SAMSUNG SDI CO., LTD. AND SUBSIDIARIES

Consolidated Financial Statements

December 31, 2019 and 2018

(With Independent Auditors' Report Thereon)

Contents

	Page
Independent Auditors' Report	2
Consolidated Statements of Financial Position	6
Consolidated Statements of Comprehensive Income	7
Consolidated Statements of Changes in Equity	8
Consolidated Statements of Cash Flows	10
Notes to the Consolidated Financial Statements	11

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, 2019 and 2018, 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, 2019 and 2018, 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, 2019. 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.

Impairment on CGU including goodwill

1) Risks

The Group allocated goodwill to two of its cash-generating units ("CGUs"), electronic material segment and Novaled. As of December 31, 2019, carrying amount of goodwill in such CGUs is ₩605,672 million.

Considering the estimation of future cash flow used in measuring cash flow model includes the uncertainties in economic environment faced by the Group's markets and the management judgment in discount rate, we identified assessment of impairment on CGU including goodwill 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:

• We compared future cash flows forecasts prepared in prior year with the actual performance to retroactively assess whether the estimates include optimistic assumptions.

• We involved our internal valuation specialists to assist us in assessing whether the assumptions such as revenue growth rate, operational margin rate and discount rate used for estimating future cash flows are reasonable compared to historical experience and external market data.

• We also evaluated the adequacy of the disclosures such as key assumptions used to estimate future cash flow in the Group's consolidated financial statements in accordance with K-IFRS.

<u>Valuation allowance for inventory</u>

1) Risk

The carrying amount of inventories is ₩ 1,802,246 million as of December 31, 2019 and the amount recognized as valuation allowance for inventory is ₩ 94,325 million.

The Group conducted an assessment of the net realizable value and obsolescence of inventories, which management's judgment and estimation were involved. We identified assessment of the valuation allowance for inventory as a key audit matter by considering the importance of the inventory balance, uncertainty in the estimation and judgment used by management.

2) How the matter was addressed in our audit

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

• We assessed the adequacy of Group's accounting policies for valuation of inventories in accordance with K-IFRS.

• We performed the recalculation of valuation allowance for inventory in accordance with Group's accounting policies.

• We assessed the accuracy of inventories aging schedule for selected samples.

• We evaluated the Group's future estimated selling price used to calculate the net realizable value of the inventories is consistent with the latest selling price for selected samples.

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 Kim, Ik-Chan.

KPMG Samjong Accounting Corp.

Seoul, Korea
February 28, 2020

This report is effective as of February 28, 2020, 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, 2019 and 2018

(In thousands of won)	Note		2019	2018
Assets				
Cash and cash equivalents	4,6	₩	1,156,295,421	1,516,585,547
Trade and other receivables, net	4,7,31		2,015,345,598	1,851,185,859
Inventories, net	8		1,707,920,529	1,745,650,833
Other investments	4,9		147,307,933	150,531,068
Other assets	10		154,545,416	198,560,107
Non-current assets held for sale			-	56,828,796
Total current assets			**5,181,414,897**	**5,519,342,210**
Long-term trade and other receivables, net	4,7,31		27,812,098	23,168,939
Investments in equity-accounted investees	11		6,763,177,129	6,554,633,768
Property, plant and equipment, net	5,12,30		5,426,843,174	4,608,333,986
Intangible assets, net	5,13		831,370,662	866,271,119
Investment property	5,14		153,656,746	149,725,014
Deferred tax assets	28		85,799,169	51,799,609
Other non-current investments, including derivatives	4,9,19		1,268,769,439	1,495,631,279
Other non-current assets	10		113,253,135	80,815,260
Total non-current assets			**14,670,681,552**	**13,830,378,974**
Total assets		₩	**19,852,096,449**	**19,349,721,184**
Liabilities				
Trade and other payables	4,15,17,19,30,33	₩	1,835,800,151	2,145,075,054
Income taxes payable	28		72,873,576	35,623,226
Advance received			60,860,324	69,598,589
Unearned revenue			5,513,614	6,304,690
Short-term borrowings	4,16,33		1,766,474,986	1,739,389,710
Derivative liabilities	4,19		-	15,202,782
Liabilities held-for-sale			-	1,628,447
Total current liabilities			**3,741,522,651**	**4,012,822,498**
Trade and other payables	4,15,17,19,30,33		338,467,512	291,312,664
Long-term unearned revenue			5,259,529	27,083,907
Long-term borrowings	4,16,33		1,801,994,890	1,514,282,001
Employee benefit liabilities, net	18		61,489,160	70,146,754
Derivative liabilities	4,19		2,420,075	29,866,610
Deferred tax liabilities	28		1,240,597,436	1,178,987,534
Total non-current liabilities			**3,450,228,602**	**3,111,679,470**
Total liabilities			**7,191,751,253**	**7,124,501,968**
Capital stock	1,20		356,712,130	356,712,130
Capital surplus	20		5,001,974,693	5,037,936,784
Other capital	21		(345,131,584)	(345,131,584)
Accumulated other comprehensive income	22		404,513,004	271,989,660
Retained earnings	23		6,906,868,478	6,612,515,754
Equity attributable to owners of the Parent Company			**12,324,936,721**	**11,934,022,744**
Non-controlling interests	32		**335,408,475**	**291,196,472**
Total equity			**12,660,345,196**	**12,225,219,216**
Total liabilities and equity		₩	**19,852,096,449**	**19,349,721,184**

See accompanying note to the consolidated financial statements.

For the years ended December 31, 2019 and 2018

(In thousands of won, except per share information)	*Note*		2019	2018
Revenue	*5,31*	₩	**10,097,426,165**	**9,158,272,455**
Cost of sales	*8,18,25,31*		(7,882,255,450)	(7,118,188,528)
Gross profit			**2,215,170,715**	**2,040,083,927**
Selling, general and administrative expenses	*13,18,24,25,31*		(1,752,994,251)	(1,325,113,320)
Operating income	*5*		**462,176,464**	**714,970,606**
Other income	*26,31*		84,006,372	129,512,317
Other expenses	*26,31*		(90,910,750)	(193,470,665)
Finance income	*27*		314,411,077	381,754,697
Finance costs	*27*		(383,670,662)	(338,715,141)
Share of profit of equity accounted investees	*11*		178,629,731	342,181,824
Profit before income taxes			**564,642,232**	**1,036,233,637**
Income tax expense	*28*		(162,275,802)	291,184,452
Profit for the year			**402,366,430**	**745,049,185**
Other comprehensive income (loss)				
Items that will never be reclassified to profit or loss:				
Remeasurements of defined benefit liability	*18*		5,897,603	(29,815,081)
Unrealized net changes in fair value of FVOCI financial assets	*9*		41,532,379	77,282,457
Related tax	*28*		(11,199,966)	(11,443,794)
Items that are or may be reclassified to profit or loss:				
Effective portion of unrealized changes in fair values of cash flow hedges	19		28,819,436	(25,658,004)
Change in equity of equity-method accounted investees	*11*		21,850,440	(6,897,968)
Change in gain on translation of foreign operations			60,421,136	39,557,924
Related tax	28		(8,605,119)	8,252,786
Other comprehensive income for the year, net of tax			**138,715,909**	**51,278,320**
Total comprehensive income		₩	**541,082,339**	**796,327,505**
Profit attributable to:				
Owners of the Parent Company	*29*	₩	356,548,861	701,166,337
Non-controlling interests	*32*		45,817,569	43,882,848
Total comprehensive income attributable to:				
Owners of the Parent Company			493,820,677	748,427,028
Non-controlling interests	*32*		47,261,662	47,900,477
Earnings per share	*29*			
Basic earnings per share (won) - Ordinary share			5,331	10,484
Basic earnings per share (won) - Preferred share			5,381	10,534

See accompanying note to the consolidated financial statements.

