fixed exchange rate at the time of the contract is delivered from the counterparty.

Details of the Group's currency forwards are as follows:

(In CNY, USD)

Subsidiaries	Selling Currency	Selling Amount	Buying Currency	Buying Amount	Forward Rate (CNY/USD)	expiry
SAPB	CNY	67,858,000	USD	10,000,000	6.7858	2023-08-25
	CNY	271,820,000	USD	40,000,000	6.7955	2023-08-25
SDITB	CNY	239,627,500	USD	35,000,000	6.8465	2023-03-07
	CNY	468,937,000	USD	70,000,000	6.6991	2023-06-08
	CNY	542,184,000	USD	80,000,000	6.7773	2023-06-27
	CNY	149,270,000	USD	22,000,000	6.7850	2023-06-27
	CNY	121,345,200	USD	18,000,000	6.7414	2023-06-27

As of December 31, 2022, the carrying amount of the derivative asset and liability related to the currency forwards above are ₩4,565 million and ₩140 million, respectively. The gain on the valuation of derivatives of ₩19,272 million, the gain on the transaction of derivatives of ₩10,832 million and the loss on the transaction of derivatives of ₩4,067 million, which are considered effective for hedging the fair value risk, are reflected in profit or loss.

(7) The Group entered into commercial swap contracts to hedge the purchase price fluctuation of raw materials. Details of the Group's commercial swap contracts are as follows:

(In USD)

Descriptions	Expiry Date	Remaining Quantity (tons)	Contract Price (USD/ton)
Nickel (Ni)	2023-01-31	137	13,000
Nickel (Ni)	2023-01-31	133	13,500
Nickel (Ni)	2023-01-31	60	13,200
Nickel (Ni)	2023-02-28	434	12,700
Copper (Cu)	2024-12-31	3,740	5,296

As of December 31, 2022, the net carrying amount of the derivative asset related to commercial swap above is ₩30,143 million, and the Group recognized effective portion of gain on valuation of derivatives amounting ₩22,185 million as other comprehensive income, net of tax.

19. Commitment and Contingencies, Continued

(8) Until December 31, 2022, the Group has acquired 40% ownership of ECOPRO EM Co., Ltd. by investing ₩88,000 million. Also, if the agreement is terminated due to a liability of a party, the Group and ECOPRO BM CO., LTD. owns put option and call option respectively on all of the shares of ECOPRO EM Co., Ltd. owned by the Group.

(9) According to the joint venture agreement under with PHILOPTICS CO., LTD., within 20 years from the date of 5 years from the date of the agreement, the Group has the right to sell all or part of the shares of Philenergy Co., Ltd. owned by the Group to Philenergy Co., Ltd. or PHILOPTICS CO., LTD. Also, if the agreement is terminated due to a liability of a party, the Group and PHILOPTICS CO., LTD. owns put option and call option respectively on all the shares of Philenergy Co., Ltd. owned by the Group.

(10) According to the joint venture contract signed with FCA US LLC., the Group can agree on the expiration of the contract period, and the Group has the right to exercise a call option on the stake in StarPlus Energy LLC. owned by FCA US LLC. at the expiration of the contract period.
In addition, if the contract is terminated due to one-way or deadlock, the Group has a call option and FCA US LLC. has a put option for the StarPlus Energy LLC. stake owned by FCA US LLC.

(11) As of December 31, 2022, the contract amount for the acquisition of tangible and intangible assets that did not occur is ₩1,279,756 million.

20. Share Capital and Share Premium

(1) Share capital

Ordinary shares and preferred shares issued and outstanding as of December 31, 2022 and 2021 are summarized as follows:

1) 2022

(In shares)	Shares issued	Treasury shares	Shares outstanding
Ordinary shares	68,764,530	(3,331,391)	65,433,139
Preferred shares	1,617,896	(178,400)	1,439,496
Total	70,382,426	(3,509,791)	66,872,635

2) 2021

(In shares)	Shares issued	Treasury shares	Shares outstanding
Ordinary shares	68,764,530	(3,331,391)	65,433,139
Preferred shares	1,617,896	(178,400)	1,439,496
	70,382,426	(3,509,791)	66,872,635

(2) Share premiums as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Additional paid-in-capital	₩	4,838,555,882	4,838,555,882
Other share premiums		163,418,811	163,418,811
Total	₩	5,001,974,693	5,001,974,693

(3) Dividends by the Parent Company for the reporting periods ending December 31, 2022 and 2021 are summarized as follows. The dividends for the reporting periods ending December 31, 2022 will be presented as an agenda at the regular shareholders' meeting of the parent company.

(In thousands of won)		2022	2022
Ordinary shares (2022: ₩1,030 per share, 2021: ₩1,000 per share)	₩	67,396,133	65,433,139
Preferred shares (2022: ₩1,080 per share, 2021: ₩1,050 per share)		1,554,656	1,511,471
	₩	68,950,789	66,944,610

21. Other capital

Other capital comprises treasury shares of the Parent Company. Number of treasury shares and its carrying amount as of December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022			2021		
		Ordinary shares	Preferred shares	Total	Ordinary shares	Preferred shares	Total
Number of shares		3,331,391	178,400	3,509,791	3,331,391	178,400	3,509,791
Carrying amount	₩	336,813,481	8,318,103	345,131,584	336,813,481	8,318,103	345,131,584

22. Accumulated Other Comprehensive Income

Accumulated other comprehensive income, net of tax, as of December 31, 2022 and 2021 is summarized as follows:

(In thousands of won)		2022	2021
Equity instruments at FVOCI – net change in fair value	₩	310,011,247	458,759,112
Gain on derivatives valuation		22,185,366	74,380,921
Unrealized gain on equity method investments		846,161,991	862,842,612
Unrealized loss on equity method investments		(352,980,548)	(346,193,957)
Gain (loss) on translation of foreign operations		178,438,837	124,446,870
Total	₩	1,003,816,893	1,174,235,558

23. Retained Earnings

Retained earnings as of December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Legal reserve	₩	179,533,582	172,839,121
Discretionary reserve		6,198,238,000	5,679,798,000
Unappropriated retained earnings		4,090,579,799	2,663,836,213
Total	₩	10,468,351,381	8,516,473,334

24. Selling, General, and Administrative Expenses

Details of selling, general and administrative expenses for the years ended December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Salaries and wages	₩	334,032,459	336,121,452
Severance and retirement benefits		20,554,496	20,756,256
Employee fringe benefits		102,180,332	89,409,193
Depreciation		53,482,853	52,381,508
Amortization		19,172,737	38,919,461
Research and development expenses		1,076,352,606	877,647,905
Selling and distribution cost		232,757,802	187,279,404
Fees and commissions		142,470,917	124,838,105
(Reversal of) Bad debt expenses		(90,503)	155,706
Others		431,819,970	282,533,589
Total	₩	2,412,733,669	2,010,042,579

25. The Nature of Expenses

The nature of expenses for the years ended December 31, 2022 and 2021 is summarized as follows:

(In thousands of won)		2022	2021
Changes in inventories	₩	(5,470,459,008)	(4,419,832,915)
Raw materials used		17,044,354,697	11,554,867,014
Salaries and wages		1,669,172,316	1,463,694,488
Severance and retirement benefits		96,900,343	102,604,443
Employee fringe benefits		499,220,111	421,096,402
Depreciation		1,408,100,379	1,173,117,985
Amortization		55,232,876	79,045,768
Others		3,013,534,789	2,111,051,463
Total	₩	18,316,056,503	12,485,644,648

26. Other Income and Other Expenses

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

(In thousands of won)		2022	2021
Dividends income	₩	12,250,892	12,385,096
Rental income		332,498	301,253
Gain on sale of property, plant and equipment		4,287,067	2,891,387
Gain on sale of investments		6,454,062	-
Gain on lease termination		70,676	3,447
Miscellaneous income		39,602,824	36,379,705
Total	₩	62,998,019	51,960,888

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

(In thousands of won)		2022	2021
Donations	₩	7,719,130	6,162,258
Loss on sale of property, plant and equipment		113,273,606	44,880,498
Loss on impairment of property, plant and equipment		31,085,526	11,736,915
Loss on sale of intangible assets		318,439	2,266,605
Loss on impairment of intangible assets		3,128	31,161
Loss on disposal of investments		-	1,303,108
Loss on lease termination		4,663	91,359
Legal expenses and other miscellaneous expenses		53,912,454	26,856,571
Total	₩	206,316,946	93,328,475