For the years ended December 31, 2019 and 2018

(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, 2018	₩	**356,712,130**	**5,042,698,139**	**(345,131,584)**	**602,435,775**	**5,600,587,220**	**194,697,817**	**11,451,999,497**
Change in accounting policies		-	-	-	(400,263,326)	400,263,326	-	-
Restated balance at January 1, 2018		**356,712,130**	**5,042,698,139**	**(345,131,584)**	**202,172,449**	**6,000,850,546**	**194,697,817**	**11,451,999,497**
Comprehensive income (loss)								
Profit for the year		-	-	-	-	701,166,337	43,882,848	745,049,185
Remeasurements of defined benefit liability		-	-	-	-	(22,556,520)		(22,556,520)
Effective portion of unrealized changes in fair values of cash flow hedges		-	-	-	(19,439,526)	-	-	(19,439,526)
Changes in fair values of FVOCI financial assets		-	-	-	58,580,102	-	-	58,580,102
Change in equity of equity-accounted investees		-	-	-	(5,585,884)	-	-	(5,585,884)
Change in gain on translation of foreign operations		-	-	-	36,262,519	-	4,017,629	40,280,148
Total comprehensive income		-	**-**	**-**	**69,817,211**	**678,609,817**	**47,900,477**	**796,327,505**
Transactions with shareholders directly recognized in equity								
Dividends to owners of the Company		-	-	-	-	(66,944,609)	(4,781,908)	(71,726,517)
Capital contribution from non-controlling interests		-	-	-	-	-	56,321,980	56,321,980
Capital reduction to non-controlling interests		-	-	-	-	-	(107,500)	(107,500)
Acquisition of non-controlling interest		-	(3,154,855)	-	-	-	(2,834,394)	(5,989,249)
Others		-	(1,606,500)	-	-	-	-	(1,606,500)
Balance at December 31, 2018	₩	**356,712,130**	**5,037,936,784**	**(345,131,584)**	**271,989,660**	**6,612,515,754**	**291,196,472**	**12,225,219,216**

See accompanying notes to the consolidated financial statements.

For the years ended December 31, 2019 and 2018, 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, 2019	₩	**356,712,130**	**5,037,936,784**	**(345,131,584)**	**271,989,660**	**6,612,515,754**	**291,196,472**	**12,225,219,216**
Comprehensive income								
Profit for the year		-	-	-	-	356,548,861	45,817,569	402,366,430
Remeasurements of defined benefit liability		-	-	-	-	4,748,473	-	4,748,473
Effective portion of unrealized changes in fair values of cash flow hedges		-	-	-	21,845,133	-	-	21,845,133
Changes in fair values of FVOCI financial assets		-	-	-	31,481,544	-	-	31,481,544
Change in equity of equity-accounted investees		-	-	-	16,599,622	-	-	16,599,622
Change in gain on translation of foreign operations		-	-	-	62,597,045	-	1,444,093	64,041,138
Total comprehensive income		**-**	**-**	**-**	**132,523,344**	**361,297,334**	**47,261,662**	**541,082,340**
Transactions with shareholders directly recognized in equity								
Dividends to owners of the Company		-	-	-	-	(66,944,610)	-	(66,944,610)
Capital contribution from non-controlling interests		-	-	-	-	-	14,871,010	14,871,010
Capital reduction to non-controlling interests		-	-	-	-	-	(84,400)	(84,400)
Disposal of subsidiaries		-	-	-	-	-	(8,543,359)	(8,543,359)
Liquidation of subsidiaries		-	(3,517,575)	-	-	-	(655,204)	(4,172,779)
Acquisition of non-controlling interest		-	(32,444,516)	-	-	-	(8,637,706)	(41,082,222)
Balance at December 31, 2019	₩	**356,712,130**	**5,001,974,693**	**(345,131,584)**	**404,513,004**	**6,906,868,478**	**335,408,475**	**12,660,345,196**

See accompanying notes to the consolidated financial statement.

For the years ended December 31, 2019 and 2018

(In thousands of won)	*Note*		2019	2018
Cash flows from operating activities				
Profit for the year		₩	402,366,430	745,049,185
Adjustments for expense (benefit)	33		981,811,235	629,720,089
Changes in assets and liabilities	33		(306,525,782)	(979,201,821)
Interest received			18,526,591	17,250,052
Interest paid			(76,707,916)	(48,904,350)
Dividends received			17,560,342	25,532,902
Income taxes paid			(113,959,268)	(128,836,322)
Net cash from operating activities			**923,071,632**	**260,609,735**
Cash flows from investing activities				
Proceeds from other investments			354,134,808	576,569,660
Proceeds from non-current assets held for sale			14,985,000	-
Proceeds from sale of property, plant and equipment			19,321,226	3,742,953
Proceeds from sale of intangible assets			2,388,237	500,292
Proceeds from sale of investment property			-	83,410
Government grants received			11,132,957	41,074,938
Acquisition of other investment assets			(28,435,487)	(147,385,243)
Acquisition of property, plant and equipment			(1,898,302,352)	(2,146,134,809)
Acquisition of intangible assets			(5,117,254)	(13,186,617)
Increase of loan receivables			(5,166,900)	(19,993,781)
Net cash used in investing activities			**(1,535,059,765)**	**(1,704,729,197)**
Cash flows from financing activities				
Proceeds from short-term borrowings			616,344,422	1,080,084,321
Proceeds from long-term borrowings			829,278,139	793,007,292
Issuance of debentures			-	588,240,960
Capital contribution from non-controlling interest			14,871,010	56,321,980
Dividends paid			(66,937,929)	(71,719,718)
Repayment of short-term borrowings			(862,536,301)	(393,049,640)
Repayment of long-term borrowings			(265,800,161)	(249,580,360)
Capital reduction from non-controlling interest			(84,400)	(107,500)
Repayment of lease liabilities			(26,200,032)	-
Acquisition of non-controlling interest			- -	(47,071,471)
Net cash from financing activities			**238,934,748**	**1,756,125,864**
Net increase (decrease) in cash and cash equivalents			**(373,053,385)**	**312,006,402**
Cash and cash equivalents at January 1			1,516,585,547	1,209,015,664
Effect of exchange rate fluctuations on cash held			12,763,259	(4,436,519)
Cash and cash equivalents at December 31		₩	**1,156,295,421**	**1,516,585,547**

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 and 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 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 20 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 of capital stock with a par value of ₩5,000 per share. As of December 31, 2019, 70,382,426 shares of capital 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 major shareholder of the Parent Company is Samsung Electronics Co., Ltd. (ownership: 19.13%). The Parent Company is allowed to retire its stock 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, 2019, 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, 2020 and will be submitted for approval to general shareholders meeting to be held on March 18, 2020.

(1) Basis of measurement

The consolidated financial statements have been prepared on the historical cost basis except for the following material items in the statement of financial position:

- 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 make judgments, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

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 30: Lease term: whether the Group is reasonably certain to exercise extension options

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

- Notes 12 and 13: impairment test - key assumptions underlying recoverable amounts, including the recoverability of development costs;

- Notes 17 and 19: recognition and measurement of provisions and contingencies - key assumptions about likelihood and magnitude of an outflow of resources;

- Note 18: measurement of defined benefit obligations: key actuarial assumptions; and

- Note 28: recognition of deferred tax assets: availability of future taxable profit against which carry-forward tax losses can be used, cash reserve taxation

2. Basis of Preparation, Continued

(4) Fair value measurement

A number of the 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 reports 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 a fair value hierarchy based on the inputs used in the valuation techniques as follows.

- Level 1: quoted prices (unadjusted) in 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 fare 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 following note:

- Note 4: Financial Risk Management

3. Significant Accounting Policies

The Group applies the same accounting policies as it did in preparing its annual consolidated financial statements for the fiscal year ending on 31 December 2018, except as described below.

The Group initially applied K-IFRS No.1116 'Leases' on 1 January 2019. Other criteria that apply o n or after 1 January 2019 have no significant effect on the group's consolidated financial stateme nts. More details are included in Note 3. (23),(25) Changes in Accounting Policies.

(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 received.

The consideration transferred does not include amounts related to the settlement of pre-existing relationships. Such amount 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, 2019 and 2018 are as follows: All subsidiaries' fiscal year end is December 31.

			Percentage of ownership (*1)	
Subsidiaries	**Location**	**Primary business**	**2019**	**2018**
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%
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")(*2)	India	Manufacturing and sales of rechargeable battery	100.0%	-
Samsung SDI (Hong Kong) Ltd. ("SDIHK")	Hong Kong	Supporting sales of rechargeable batteries	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")(*3)	China	Manufacturing and sales of automotive battery	65.0%	50.0%
Samsung SDI (Changchun) Power Battery Co., Ltd. ("SCPB")(*4)	China	Manufacturing and sales of automotive battery	50.0%	50.0%
Samsung SDI（Tianjin）Battery Co., Ltd. ("SDITB')	China	Manufacturing and sales of rechargeable battery	80.0%	80.0%
Samsung SDI (Wuxi) Battery Systems Co., Ltd.("SWBS")(*4)	China	Manufacturing and sales of automotive battery	50.0%	50.0%
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%

3. Significant Accounting Policies, Continued

(1) Consolidation, continued

3) Subsidiaries, continued

(i) The list of subsidiaries as of December 31, 2019 and 2018 are 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. In accordance with the local laws and regulations, no shares have been issued and ownership interest has been measured based on investments.

(*2) It was included in the scope of consolidation as a new establishment during the current year.