27. Financial Income and Financial Expenses

Financial income and costs for the years ended December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Financial income			
Interest income	₩	43,378,706	12,208,588
- Bank deposit		35,612,744	8,476,985
- Other		7,765,962	3,731,603
Gain on foreign currency transaction		973,041,270	326,200,523
Gain on foreign currency translation		264,036,354	29,610,575
Gain on valuation of derivatives		19,271,872	18,409,364
Gain on transaction of derivatives		10,832,244	-
Gain on valuation of financial assets at fair value through profit or loss		79,997,719	103,841,930
Gain on disposal of financial assets at fair value through profit or loss		87,808	57,349,010
Subtotal		1,390,645,973	547,619,990
Financial expenses		-	-
Interest expense		90,058,982	57,204,723
- Borrowing		75,119,338	39,256,614
- Debentures		5,434,340	11,350,936
- Other		9,505,304	6,597,173
Loss on foreign currency transactions		978,729,104	298,017,240
Loss on foreign currency translation		300,760,298	42,110,743
Loss on transaction of derivatives		4,066,889	36,720,206
Loss on disposal of other receivables		11,662,825	1,991,933
Loss on valuation of financial assets at fair value through profit or loss		54,619,083	4,489,752
Loss on disposal of financial assets at fair value through profit or loss		2,806,135	3
Loss on guarantee fee		58,025	-
Subtotal		1,442,761,341	440,534,600
Net financial expense(income)	₩	52,115,368	(107,085,390)

28. Income Tax Expense

(1) Income tax expenses for the years ended December 31, 2022 and 2021 are summarized as follows:

(In thousands of won)		2022	2021
Current income taxes	₩	362,740,808	285,633,103
Deferred income taxes from changes in temporary differences		160,863,625	116,385,547
Changes in deferred income taxes due to tax credit carry forward		(42,313,717)	11,153,497
Changes in deferred income taxes due to changes in the tax rate		131,109,165	-
Others (exchange rate differences)		514,060	(238,385)
Income tax expense	₩	612,913,941	412,933,762

28. Income Tax Expense, Continued

(2) Deferred tax assets and liabilities recognized at stockholders' equity as of December 31, 2022 and 2021 are summarized as follows:

1) 2022

(In thousands of won)		Before tax	Deferred tax assets (liabilities)	After tax
Income tax related to items recognized directly in equity:	₩			
Share premium		44,411,694	5,421,821	49,833,515
Income tax related to items recognized as OCI:				
Actuarial gain (losses) from defined benefit plan		(38,522,955)	9,148,662	(29,374,293)
Change in equity of equity-accounted investees		851,658,708	(180,038,428)	671,620,280
Cash flow hedges – effective portion of changes in fair value		30,143,160	(7,957,794)	22,185,366
Equity instruments at FVOCI – net change in fair value		421,210,933	(111,199,686)	310,011,247
Total	₩	1,308,901,540	(284,625,425)	1,024,276,115

2) 2021

(In thousands of won)		Before tax	Deferred tax assets (liabilities)	After tax
Income tax related to items recognized directly in equity:	₩			
Share premium		44,411,694	5,421,821	49,833,515
Income tax related to items recognized as OCI:				
Actuarial gain (losses) from defined benefit plan		(126,493,348)	30,611,390	(95,881,958)
Change in equity of equity-accounted investees		808,941,776	(167,846,250)	641,095,526
Cash flow hedges – effective portion of changes in fair value		98,127,864	(23,746,943)	74,380,921
Equity instruments at FVOCI – net change in fair value		605,223,103	(146,463,991)	458,759,112
Total	₩	1,430,211,089	(302,023,973)	1,128,187,116

28. Income Tax Expense, Continued

(3) The relationship between income tax expense and accounting income for the years ended December 31, 2022 and 2021, is as follows.

(In thousands of won)		2022	2021
Profit before income tax	₩	2,652,275,389	1,663,335,322
Income tax using the Group's statutory tax rate		431,782,858	322,265,509
Adjustments			
Foreign withholding tax		18,312,562	17,634,085
Permanent differences		33,681	(19,205,847)
Carry-over deficit effect		8,050,869	16,739,215
Unrecognized temporary differences		-	(5,196,528)
Tax credits		(158,473,285)	(108,011,281)
Difference in tax rate		131,109,165	1,093
Consolidation adjustments, and others		182,098,091	188,707,516
Income tax expense	₩	612,913,941	412,933,762
Average effective tax rate		23.1%	24.8%

(4) As of December 31, 2022, the tax effects of temporary differences were calculated by using expected tax rate for the year when the temporary differences are expected to be reversed.

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

(In thousands of won)		2022			2021		
		Beginning balance	Changes	Ending balance	Beginning balance	Changes	Ending balance
Tangible/Intangible assets	₩	98,647,981	17,368,269	116,016,250	85,928,054	12,719,927	98,647,981
Investment in subsidiaries and associates		(1,624,952,989)	(290,048,111)	(1,915,001,100)	(1,458,953,066)	(165,999,923)	(1,624,952,989)
Inventories		3,951,753	2,391,161	6,342,914	5,983,803	(2,032,050)	3,951,753
Accrued expenses		112,292,074	29,684,819	141,976,893	122,126,061	(9,833,987)	112,292,074
Available-for-sale financial assets		(99,121,965)	23,895,164	(75,226,801)	(126,108,925)	26,986,960	(99,121,965)
Others		3,273,905	(80,829,914)	(77,556,009)	28,474,216	(25,200,311)	3,273,905
Sub total		(1,505,909,241)	(297,538,612)	(1,803,447,853)	(1,342,549,857)	(163,359,384)	(1,505,909,241)
Deferred tax added to capital		(302,023,973)	17,398,548	(284,625,425)	(185,264,321)	(116,759,652)	(302,023,973)
Tax credit		158,272,955	42,313,717	200,586,672	169,652,006	(11,379,051)	158,272,955
Temporary differences of subsidiaries		137,141,397	25,335,300	162,476,697	77,569,595	59,571,802	137,141,397
Total	₩			(1,725,009,909)			(1,512,518,862)

(6) At 31 December 2022, there was a deferred tax liability of ₩188,618 million for temporary differences of ₩714,464 million related to investments in subsidiaries. However, this liability was not recognized because the Group is able to control the timing of the reversal of the temporary differences and it is probable that it will not reverse in the foreseeable future.

(7) The Group believes that its accruals for tax liabilities are adequate for all open tax years based on its assessment of many factors, including interpretations of tax law and prior experience.

29. Earning per Share

(1) Basic earnings per share

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

(i) Ordinary Shares

(In thousands of won, except earnings per share)	2022	2021
Profit attributable to the owners of the Company	₩ 1,952,148,536	1,169,801,395
Profit attributable to ordinary shares	1,910,056,287	1,144,549,900
Weighted average number of ordinary shares (basic)	65,433,139	65,433,139
Basic earnings per share (won)	29,191	17,492

(ii) Preferred Shares

(In thousands of won, except earnings per share)	2022	2021
Profit attributable to the owners of the Company	₩ 1,952,148,536	1,169,801,395
Profit attributable to preferred shares	42,092,249	25,251,495
Weighted average number of preferred shares (basic)	1,439,496	1,439,496
Basic earnings per share (won)	29,241	17,542

2) Weighted average number of shares for the years ended December 31, 2022 and 2021 is calculated as follows:

(i) Ordinary Shares

(In shares)	2022	2021
Issued ordinary shares at January 1	68,764,530	68,764,530
Treasury stock	(3,331,391)	(3,331,391)
Weighted-average number of common shares outstanding (basic)	65,433,139	65,433,139

(ii) Preferred Shares

(In shares)	2022	2021
Issued preferred shares at January 1	1,617,896	1,617,896
Treasury stock	(178,400)	(178,400)
Weighted-average number of common shares outstanding (basic)	1,439,496	1,439,496

The preferred shares are not entitled for priority rights other than additional dividend of 1% per annum, compared to ordinary shares, the Group considers the preferred shares as ordinary shares with different dividend ratio.

(2) Diluted earnings per share

Diluted earnings per share are same as basic earnings per share as there are no diluted effects for the years ended December 31, 2022 and 2021.

30. Leases

Information related to leases for which the Group is a lessee is as follows.