(*3) The Group acquired additional 15% ownership of SAPB, resulting in 65% ownership as of December 31, 2019.

(*4) Although the Group's ownership in SCPB and SWBS does not exceed 50%, the Group has determined that the Group controls the entities based on the terms of the shareholders' agreement.

(ii) Changes in subsidiaries as of December 31, 2019 are as follows:

Subsidiaries	Change History	Reason for change
Samsung SDI Brazil Ltda. ("SDIB")	Subsidiaries Excluded	Liquidation
Samsung SDI-Sungrow Energy Storage Battery Co., Ltd. ("SSEB")	Subsidiaries Excluded	Loss of control due to partial sale of share
Samsung Chemical Electronic Materials (SuZhou) Co., Ltd. ("SCES")	Subsidiaries Excluded	Merged with SDIW

3. Significant Accounting Policies, Continued

(1) Consolidation, continued

3) Subsidiaries, continued

(iii) Summarized financial information of subsidiaries as of and for the year ended December 31, 2019 are as follows:

(In thousands of won)

Subsidiaries	Assets	Liabilities	Equity	Revenue	Net profit (loss)	Total comprehensive income (loss)
STM	₩ 188,219,679	31,094,905	157,124,774	168,030,913	11,065,822	10,987,213
SVIC24	68,715,581	262,957	68,452,624	-	15,520,776	15,520,776
SVIC15	22,154,203	86,809	22,067,394	-	2,480,074	2,480,074
SDIJ	6,433,667	2,041,921	4,391,746	16,654,469	585,274	707,453
SDIA	144,585,116	104,025,311	40,559,805	124,482,126	(12,393)	1,467,026
NOVALED	442,922,693	30,134,823	412,787,870	127,431,954	47,976,064	52,730,839
SDIHU	2,131,671,010	1,784,659,456	347,011,554	630,370,839	(47,725,617)	(51,313,945)
SDIEU	22,312,000	18,595,717	3,716,283	30,873,451	3,505,476	3,555,631
SDIBS	263,622,116	186,835,095	76,787,021	447,944,931	14,325,325	14,690,205
SDIV	440,795,077	209,977,660	230,817,417	1,633,541,457	56,428,711	62,189,489
SDIEM	473,832,835	198,828,953	275,003,882	843,714,035	38,118,706	45,956,016
SDII	5,649,018	1,379,872	4,269,146	772,768	(615,250)	(638,854)
SDIW	588,922,205	228,699,793	360,222,412	1,109,755,941	64,715,017	68,915,877
TSDI	755,442,611	414,092,483	341,350,128	671,468,729	14,639,082	20,263,822
SDIHK	613,683,993	56,293,783	557,390,210	3,612,415	24,935,957	41,565,241
SDIC	11,265,579	6,079,871	5,185,708	18,000,504	2,329,130	2,414,804
SAPB	755,131,711	627,900,936	127,230,775	1,002,891,615	48,178,002	47,901,482
SCPB	13,473,159	7,326,894	6,146,265	5,799,784	(862,822)	(717,835)
SDITB	890,967,806	577,298,123	313,669,683	468,230,706	(1,102,971)	4,605,735
SWBS	5,755,436	327,437	5,427,999	-	76,069	167,289

3. Significant Accounting Policies, Continued

(1) Consolidation, continued

4) Loss of control

If the controlling company loses control of 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 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 and transactions, 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 capital surplus.

3. Significant Accounting Policies, Continued

(2) 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 a foreign currency 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.

(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, and 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

3. Significant Accounting Policies, Continued

(4) Financial instruments, continued

2) Classification and subsequent measurement, continued

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.

3) Business model assessment

The Group makes an assessment of the objective of the business model in which a financial asset is held at a portfolio level because this best reflects the way the business is managed and information is provided to management. The information considered includes:
– the stated policies and objectives for the portfolio and the operation of those policies in practice. 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.

3. Significant Accounting Policies, Continued

(4) Financial instruments, continued

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.

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.

3. Significant Accounting Policies, Continued

(4) Financial instruments, continued

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) Offsetting

Financial assets and financial liabilities are offset and the net amount 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) 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.

The Group designates certain derivatives as hedging instruments to hedge the variability in cash flows associated with highly probable forecast transactions arising from changes in foreign exchange rates and interest rates and certain derivatives and non-derivative financial liabilities as hedges of foreign exchange risk on a net investment in a foreign operation.

At inception of designated hedging relationships, the Group documents the risk management objective and strategy 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

(5) Derivatives, continued

2) Cash flow hedges, continued

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.

(6) Non-derivative financial liabilities

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.

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.

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 certain items of property, plant and equipment at 1 January 2005, the Group's date of transition to IFRS, was determined with reference to its fair value at that date.

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

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.

3. Significant Accounting Policies, Continued

(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 of time 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.

(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
Development costs	8 ~11
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.

3. Significant Accounting Policies, Continued

(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.

(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.

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.

3. Significant Accounting Policies, Continued

(13) Impairment, continued

1) Impairment of financial assets, continued

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.

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 reorganisation; 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.

3. Significant Accounting Policies, Continued

(13) Impairment, continued

1) Impairment of financial assets, continued

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.

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. 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.

3. Significant Accounting Policies, Continued

(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) 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.

3. Significant Accounting Policies, Continued

(14) Employee benefits, continued

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.

(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.

3. Significant Accounting Policies, Continued

(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.

(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.

3. Significant Accounting Policies, Continued

(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;
– dividend income;
– 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;
– 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.

(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 tax comprises the expected tax payable or receivable on the taxable income or loss for the year and any adjustment to the tax payable or receivable in respect of previous years. The amount of current tax payable or receivable is the best estimate of the tax amount expected to be paid or received that reflects uncertainty related to income taxes, if any. It is measured using tax rates enacted or substantively enacted at the reporting date. Current tax also includes any tax arising from dividends.
Current tax assets and liabilities are offset only if certain criteria are met.

3. Significant Accounting Policies, Continued

(19) Income taxes, continued

2) Deferred tax

Deferred tax is recognized in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognized for:

– temporary differences on the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss;
– temporary differences related to investments in subsidiaries, associates and joint arrangements to the extent that the Group is able to control the timing of the reversal of the temporary differences and it is probable that they will not reverse in the foreseeable future; and
– taxable temporary differences arising on the initial recognition of goodwill.

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 future taxable profits, adjusted for reversals of existing temporary differences, are considered, based on the business plans for individual subsidiaries in the Group. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realized; such reductions are reversed when the probability of future taxable profits improves.

Unrecognized deferred tax assets are reassessed at each reporting date and recognized to the extent that it has become probable that future taxable profits will be available against which they can be used.

Deferred tax is measured at the tax rates that are expected to be applied to temporary differences when they reverse, using tax rates enacted or substantively enacted at the reporting date.

The measurement of deferred tax reflects the tax consequences that would follow from the manner in which the Group expects, at the reporting date, to recover or settle the carrying amount of its assets and liabilities. For this purpose, the carrying amount of investment property measured at fair value is presumed to be recovered through sale, and the Group has not rebutted this presumption.

Deferred tax assets and liabilities are offset only if certain criteria are met.

(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.

3. Significant Accounting Policies, Continued

(21) Operating segment

The Group has three reportable segments: the chemicals business segment, electronic materials business segment and energy and other business segment. Strategic operations 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.

(23) Lease

1) Accounting policy applied from January 1, 2019
More details are included in Note 3. (25) Changes in accounting policies.

2) Accounting policy applied before January 1, 2019

(i) As a lessee
For contracts entered into before 1 January 2019, the Group determined whether the arrangement was or contained a lease based on the assessment of whether:

3. Significant Accounting Policies, Continued

(23) Lease, continued

- Fulfilment of the arrangement was dependent on the use of a specific asset or assets; and
- The arrangement had conveyed a right to use the asset. An arrangement conveyed the right to use the asset if one of the following was met:
- The purchaser had the ability or right to operate the asset while obtaining or controlling more than an insignificant amount or the output;
- The purchaser had the ability or right to control physical access to the asset while obtaining or controlling more than an insignificant amount of the output; or
- Facts and circumstances indicated that it was remote that other parties would take more than an insignificant amount of the output, and the price per unit was neither fixed per unit of output nor equal to the current market price per unit of output.

In the comparative period, as a lessee the Group classified leases that transferred substantially all of the risks and rewards of ownership as finance leases. When this was the case, the leases assets were measured initially at an amount equal to the lower of their fair value and the present value of the minimum lease payments. Minimum lease payments were the payments over the lease term that the lessee was required to make, excluding any contingent rent. Subsequent to initial recognition, the assets were accounted for in accordance with the accounting policy applicable to that asset.

Assets held under other leases were classified as operating leases and were not recognized in the Group's statement of financial position. Payments made under operating leases were recognized in profit or loss on a straight-line basis over the term of the lease. Lease incentives received were recognized as an integral part of the total lease expense, over the term of the lease.

(ii) As a lessor

When the Group acted as a lessor, it determined at lease inception whether each lease was a finance lease or an operating lease. To classify each lease, the Group made an overall assessment of whether the lease transferred substantially all of the risks and rewards incidental to ownership of the underlying asset. If this was the case, then the lease was a finance lease; if not, then it was an operating lease. As part of this assessment, the Group considered certain indicators such as whether the lease was 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 which became effective in 2015.

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. The cost includes any directly attributable costs incurred during the normal course of business.

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. 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 Company 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.

3. Significant Accounting Policies, Continued

(24) Emissions Rights, continued

2) Emission liability

Emission liability is a present obligation of submitting emission rights to the government with regard to emission of greenhouse gas. Emission liability is recognized when it is probable that outflows of resources will be required to settle the obligation and the costs required to perform the obligation are reliably estimable. Emission liability is an amount of estimated obligations for emission rights to be submitted to the government for the performing period. The emission liability is measured based on the expected quantity of emission for the performing period in excess of emission allowance in possession and the unit price for such emission rights in the market at the end of the reporting period.

(25) Changes in accounting policies

The Group has initially applied K-IFRS No.1116 from January 1, 2019. A number of other new standards are also effective from January 1, 2019 but they do not have a material effect on the Group's consolidated financial statements.

The Group applied K-IFRS No.1116 using the revised retrospective method that reflected the cumulative effect of initial application of K-IFRS No.1116 in retained earnings on 1 January 2019. Therefore, the comparison information for 2018 has not been restated. Comparative information was previously prepared and presented in accordance with K-IFRS No.1017 and the related Interpretation. Specific details related to the change in accounting policy are disclosed below. In addition, the disclosure requirements in K-IFRS No.1116 did not generally apply to comparative information.

1) Definition of a lease
Previously, the Group determined at contract inception whether an arrangement was or contained a lease under K-IFRS No.2104 'Determining Whether an Arrangement Contains a Lease'. The Group now assesses whether a contract is or Contains a lease based on the new definition of a lease. Under K-IFRS No.1116 'Leases', a contract is, or contains, a lease if the contract conveys a right to control the use of an identified asset for a period of time in exchange for consideration. On transition to K-IFRS No.1116 'Leases', the Group elected to apply the practical expedient to grandfather the assessment of which transactions are leases. The Group applied K-IFRS No.1116 only to contracts that were previously identified as leases. Contracts that were not identified as leases under K-IFRS No.1017 'Leases' and K-IFRS No.2104 'Determining Whether an Arrangement Contains a Lease' were not reassessed. Therefore, the definition of a lease under K-IFRS No.1116 has been applied only to contracts entered into or changed on or after January 1, 2019.

2) As a lessee
The Group leases many assets, including warehouses. As a lessee, the Group previously classified leases as operating or finance leases based on its assessment of whether the lease transferred substantially all of the risks and rewards of ownership. Under K-IFRS No.1116 'Leases', the Group recognizes right-of-use assets and lease liabilities for most leases. That is, most leases are presented in the statement of financial position.

3. Significant Accounting Policies, Continued

(25) Changes in accounting policies, continued

2) As a lessee, continued

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 on the basis of their relative stand-alone prices.

However, for leases of property the Group has elected not to separate non-lease components and account for the lease and associated non-lease components as a single lease components.

a. Leases previously classified as operating leases in accordance with K-IFRS No.1017
The Group previously classified the real estate lease as an operating lease in accordance with K-IFRS No.1017. At the time of transition, the lease liability was measured at the present value of the remaining lease payments discounted at the group's incremental borrowing rate on 1 January 2019. Right-of-use assets were measured at the same amount as the lease liabilities.

The Group applied the following practical expedients when applying K-IFRS No.1116 to leases that were previously classified as operating leases in accordance with K-IFRS No.1017.

- Right-of-use assets and lease liabilities are not recognized for leases with a lease term of 12 months or less
- Right-of-use assets and lease liabilities are not recognized for small underlying asset leases
- Right-of-use asset measurement at the date of initial application excludes direct costs of lease opening
- Use hindsight to calculate lease duration

3) As a lessor
The Group provides investment property, including property owned, as a lease. The Group classifies these leases as operating leases. The Group does not have to make any adjustments to the lease corresponding to the lessor at the time of transition.

4) Impact on financial statements
The Group recognized additional right-of-use assets and lease liabilities as of January 1, 2019, the date of initial application. The effect on the financial statements as of January 1, 2019, the date of initial application, is as follows:

(In thousands of won)		**2019**
Right-of-use assets presented as property, plant and equipment	₩	49,324,801
Lease liabilities		49,324,801

3. Significant Accounting Policies, Continued

(25) Changes in accounting policies, continued.

4) Impact on financial statements, continued.

When measuring lease liabilities for leases that were classified as operating leases, the Group discounted lease payments using its incremental borrowing rates as of January 1, 2019, the date of initial application, and the weighted-average rate applied is 2.27%.

(In thousands of won)		**2019**
Amount discounted using the incremental borrowing rate as of January 1, 2019, the date of initial application	₩	55,238,155
Leases of low-value assets		(1,263,827)
Leases with less than 12 months of lease term at transition		(4,649,527)
Lease liabilities as of January 1, 2019, the date of initial application		49,324,801

(26) 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, 2019, and the Company has not early adopted them.

The following redeliberations and amendments are not considered to have any significant impact on the Group:

- Revision of the conceptual framework for financial reporting
- Definition of a business (Amendments to K-IFRS No.1103 'Business Combinations')
- Definition of materiality (Amendments to K-IFRS No.1001 'Presentation of Financial Statements' and K-IFRS No.1008 'Accounting Policies, Changes in Accounting Estimates and Errors')
- K-IFRS No.1117 'Insurance Contracts'

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 customers on a regular basis.

The Group sets allowances for estimated losses from accounts receivable and investment 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.

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, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Cash and cash equivalents	₩	1,154,932,009	1,514,712,242
Trade and other receivables, net		2,043,157,696	1,874,354,797
Government bonds		795,725	1,113,525
Non-derivative financial instruments		88,710,928	95,239,953
Guarantee deposits		139,554,621	142,247,800
Total	₩	3,427,150,979	3,627,668,317

The maximum exposure to credit risk for trade and other receivables at the reporting date by geographic region as of December 31, 2019 and 2018 are as follows:

(In thousands of won)		2019	2018
Domestic	₩	415,585,764	463,723,234
Europe		507,757,712	94,748,793
America		304,124,679	374,837,958
China		536,469,214	530,542,155
Other		279,220,327	410,502,657
Total	₩	2,043,157,696	1,874,354,797

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, 2019 and 2018 are as follows:

(In thousands of won)		2019		2018	
		Gross	Impairment	Gross	Impairment
Not past due	₩	1,969,890,556	-	1,820,132,950	-
Past due 1-30 days		68,101,654	-	44,077,618	-
Past due 31-60 days		825,793	-	1,647,922	-
Past due over 61 days		4,339,693	1,872,493	8,496,307	1,805,208
Total	₩	2,043,157,696	1,872,493	1,874,354,797	1,805,208

(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 sufficient 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 is able to redeem its financial liabilities through operating cash flows and cash inflows of financial assets.

Maturity analysis of financial liabilities as of December 31, 2019 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(*)	₩	1,497,465,494	1,499,706,605	1,258,284,414	235,542,175	5,880,016
Short-term borrowings		1,766,474,986	1,794,082,805	1,794,082,805	-	-
Long-term borrowings		1,801,994,890	1,813,407,538	24,160,135	1,789,247,403	-
Total	₩	5,065,935,370	5,107,196,948	3,076,527,354	2,024,789,578	5,880,016

(*)This amount 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 manages the exchange rate risk through currency forward transactions as considered necessary in order to hedge the exchange risk.