(1) Right-of-use assets

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

1) 2022

(In thousands of won)		Land	Buildings and structures	Tools, furniture, and fixtures	Total
Beginning balance	₩	1,823,232	29,009,016	4,402,972	35,235,220
Acquisition cost		9,749,730	63,878,503	9,450,839	83,079,072
Accumulated depreciation		(7,926,498)	(34,869,487)	(5,047,867)	(47,843,852)
Acquisitions and capital expenditure		13,812,617	46,109,642	4,263,215	64,185,474
Depreciation		(6,576,822)	(15,878,927)	(2,920,002)	(25,375,751)
Disposals		-	(967,792)	(320,700)	(1,288,492)
Exchange rate fluctuation		(469,755)	(2,688,553)	(410,117)	(3,568,425)
Ending balance	₩	8,589,272	55,583,386	5,015,368	69,188,026
Acquisition cost		13,762,617	74,265,664	11,209,676	99,237,957
Accumulated depreciation		(5,173,345)	(18,682,278)	(6,194,308)	(30,049,931)

2) 2021

(In thousands of won)		Land	Buildings and structures	Tools, furniture, and fixtures	Total
Beginning balance	₩	6,620,010	32,239,452	5,819,546	44,679,008
Acquisition cost		9,930,749	51,262,772	9,117,142	70,310,663
Accumulated depreciation		(3,310,739)	(19,023,320)	(3,297,596)	(25,631,655)
Acquisitions and capital expenditure		278,459	14,444,831	1,872,578	16,595,868
Depreciation		(4,737,625)	(17,244,210)	(2,956,186)	(24,938,021)
Disposals		(479,438)	(1,710,317)	(747,098)	(2,936,853)
Exchange rate fluctuation		141,826	1,279,260	414,132	1,835,218
Ending balance	₩	1,823,232	29,009,016	4,402,972	35,235,220
Acquisition cost		9,749,730	63,878,503	9,450,839	83,079,072
Accumulated depreciation		(7,926,498)	(34,869,487)	(5,047,867)	(47,843,852)

(2) Amounts recognized in expenses related to lease for the years ended December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022	2021
Interest on lease liabilities	₩	1,394,299	815,634
Expenses relating to short-term leases		7,002,867	6,027,041
Expenses relating to leases of low-value assets, excluding short-term leases of low-value assets		2,011,757	2,058,199
Total	₩	10,408,923	8,900,874

30. Leases, continued

(3) Maturities of lease liabilities for the years ended December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022	2021
Less than one year	₩	28,234,309	17,017,152
One to five years		35,676,658	17,857,548
More than five years		17,084,727	5,443,988
Total undiscounted lease liabilities as of 31 December		80,995,694	40,318,688
Lease liabilities recognized in the statement of financial position as of 31 December		72,105,093	38,561,071
Current lease liabilities		27,752,325	16,879,385
Non-current lease liabilities		44,352,768	21,681,686

(4) Amounts recognized in statement of cash flow for the years ended December 31, 2022 and 2021 are as follows:

(In thousands of won)		2022	2021
Total cash outflow for leases	₩	39,578,585	32,492,460

(5) Extension option

Some leases contain extension options exercisable by the Group before the end of the non-cancellable contract period. The Group seeks to include extension options in new leases to provide operational flexibility. The Group estimates the lease period by assessing at the lease commencement date whether it is reasonably certain to exercise the extension option.

(6) Details of leases as lessor are as follows:

The Group leases out its investment property. The Group has classified these leases as operating leases, because they do not transfer most of the risks and rewards incidental to the ownership of the assets. The following is the maturity analysis table for operating lease payments, and the lease payments to be received after the end of the reporting period are presented in undiscounted amounts.

(In thousands of won)		2022	2021
Less than one year	₩	4,509,895	4,200,683
One to five years		9,099,826	4,200,683

31. Related Parties

(1) List of the Group's related parties are as follows:

Associates	Samsung Display Co., Ltd. ("SDC") and subsidiaries
	Samsung Global Research Co., Ltd.
	SD FLEX CO., LTD. ("SDFLEX")
	Intellectual Keystone Technology LLC ("IKT")
	Philenergy Co., Ltd. ("Philenergy")
	ECOPRO EM Co., Ltd. ("ECOPROEM")
	Secondary Battery Growth Fund
Other Related Parties	ECOPRO BM Co., Ltd. ("ECOPROBM")
Conglomerate entities	Samsung Electronics Co., Ltd.("SEC"), Samsung C&T Corporation, and etc.