Carrying amounts of monetary assets and liabilities expressed as other than functional currency as of December 31, 2019 and 2018 are as follows:

(In thousands of won)		2019			2018		
		USD	**EUR**	**JPY, etc.**	**USD**	**EUR**	**JPY, etc.**
Monetary assets :							
Cash and cash equivalents	₩	160,395,513	738,777	108,346,059	346,810,889	179,220	40,956,898
Trade and other receivables		2,104,882,437	211,883,460	199,754,528	1,896,589,808	77,587,973	190,180,757
Other investments		2,787,351	-	772,539	782,788	-	487,023
Total	₩	2,268,065,301	212,622,237	308,873,126	2,244,183,485	77,767,193	231,624,678
Monetary liabilities:							
Trade and other payables	₩	1,586,702,756	45,782,283	437,774,185	1,188,851,513	77,587,973	190,180,757
Borrowings		1,293,668,136	170,656,643	142,448,642	1,259,179,438	50,719,391	162,945,687
Total	₩	2,880,370,892	216,438,926	580,222,827	2,448,030,951	128,307,364	353,126,444

The following exchange rates were applied during the years ended December 31, 2019 and 2018:

(In Won)		Average rate		Reporting date spot rate	
Currency		**2019**	**2018**	**2019**	**2018**
USD	₩	1,165.16	1,100.10	1,157.80	1,118.10
EUR		1,304.26	1,298.80	1297.43	1,279.20
JPY		10.69	9.96	10.63	10.13

Effects on income (loss) after income taxes as a result of change in exchange rate as of December 31, 2019 and 2018 are as follows:

(In thousands of won)		2019		2018	
Currency		**If increased by 5%**	**If decreased by 5%**	**If increased by 5%**	**If decreased by 5%**
USD	₩	(23,206,382)	23,206,382	(7,725,819)	7,725,819
EUR		(144,652)	144,652	(1,915,472)	1,915,472
JPY, etc.		(10,284,154)	10,284,154	(4,604,917)	4,604,917

4. Financial Risk Management, Continued

(3) Market risk, continued

2) Interest rate risk

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

(i) The interest rate profile of the Group's interest-bearing financial instruments as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Fixed interest rate:			
Short-term borrowings	₩	937,382,877	1,140,979,544
Long-term borrowings		588,869,273	689,097,586
Sub-total		1,526,252,150	1,830,077,130
Floating interest rate:			
Short-term borrowings		829,092,109	598,410,166
Long-term borrowings		1,213,125,617	825,184,415
Sub-total		2,042,217,726	1,423,594,581
Total	₩	3,568,469,876	3,253,671,711

(ii) Fair value sensitivity analysis for fixed rate instruments

Debentures and borrowings 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, 2019 and 2018.

(In thousands of won)		2019		2018	
		If increased by 1%	If decreased by 1%	If increased by 1%	If decreased by 1%
Variable rate instruments	₩	(15,480,010)	15,480,010	(10,790,847)	10,790,847

4. Financial Risk Management, Continued

(3) Market risk, continued

3) Other market price risk

Market price risk arises from the listed equity instruments that the Group possess. Major investments within the portfolio are managed separately and the approval of the Board of Directors is necessary for significant acquisition or sale decisions.

The effect on other comprehensive income (gains/losses on valuation of FVOCI equity instruments, when the price of listed equity financial assets that the Group possess, changed by five percent points as of December 31, 2019 is as follows:

(In thousands of won)

		If increased by 5%	If decreased by 5%
Total comprehensive income, net of tax effect	₩	35,114,104	(35,114,104)

(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)		2019	2018
Debt to equity ratio:			
Total liabilities	₩	7,191,751,253	7,124,501,968
Total equity		12,660,345,195	12,225,219,216
Debt to equity ratio	₩	56.81%	58.28%
Net borrowings to equity ratio:			
Borrowings	₩	3,568,469,876	3,253,671,711
Less : Cash and cash equivalents		(1,156,295,421)	(1,516,585,547)
Less : Short-term financial instruments		(88,667,410)	(95,216,453)
Net borrowings	₩	2,323,507,045	1,641,869,711
Net borrowings to equity ratio		18.35%	13.43%

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, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019		2018	
		Carrying amount	**Fair value**	**Carrying amount**	**Fair value**
Financial assets:					
Assets carried at fair value					
Equity Instruments	₩	1,169,614,322	1,169,614,322	1,364,002,758	1,364,002,758
Derivative financial assets		17,401,776	17,401,776	43,558,311	43,558,311
Subtotal		1,187,016,098	1,187,016,098	1,407,561,069	1,407,561,069
Assets carried at amortized cost					
Cash and cash equivalents		1,156,295,421	1,156,295,421	1,516,585,547	1,516,585,547
Trade receivables and other receivables		2,043,157,696	2,043,157,696	1,874,354,797	1,874,354,797
Government bonds		795,725	795,725	1,113,525	1,113,525
Financial instruments		88,710,928	88,710,928	95,239,953	95,239,953
Guarantee deposits		139,554,621	139,554,621	142,247,800	142,247,800
Subtotal		3,428,514,391	3,428,514,391	3,629,541,622	3,629,541,622
Total financial assets	₩	4,615,530,489	4,615,530,489	5,037,102,691	5,037,102,691
Financial liabilities:					
Liabilities carried at fair value					
Derivative financial liabilities	₩	2,420,075	2,420,075	45,069,392	45,069,392
Liabilities carried at amortized cost					
Borrowings		3,568,469,876	3,275,713,838	3,253,671,711	3,240,875,268
Trade and other payables		1,497,465,494	1,497,465,494	2,067,458,942	2,067,458,942
Subtotal		5,065,935,370	4,773,179,332	5,321,130,653	5,308,334,210
Total financial liabilities	₩	5,068,355,445	4,775,599,407	5,366,200,045	5,353,403,602

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:

	2019	**2018**
Borrowings	1.75%	2.23%

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 available-for-sale 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". "Level 2" consists of currency swap agreement which is classified as derivatives. 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 value of Hanwha Total Petrochemicals Co., Ltd., and Samsung Venture Investment Corporation are estimated in accordance with estimated price per share calculated by the free cash flows to equity method. The Korea Economic Daily are estimated by the continuous probability distribution of value per share in accordance with estimated price per share calculated by the discounted cash flow valuation model and Comparable company valuation multiples.

These unlisted equity securities and derivatives are classed as "Level 3".

The fair values of financial instruments based on the fair value hierarchy as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		Level 1	Level 2	Level 3	Total
December 31, 2019:					
Financial assets					
Equity instruments	₩	926,493,519	-	243,120,803	1,169,614,322
Derivative assets		-	17,401,776	-	17,401,776
Financial liabilities					
Derivative liabilities		-	2,420,075	-	2,420,075
December 31, 2018:					
Financial assets					
Equity Instruments		891,094,121	-	472,908,637	1,364,002,758
Derivative assets		-	11,889,311	31,669,000	43,558,311
Financial liabilities					
Derivative liabilities		-	27,826,392	17,243,000	45,069,392

4. Financial Risk Management, Continued

(6) Transfer of financial assets and others

The list of transferred financial assets which are not derecognized in the statement of financial position as of December 31, 2019 and 2018 are as follows:

(In thousands of won)		Trade receivables	
		2019	2018
Carrying amount of assets	₩	836,836,421	1,068,876,667
Carrying amount of associated liabilities		836,836,421	1,068,876,667

5. Segments Information

(1) Operating segments

1) The Group has three reportable segments, which are summarized as follows:

Segment	Main business
Energy solutions	Rechargeable lithium-ion batteries and other businesses
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. The Group has two reportable segments which offer different products and services. The following table provides information for each reportable segment for the years ended December 31, 2019 and 2018.

(i) 2019

(In thousands of won)		Revenues	Depreciation	Amortization	Operating profit (loss)
Energy solutions	₩	7,719,347,661	658,940,939	46,951,472	55,484,659
Electronic material		2,378,078,503	103,648,796	46,454,953	406,691,803
Total	₩	10,097,426,164	762,589,735	93,406,425	462,176,462

(ii) 2018

(In thousands of won)		Revenues	Depreciation	Amortization	Operating profit (loss)
Energy solutions	₩	6,954,167,609	408,352,680	41,620,101	397,377,836
Electronic material		2,204,104,846	82,807,864	49,459,338	317,592,770
Total	₩	9,158,272,455	491,160,544	91,079,439	714,970,606

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

5. Segments Information, Continued

(2) Geographical information

The Group operates in global markets such as Korea (the Parent Company's domicile), North America, Europe, South America, China, South-eastern Asia, and so on. The following table provides information for each geographical region as of and for the years ended December 31, 2019 and 2018.

(In thousands of won)

		2019		2018	
		Revenue(*1)	Non-current Assets(*2)	Revenue(*1)	Non- current Assets(*2)
Korea	₩	1,343,008,498	3,152,461,143	1,697,356,639	3,145,837,438
North America		1,042,109,437	54,501,306	563,023,579	17,864,563
Europe and South America		2,791,083,237	1,602,154,553	2,029,858,904	1,031,782,491
China		3,017,052,921	1,709,102,316	2,318,196,002	1,211,399,452
South-eastern Asia and etc.		1,904,172,071	334,769,259	2,549,837,331	346,491,148
Consolidation adjustments		-	(441,117,996)	-	(129,044,973)
Total	₩	10,097,426,164	6,411,870,581	9,158,272,455	5,624,330,119

(*1) As described in Note 31, the Group's related party transactions comprise more than 10% of the Group's consolidated revenue.

(*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, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Cash on hand	₩	1,363,412	1,873,305
Demand deposits		1,142,501,509	1,447,542,173
Short-term investments		12,430,500	67,170,069
Total	₩	1,156,295,421	1,516,585,547

7. Trade and Other Receivables

(1) Trade and other receivables as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019		2018	
		Current	Non-current	Current	Non-current
Loans	₩	678,881	27,313,241	882,756	23,293,958
Present value discount		-	(74,934)	-	(198,983)
Other account receivables		112,489,947	58,147	88,811,808	67,839
Accrued income		17,378,322	-	30,335,443	-
VAT receivables		64,959,744	-	234,774,885	-
Trade account receivable		1,821,711,197	515,644	1,498,186,175	6,125
Allowance		(1,872,493)	-	(1,805,208)	-
Total	₩	2,015,345,598	27,812,098	1,851,185,859	23,168,939

(2) Changes in allowance for trade and other receivables for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
		Current	Current
Balance at beginning	₩	1,805,208	9,653,798
(Reversal of) Bad debt expense		38,067	(7,615,518)
Exchange rate fluctuation		29,218	(233,072)
Balance at ending	₩	1,872,493	1,805,208

8. Inventories

(1) Inventories as of December 31, 2019 and 2018 are summarized as follows:

1) 2019

(In thousands of won)		Acquisition cost	Allowance for valuation	Carrying amount
Merchandize	₩	802,274	-	802,274
Finished goods		398,994,644	(30,222,713)	368,771,931
Semi-finished goods		569,890,372	(58,556,240)	511,334,132
Raw materials		550,290,406	(5,546,129)	544,744,277
Supplies		30,927,478	-	30,927,478
Materials-in-transit		250,035,134	-	250,035,134
Other inventories		1,305,303	-	1,305,303
Total	₩	1,802,245,611	(94,325,082)	1,707,920,529

8. Inventories, Continued

(1) Inventories as of December 31, 2019 and 2018 are summarized as follows, continued:

2) 2018

(In thousands of won)		Acquisition cost	Allowance for valuation	Book value
Merchandize	₩	704,860	-	704,860
Finished goods		448,050,974	(42,702,683)	405,348,291
Semi-finished goods		524,016,606	(62,382,552)	461,634,054
Raw materials		647,143,259	(7,207,065)	639,936,194
Supplies		26,041,729	-	26,041,729
Materials-in-transit		210,624,963	-	210,624,963
Other inventories		1,360,742	-	1,360,742
Total	₩	1,857,943,133	(112,292,300)	1,745,650,833

(2) The amount of inventories expensed as cost of sales and loss on valuation of inventories for the years ended December 31, 2019 and 2018 are as follows:

(In thousands of won)		2019	2018
Inventories recognized as cost of sales	₩	7,900,574,155	7,101,571,677
Loss on valuation of inventories		(18,318,704)	16,616,851
Total	₩	7,882,255,451	7,118,188,528

9. Other Investments

(1) Other investments as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019		2018	
		Current	Non-current	Current	Non-current
Government bonds	₩	-	795,725	-	1,113,525
Equity instruments		-	1,169,614,322	-	1,364,002,758
Financial instruments		88,667,410	43,518	95,216,453	23,500
Guarantee deposits		47,094,226	92,460,395	47,948,360	94,299,440
Derivatives financial assets		11,546,297	5,855,479	7,366,255	36,192,056
Total	₩	147,307,933	1,268,769,439	150,531,068	1,495,631,279

9. Other Investments, Continued

(2) Available-for-sale financial assets as of December 31, 2019 and 2018 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, 2019						
FVOCI						
Listed equity instruments	₩	728,380,978	162,713,143	35,399,399	198,112,542	926,493,520
Unlisted equity instruments		18,673,588	14,625,162	6,132,980	20,758,142	39,431,730
Tax effect			(42,915,870)	(10,050,836)	(52,966,706)	
FVTPL						
Unlisted equity instruments		116,339,887	61,474,333	25,874,852	87,349,185	203,689,072
Total	₩	863,394,453	238,812,638	67,407,231	306,219,869	1,169,614,322
December 31, 2018						
FVOCI						
Listed equity instruments	₩	728,380,978	84,930,711	77,782,432	162,713,143	891,094,121
Unlisted equity instruments		18,690,255	15,125,137	(499,975)	14,625,162	33,315,417
Tax effect			(24,213,515)	(18,702,355)	(42,915,870)	
FVTPL						
Unlisted equity instruments		374,839,887	17,545,393	47,207,940	64,753,333	439,593,220
Total	₩	1,121,911,120	117,601,241	124,490,397	242,091,638	1,364,002,758

As of December 31, 2019, the dividend income originated from equity investments designated as measured at FVOCI are ₩12,060 million and ₩18,833 million, respectively

1) The Group estimates fair values of certain unlisted equity securities as follows:

① The fair value of Hanwha General Chemical Co., Ltd. is estimated using the discounted cash flow method in income approach. The acquisition cost and the carrying value of the unlisted security are ₩ 78,672 million and ₩ 116,756 million, respectively, as of December 31, 2019. As mentioned in note 19, the Group entered into a contract with third party regarding this equity instrument.

② The fair value of Samsung Venture Investment Corporation is estimated using the free cash flows to equity method. The acquisition cost and the carrying value of the unlisted security are ₩ 4,900 million and ₩ 12,754 million, respectively, as of December 31, 2019.

③ The fair value of The Korea Economic Daily is estimated using the discounted cash flow model and comparable company valuation multiples. The acquisition cost and the carrying value of the unlisted security are ₩ 9,073 million and ₩ 17,307 million, respectively, as of December 31, 2019.

④ The fair value of iMarket Asia Co., Ltd. is estimated using the free cash flows to equity method. The acquisition cost and the carrying value of the unlisted security are ₩ 4,028 million and ₩ 8,699 million, respectively, as of December 31, 2019.

3) The Group disposed its entire shares in Lotte Advanced Materials Co., Ltd, for ₩ 279,516 million, as of December 31, 2019, thus recognizing a disposal gain of ₩ 1,914 million.

10. Other Current Assets and Non-current Assets

Other current and non-current assets as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019		2018	
		Current	Non-current	Current	Non-current
Advance payments	₩	84,208,171	44,547,669	123,935,188	4,877,247
Prepaid expenses		66,220,706	68,705,466	58,483,957	75,938,013
Prepaid income tax		4,116,539	-	16,140,962	-
Total	₩	154,545,416	113,253,135	198,560,107	80,815,260

11. Equity-method-accounted Investees

(1) The equity-method accounted investees of the Group as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)			2019		2018	
Associates:	Country	Primary business	Percentage of ownership	Carrying amount	Percentage of ownership	Carrying amount
Samsung Display Ltd.("SDC") (*)	Korea	Manufacturing and sale of LCD, OLED	15.2%	6,701,186,392	15.2%	₩ 6,505,550,522
Samsung Economic Research Institute Ltd. ("SERI")	Korea	Management advisory consulting	29.6%	23,636,155	29.6%	25,503,411
Intellectual Keystone Technology ("IKT")	U.S.A	Investing in new technology	41.0%	13,141,203	41.0%	12,389,611
Sungrow-Samsung SDI Energy Storage Power Supply Co., Ltd. ("SSEP")	China	Manufacturing ESS products	35.0%	4,889,153	35.0%	1,866,870
Samsung SDI-Sungrow Energy Storage Battery Co., Ltd. ("SSEB")	China	Manufacturing ESS products	35.0%	8,357,248	-	-
SD Flex Co., Ltd.	Korea	Manufacturing printed-circuit board	50.0%	11,966,978	50.0%	9,323,354
Total				₩ 6,763,177,129		₩ 6,554,633,768

(*) 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.

Fiscal year of equity-method accounted investees ended on December 31, 2019.