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

1) 2022

(In thousands of won)		Revenues	Other Income	Inventory purchase	Purchase of property plant and equipment	Other expenses
Associates						
SDC	₩	401,449,369	31,481,079	2,369,753	-	1,482,080
Samsung Global Research Co., Ltd.		-	-	-	-	9,634,783
SD FLEX CO., LTD.		147,312	1,263,968	15,172,507	-	56,624
ECOPROEM		-	-	2,161,138,608	-	701,795
Philenergy CO., LTD.		-	-	-	139,898,976	2,065,220
SEST(*)		1,257,063	-	-	-	-
Other Related Parties						
ECOPROBM		-	311,501	1,019,537,801	-	73,928
Conglomerate entities						
SEC		1,368,792,891	2,287,681	2,226,515	8,143,019	59,803,135
Others		1,362,763	6,963,273	5,330,407	48,766,577	225,250,981
Total	₩	1,773,009,398	42,307,502	3,205,775,591	196,808,572	299,068,546

(*) SEST was excluded from the related parties due to the disposition during the current year, and the transaction amount before excluded from the related party

31. Related Parties, Continued

(2) Significant transactions with related parties for the years ended December 31, 2022 and 2021 are summarized as follows: continued

2) 2021

(In thousands of won)	Revenues	Disposal of Property, Plant and Equipment	Other Income	Inventory purchase	Purchase of property plant and equipment	Other expenses
Associates						
SDC	₩ 362,442,750	-	26,398,206	1,144,999	-	1,251,053
Samsung Global Research Co., Ltd.	-	-	-	-	-	6,987,266
SD FLEX CO., LTD.	147,312	2,000	1,272,659	10,282,727	-	46,239
ECOPROEM	-	-	-	11,827,553	-	-
Philenergy CO., LTD.	-	-	25,889	-	117,110,983	295,055
SEST	60,859,066	-	-	-	-	2,831,912
Other Related Parties						
ECOPROBM	-	-	254,002	859,472,616	-	233,035
Conglomerate entities		-				
SEC	1,410,612,101	-	1,684,573	2,084,454	15,474,334	47,051,617
Others	4,530,567	-	11,006,709	1,631,061	52,252,966	202,696,647
Total	₩ 1,838,591,796	2,000	40,642,038	886,443,410	184,838,283	261,392,824

(3) As explained in Note 11, for the year ended December 31, 2022, the Group invested ₩40,000 million (₩24,000 million in the previous year) and ₩2,010 million (₩670 million in the previous year) in ECOPROEM Co., Ltd. and the Secondary Battery Growth Fund, respectively.

(4) Details of significant account balances with related parties as of December 31, 2022 and 2021 are summarized as follows:

1) 2022

(In thousands of won)	Account receivable	Other receivable, etc.	Account payable	Other payable, etc.
Associates				
SDC	₩ 25,420,529	2,288,000	48,543	23,192
Samsung Global Research Co., Ltd.	-	-	-	241,051
SD FLEX CO., LTD.	11,926	137,268	747,219	5,836
ECOPROEM	-	66,624,825	624,318,382	193,731
Philenergy CO., LTD.	-	-	-	1,076,346
Other Related Parties				
ECOPROBM	-	16,185,276	140,527,568	10,618
Conglomerate entities				
SEC	106,283,787	8,455,496	-	122,836,552
Others	2,329	27,315,440	729,772	71,727,457
Total	₩ 131,718,571	121,006,305	766,371,484	196,114,783

31. Related Parties, Continued

(4) Details of significant account balances with related parties as of December 31, 2022 and 2021 are summarized as follows, continued

2) 2021

(In thousands of won)		Account receivable	Other receivable, etc.	Account payable	Other payable, etc.
Associates					
SDC	₩	50,132,283	-	-	299,928
Samsung Global Research Co., Ltd.		-	-	-	917,942
SD FLEX CO., LTD.		-	147,677	853,162	4,628
ECOPROEM		-	-	11,854,458	-
Philenergy CO., LTD.		-	-	-	19,040,089
SEST		1,153,421	-	-	-
Other Related Parties					
ECOPROBM		-	26,950,541	145,636,014	22,617
Conglomerate entities					
SEC		116,039,445	8,585,740	-	131,698,481
Others		1,171,752	26,532,797	471,494	73,495,909
Total	₩	168,496,901	62,216,755	158,815,128	225,479,594

(5) Personnel compensation to registered officers (the "key management") who have the authority and responsibility in planning, directing, and control of the Group are ₩6,344 million and ₩6,038 million, for the years ended December 31, 2022 and 2021, respectively.