11. Equity-accounted Investees, Continued

(2) The summarized financial information of equity-accounted investees as of and for the years ended December 31, 2019 and 2018 are summarized as follows:

1) 2019

(In thousands of won)		SDC	SERI	IKT	SSEP	SSEB	SDFLEX
Current assets	₩	23,388,389,330	75,570,478	13,516,215	90,669,059	18,467,322	20,135,771
Non-current assets		30,343,283,955	52,702,631	18,535,499	12,699,895	12,821,100	7,620,781
Current liabilities		5,482,650,298	34,553,392	-	87,920,717	6,285,513	3,822,597
Non-current liabilities		3,687,057,254	13,867,841	-	1,479,230	1,414,338	-
Revenue		30,957,776,243	176,004,388	7,282,249	101,536,997	30,001,297	26,252,892
Operating profit (loss)		1,466,735,240	(941,192)	919,303	7,974,411	489,832	6,545,279
Net income (loss)		1,139,753,745	432,133	765,023	8,198,395	594,794	5,393,754
Other comprehensive income (loss)		161,547,439	6,621,952	-	-	-	-
Total comprehensive income (loss)		1,301,301,184	7,054,085	765,023	8,198,395	594,794	5,393,754

2) 2018

(In thousands of won)		SDC	SERI	IKT	SSEP	SDFLEX
Current assets	₩	20,137,873,075	77,638,726	6,698,978	67,609,408	15,731,053
Non-current assets		34,344,307,576	59,720,495	23,519,847	11,535,025	4,697,949
Current liabilities		5,960,610,855	32,168,129	263	72,150,369	1,772,868
Non-current liabilities		5,265,107,910	19,030,919	-	1,660,152	9,426
Revenue		32,316,000,634	175,168,616	6,875,380	61,394,893	7,776,611
Operating profit (loss)		2,522,064,806	194,912	816,296	3,240,371	(340,838)
Net income (loss)		2,238,291,215	312,489	632,066	3,239,620	(52,379)
Other comprehensive income		(57,236,007)	7,813,202	1,245,680	(1,125,467)	-
Total comprehensive income (loss)		2,181,055,208	8,125,691	1,877,746	2,114,153	(52,379)

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, 2019 and 2018 are summarized as follows:

1) 2019

(In thousands of won)	SDC	SERI	IKT	SSEP	SSEB	SDFLEX
Net assets (a)(*)	₩44,021,178,292	79,851,876	32,051,714	13,969,008	23,588,571	23,933,955
Percentage of ownership(b)	15.22%	29.60%	41.00%	35.00%	35.43%	50.00%
Equity to net assets(axb)	6,701,186,392	23,636,155	13,141,203	4,889,153	8,357,248	11,966,978
Carrying amount	6,701,186,392	23,636,155	13,141,203	4,889,153	8,357,248	11,966,978

2) 2018

(In thousands of won)	SDC	SERI	IKT	SSEP	SDFLEX
Net assets(a)(*)	₩42,736,122,658	86,160,173	30,218,562	5,333,912	18,646,708
Percentage of ownership(b)	15.20%	29.60%	41.00%	35.00%	50.00%
Equity to net assets(axb)	6,505,550,522	25,503,411	12,389,611	1,866,870	9,323,354
Carrying amount	6,505,550,522	25,503,411	12,389,611	1,866,870	9,323,354

(*) Net asset of equity-accounted investees owned by the controlling interests.

(4) Changes in investments in equity-accounted investees for the years ended December 31, 2019 and 2018 are as follows:

1) 2019

(In thousands of won)

Company	January 1, 2019	Acquisition	Share of profits(loss)	Other capital movements	December 31, 2019
SDC	₩ 6,505,550,522	-	172,400,743	23,235,127	6,701,186,392
SERI	25,503,411	-	92,842	(1,960,098)	23,636,155
IKT	12,389,611	-	313,659	437,933	13,141,203
SSEP	1,866,870	-	2,869,438	152,845	4,889,153
SSEB	-	8,063,190	309,425	(15,367)	8,357,248
SDFLEX	9,323,354	-	2,643,624	-	11,966,978
Total	₩ 6,554,633,768	8,063,190	178,629,731	21,850,440	6,763,177,129

11. Equity-accounted Investees, Continued

(4) Changes in investments in equity-accounted investees for the years ended December 31, 2019 and 2018 are as follows, continued:

2) 2018

(In thousands of won)

Company		January 1, 2018	Share of profits(loss)	Other capital movements	December 31, 2018
SDC	₩	6,175,255,630	339,622,384	(9,327,492)	6,505,550,522
SERI		23,130,678	60,025	2,312,708	25,503,411
IKT		11,619,735	259,147	510,729	12,389,611
SSEP		-	2,260,783	(393,913)	1,866,870
SDFLEX		9,343,869	(20,515)	-	9,323,354
Total	₩	6,219,349,912	342,181,824	(6,897,968)	6,554,633,768

(5) None of the equity-accounted investees is a listed company as of December 31, 2019.

(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.

(7) No contingent liability related to equity-accounted investees exists as of December 31, 2019.

12. Property, Plant and Equipment

Changes in property, plant and equipment for the years ended December 31, 2019 and 2018 are summarized as follows:

(1) 2019

(In thousands of won)

	Land	Buildings and structures	Machinery	Tools, furniture and fixtures	Right-of-use assets	Construction in progress	Total
Beginning balance	₩305,786,793	1,217,761,158	1,348,032,153	175,990,846	-	1,560,763,039	4,608,333,989
Acquisition cost	305,786,793	2,756,931,139	3,514,583,785	589,544,011	-	1,560,763,039	8,727,608,767
Accumulated depreciation	-	(1,539,169,981)	(2,166,551,632)	(413,553,165)	-	-	(4,119,274,778)
Acquisitions and capital expenditure	-	-	-	-	49,324,801	-	49,324,801
IFRS 16 Effects (January 1, 2019)	21,467,962	91,973,924	681,801,511	51,055,863	8,452,728	1,333,645,092	2,188,397,080
Depreciation	-	(94,896,236)	(541,194,027)	(106,662,008)	(19,373,595)	-	(762,125,866)
Disposals	(257,271)	(2,861,125)	(58,964,813)	(22,775,544)	-	(3,350,729)	(88,209,482)
Impairment losses	-	(1,069,511)	(15,192,036)	(11,857,699)	-	-	(28,119,246)
Government grant	-	(6,728,430)	(29,707,444)	-	-	-	(36,435,874)
Other	3,815,584	178,633,585	644,799,416	78,383,964	-	(1,565,962,752)	(660,330,203)
Exchange rate fluctuation	794,829	177,852,925	(65,930,914)	30,908,064	(1,718,982)	14,102,053	156,007,975
Ending balance	₩ 331,607,897	1,560,666,290	1,963,643,846	195,043,486	36,684,952	1,339,196,703	5,426,843,174
Acquisition cost	331,607,897	3,201,437,307	4,556,832,769	650,071,442	56,058,547	1,339,196,703	10,135,204,665
Accumulated depreciation	-	(1,640,771,017)	(2,593,188,923)	(455,027,956)	(19,373,595)	-	(4,708,361,491)

Other amounts include reclassification of construction-in-progress to appropriate accounts such as investment property, property, plant and equipment, and expense accounts.

The Group recognized impairment loss as the estimated recoverable amount of assets in certain business segments is less than the carrying amount.

The Group has changed its estimate of expected service life for some machines from the previous 3 to 8 years to 6 years. The expected effects of the depreciation cost due to the change in the estimate are as follows.

(In thousands of won)

		19-year depreciation	20-year depreciation	21-year depreciation	22-year depreciation	After 23 years
Existing useful life	₩	96,896,861	93,345,851	92,032,732	89,556,096	255,950,848
Changed useful life		145,482,022	139,152,245	132,148,751	117,455,368	93,544,002
Difference		48,585,161	45,806,394	40,116,019	27,899,272	(162,406,846)

12. Property, Plant and Equipment, Continued

(2) 2018

(In thousands of won)

		Land	Buildings and structures	Machinery	Tools, furniture and fixtures	Construction in progress	Total
Beginning balance	₩	277,183,588	1,200,577,455	810,624,946	126,610,988	515,342,349	2,930,339,326
Acquisition cost		277,183,588	2,701,066,541	2,732,963,107	490,386,136	515,342,349	6,716,941,721
Accumulated depreciation		-	(1,500,489,086)	(1,922,338,161)	(363,775,148)	-	(3,786,602,395)
Acquisitions and capital expenditure		7,090	37,418,801	291,141,096	54,581,287	1,897,468,318	2,280,616,592
Depreciation		-	(88,142,929)	(318,619,330)	(84,212,635)	-	(490,974,894)
Disposals		(786,528)	(6,840,215)	(36,893,807)	(3,443,023)	(1,214,161)	(49,177,734)
Impairment losses		-	(1,981,358)	(12,342,943)	(4,149,975)	-	(18,474,276)
Government grant		-	(1,298,000)	(40,611,396)	-	-	(41,909,396)
Reclassification to held-for-sale assets		-	(6,797,953)	(2,937,725)	(550,068)	-	(10,285,746)
Other		28,941,031	85,078,254	645,595,093	86,036,784	(834,539,437)	11,111,725
Exchange rate fluctuation		441,612	(252,897)	12,076,219	1,117,488	(16,294,030)	(2,911,608)
Ending balance	₩	305,786,793	1,217,761,158	1,348,032,153	175,990,846	1,560,763,039	4,608,333,989
Acquisition cost		305,786,793	2,756,931,139	3,514,583,785	589,544,011	1,560,763,039	8,727,608,767
Accumulated depreciation		-	(1,539,169,981)	(2,166,551,632)	(413,553,165)	-	(4,119,274,778)

Other amounts include reclassification of construction-in-progress to appropriate accounts such as investment property, property, plant and equipment, and expense accounts.