As of December 31, 2022 and 2021, liabilities related to long-term employee benefits for key management are ₩5,874 million and ₩7,669 million, respectively. In addition, liabilities related to retirement benefits for key management as of December 31, 2022 and 2021 are ₩13,889 million and ₩11,486 million, respectively.

32. Non-controlling Interest

Non-controlling interests as of and for the years ended December 31, 2022 and 2021 are summarized as follows:

(1) 2022

(In millions of won)		NOVALED	America	China (TSDI and 3 others)	Others	Total
Current assets	₩	197,082	352,138	1,839,775	4,445	2,393,440
Non-current assets		482,015	282,954	1,923,336	84,580	2,772,885
Current liabilities		32,258	175,539	1,571,738	12,591	1,792,126
Non-current liabilities		54	7,994	231,616	-	239,664
Net assets		646,785	451,559	1,959,757	76,434	3,134,535
Carrying amount of non-controlling interest		257,556	195,417	277,919	887	731,779
Sales		192,260	881,445	4,313,602	15,715	5,403,022
Net income (loss)		91,753	27,376	171,219	(52,459)	237,889
Total comprehensive income		93,992	25,586	163,504	(52,459)	230,623
Net income (loss) distributed to non-controlling interest		45,260	2,271	40,207	(525)	87,213
Cash flow from operating activities		2,709	11,940	131,174	(16)	145,807
Cash flow from investing activities		(303)	(112,615)	(67,826)	31	(180,713)
Cash flow from financing activities before payment of dividends to non- controlling interest		(12,333)	182,706	(57,477)	(14)	112,882
Exchange rate changes		210	(1,371)	2,076	-	915
Changes in cash and cash equivalents		(9,717)	80,660	7,947	1	78,891

The condensed information on cash flows is translated to Korean Won based on the cash flow of subsidiaries(reflecting the non-controlling interest rate) before consolidation adjustments.

32. Non-controlling Interest, Continued

(2) 2021

(In millions of won)		NOVALED	America	China (TSDI and 3 others)	Others	Total
Current assets	₩	121,093	222,587	1,411,973	4,335	1,759,988
Non-current assets		465,766	57,900	2,421,210	176,168	3,121,044
Current liabilities		33,949	236,595	1,355,335	3,623	1,629,502
Non-current liabilities		117	8,621	669,133	-	677,871
Net assets		552,793	35,271	1,808,715	176,880	2,573,659
Carrying amount of non-controlling interest		211,538	3,144	275,863	1,890	492,435
Sales		167,236	429,164	2,815,869	-	3,412,269
Net income (loss)		74,937	(1,101)	167,655	122,706	364,197
Total comprehensive income		75,624	1,745	309,394	122,706	509,469
Net income (loss) distributed to non-controlling interest		37,396	(96)	42,073	1,227	80,600
Cash flow from operating activities		31,637	(3,506)	105,903	(20)	134,014
Cash flow from investing activities		(27,960)	(543)	(97,198)	563	(125,138)
Cash flow from financing activities before payment of dividends to non-controlling interest		3,569	3,699	(9,358)	(513)	(2,603)
Dividends attributed to non-controlling interest		-	-	(2,509)	(1)	(2,510)
Exchange rate changes		16	188	5,677	-	5,881
Changes in cash and cash equivalents		7,262	(162)	2,515	29	9,644

The condensed information on cash flows is translated to Korean Won based on the cash flow of subsidiaries(reflecting the non-controlling interest rate) before consolidation adjustments.

33. Statement of Cash Flows

Adjustment and changes in assets and liabilities for cash flows from operating activities for the years ended December 31, 2022 and 2021 are summarized as follows:

(1) Adjustment for cash flows from operating activities

(In thousands of won)		2022	2021
Severance & retirement benefits	₩	69,701,704	69,079,361
Reversal of valuation of inventories		9,826,025	17,409,658
Depreciation		1,408,100,379	1,173,117,985
Amortization		55,232,876	79,045,768
(Reversal of) bad debt expense		(90,503)	155,706
Share of profit of equity accounted investees		(1,039,696,670)	(530,041,919)
Loss (gain) on sale of investments		(6,454,062)	1,303,108
Loss (gain) on foreign currency translations, net		36,723,944	12,500,168
Loss (gain) on valuation and transaction of derivative financial instruments		(26,037,227)	18,310,842
Loss on sale of property, plant and equipment, net		108,986,539	41,989,111
Impairment losses on property, plant and equipment		31,085,526	11,736,915
Loss (gain) on sale of intangible assets		318,439	2,266,605
Impairment losses on intangible assets		3,128	31,161
Equity instruments at FVTPL – net change in fair value		(25,378,636)	(99,352,178)
Loss (gain) on sale of equity instruments at FVTPL		2,718,327	(57,349,007)
Loss(gain) no lease termination		(66,013)	87,912
Miscellaneous profit and loss		(164,215)	(130,286)
Income tax expense		612,913,941	412,933,762
Interest expense		90,058,982	57,204,723
Interest income		(43,378,706)	(12,208,588)
Dividend income		(12,250,892)	(12,385,096)
Loss on sale of account receivables		11,662,825	1,991,933
Total	₩	1,283,815,711	1,187,697,644

33. Statement of Cash Flows, Continued

(2) Changes in assets and liabilities for Cash Flows from Operating Activities

(In thousands of won)		2022	2021
Changes in assets and liabilities:			
Trade receivables	₩	(673,192,991)	(283,711,615)
Other receivables		(168,058,699)	35,629,862
Other current assets		(71,269,153)	9,183,592
Inventories		(678,279,892)	564,363
Non-current other receivables		275,832	495,986
Non-current other assets		(37,001,945)	(45,954,693)
Trade payables		851,409,875	310,091,622
Other payables		116,513,009	64,351,275
Advance received		55,339,154	(146,651,288)
Unearned revenue		33,687,401	31,225,688
Other non-current payables		362,067,339	104,514,485
Payment of retirement and employee benefits		(42,234,885)	(29,988,213)
Plan assets		(118,035,833)	(74,355,506)
Total	₩	(368,780,788)	(24,604,442)

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

(In thousands of won)		2022	2021
Increase of payables related to acquisition of plant, property, and equipment	₩	(170,378,249)	282,416,077
Decrease(increase) of receivables related to disposal of plant, property, and equipment		13,424,571	(11,250,224)

33. Statement of Cash Flows, Continued

(4) Reconciliation of movements of liabilities to cash flows arising from financing activities are as follows:

1) 2022

(In thousands of won)

				Non-cash changes			
		January 1, 2022	Cash flow from financing activities	Interest expense, etc.	Reclassify current portion	Changes in foreign exchange rates	December 31, 2022
Current portion of debentures	₩	-	-	-	219,901,411	-	219,901,411
Short-term borrowings		2,510,216,802	(269,004,384)	-	420,059,856	(29,990,471)	2,631,281,803
Debentures		219,762,472	-	138,939	(219,901,411)	-	-
Long-term borrowings		1,887,998,332	806,441,268	-	(420,059,856)	22,660,256	2,297,040,000
Lease liabilities		38,561,072	(30,563,962)	64,088,242	-	19,741	72,105,093
Total	₩	4,656,538,678	506,872,922	64,227,181	-	(7,310,474)	5,220,328,307

2) 2021

(In thousands of won)

				Non-cash changes			
		January 1, 2021	Cash flow from financing activities	Interest Expense, etc.	Reclassify current portion	Changes in foreign exchange rates	December 31, 2021
Current portion of debentures	₩	369,737,492	(370,000,000)	262,508	-	-	-
Short-term borrowings		2,057,766,687	136,766,289	-	275,373,299	40,310,527	2,510,216,802
Debentures		219,626,914	-	135,558	-	-	219,762,472
Long-term borrowings		1,264,692,692	881,522,739	-	(275,373,299)	17,156,200	1,887,998,332
Lease liabilities		47,471,842	(24,407,220)	15,406,275	-	90,175	38,561,072
Total	₩	3,959,295,627	623,881,808	15,804,341	-	57,556,902	4,656,538,678