The Group recognized impairment loss as the estimated recoverable amount of assets in certain business segments is less than the carrying amount.

13. Intangible Assets

Changes in intangible assets for the years ended December 31, 2019 and 2018 are summarized as follows:

(1) 2019

(In thousands of won)		Industrial property	Development costs	Others	Goodwill	Total
Beginning balance	₩	60,881,187	884,037	200,316,933	604,188,963	866,271,120
Acquisition cost		126,493,194	6,316,943	747,326,114	633,511,944	1,513,648,195
Accumulated depreciation		(65,612,007)	(5,432,906)	(547,009,181)	(29,322,981)	(647,377,075)
Acquisitions		1,624,704	-	3,492,549	-	5,117,253
Amortization		(10,252,730)	(450,693)	(82,703,002)	-	(93,406,425)
Disposals		(186,987)	-	-	-	(186,987)
Impairment losses		-	-	(1,134)	-	(1,134)
Other		11,785,380	-	37,620,028	-	49,405,408
Exchange rate fluctuation		(212,016)	14,988	2,885,784	1,482,671	4,171,427
Ending balance	₩	63,639,538	448,332	161,611,158	605,671,634	831,370,662
Acquisition cost		139,504,276	6,331,932	791,090,316	634,994,615	1,571,921,139
Accumulated depreciation		(75,864,738)	(5,883,600)	(629,479,158)	(29,322,981)	(740,550,477)

Other amounts include reclassification of long-term prepaid expenses to industrial property rights and of construction-in-progress to other intangible assets.

13. Intangible Assets, Continued

Changes in intangible assets for the years ended December 31, 2019 and 2018 are summarized as follows: continued

(2) 2018

(In thousands of won)		Industrial property	Development costs	Others	Goodwill	Total
Beginning balance	₩	55,743,792	1,326,148	236,181,041	604,196,267	897,447,248
Acquisition cost		112,222,676	6,310,265	701,458,536	633,519,248	1,453,510,725
Accumulated depreciation		(56,478,884)	(4,984,117)	(465,277,495)	(29,322,981)	(556,063,477)
Acquisitions		856,690	-	11,151,622	-	12,008,312
Amortization		(9,133,123)	(448,789)	(81,497,527)	-	(91,079,439)
Disposals		(306,017)	-	(2,456,351)	-	(2,762,368)
Impairment losses		-	-	(234,159)	-	(234,159)
Other		13,997,451	-	40,503,299	-	54,500,750
Exchange rate fluctuation		(277,606)	6,678	(3,330,992)	(7,304)	(3,609,224)
Ending balance	₩	60,881,187	884,037	200,316,933	604,188,963	866,271,120
Acquisition cost		126,493,194	6,316,943	747,326,114	633,511,944	1,513,648,195
Accumulated depreciation		(65,612,007)	(5,432,906)	(547,009,181)	(29,322,981)	(647,377,075)

Other amounts include reclassification of long-term prepaid expenses to exclusive industrial property rights and of construction-in-progress to other intangible assets.

For the year ended December 31, 2019, the Group has recognized impairment loss since the recoverable amount of intangible assets of some divisions is expected to be lower than the carrying amount.

(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, 2019 and 2018 are ₩ 712,409 million and ₩ 603,952 million, respectively.

13. Intangible Assets, Continued

(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 9.99% and 11.62% 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 as the estimated recoverable amount exceeded its carrying amount.

As of December 31, 2019, the Group has allocated ₩ 500,381 million of its goodwill to its electronic material business, and ₩ 105,291 million to Novaled.

14. Investment Property

Changes in investment property for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)	2019			2018		
	Land	**Buildings**	**Total**	**Land**	**Buildings**	**Total**
Beginning balance	₩ 146,197,672	3,527,342	149,725,014	146,201,787	3,712,991	149,914,778
Reclassification	1,250,167	3,193,779-	4,443,946	-	-	-
Disposal	-	-	-	(4,115)	-	(4,115)
Depreciation	-	(512,214)	(512,214)	-	(185,649)	(185,649)
Ending balance	₩ 147,447,839	6,208,907	153,656,746	146,197,672	3,527,342	149,725,014

Investment property consists of land and buildings, leased to Samsung Electronics Co., Ltd. and etc. The detail of rental income from investment property for the years ended December 31, 2019 is ₩ 4,556 million.

15. Trade Payables and Other Liabilities

Trade payables and other liabilities as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019			2018		
		Current	Non-current	Total	Current	Non-current	Total
Trade payables	₩	611,583,693	-	611,583,693	638,586,622	-	638,586,622
Accounts payable		406,702,400	85,628	406,788,028	695,709,155	406,967	696,116,122
Accrued expenses		306,283,855	6,032,725	312,316,580	342,473,090	2,023,308	344,496,398
Lease Liabilities		14,044,841	22,606,387	36,651,228	-	-	-
Other(*)		497,185,362	309,742,772	806,928,134	468,306,187	288,882,389	757,188,576
Total	₩	1,835,800,151	338,467,512	2,174,267,663	2,145,075,054	291,312,664	2,436,387,718

(*) Other liabilities include provisions, withholdings, guarantee deposits received, etc.

16. Borrowings

(1) Borrowings of the Group as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Short-term borrowings			
Current portion of debentures in Korean won	₩	99,940,992	-
Current portion of long-term borrowings in foreign currency		451,810,178	249,649,393
Disposals of trade receivable		836,836,421	1,068,876,667
Short-term borrowings in foreign currency		377,887,395	1,739,389,710
Sub total		1,766,474,986	1,739,389,710
Long-term borrowings			
Debentures		588,869,273	688,244,816
Long-term borrowings in foreign currency		1,213,125,617	826,037,185
Sub total		1,801,994,890	1,514,282,001
Total	₩	3,568,469,876	3,253,671,711

(2) Debentures issued by the Parent company as of December 31, 2019 and 2018 are as follows:

(In thousands of won)

Type	Classification	Date of maturity	Annual Interest rate (%)		2019	2018
Corporate Bonds	Unsecured	2020.09.14	2.20		100,000,000	100,000,000
		2021.09.10	2.20		370,000,000	370,000,000
		2023.09.11	2.41		220,000,000	220,000,000
Sub total					690,000,000	690,000,000
Less discount on debentures					(1,189,735)	(1,755,184)
Less current portion of long-term borrowings					(99,940,992)	-
Total				₩	588,869,273	688,244,816

16. Borrowings, Continued

(3) Short-term borrowings in foreign currency as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)

Borrower	Description	Financial institution	Date of maturity	Annual interest rate (%)		2019	2018
SDIBS	Operation fund	Sumitomo Mitsui Banking	2020.07.08	EURIBOR 3M+0.84		11,549,137	1,279,160
SDIA	Operation fund	Bank of America	2020.06.18	LIBOR 6M+0.95		21,998,200	12,299,100
SDIHU	Operation fund	Citi Bank	2020.10.01	EURIBOR+0.5		60,458,114	-
SDIEM	Operation fund	Standard Chartered Bank	2020.03.10	LIBOR 6M+0.90		23,156,000	44,724,000
	Operation fund	Citi Bank	2020.01.13	LIBOR 3M+0.90		11,578,000	44,724,000
SDIW	Operation fund	Australia and New Zealand Bank	2020.02.28	LIBOR 3M+0.90		23,142,076	71,044,567
TSDI	Operation fund	Bank of Communication	2020.03.26	LIBOR 3M+0.90		19,711,993	80,877,476
	Operation fund	HSBC	2020.02.28	LIBOR 3M+0.75		21,213,244	-
SAPB	Operation fund	Standard Chartered Bank	2020.03.24	LIBOR 3M+0.90		115,726,989	-
	Operation fund	Kookmin Bank China Limited	2019.06.06	LIBOR 3M+0.80		-	32,552,000
	Operation fund	Unicredit S.p.A	2019.06.11	LIBOR 6M+0.85		-	42,073,730
	Operation fund	UNITED OVERSEAS BANK LIMITED	2019.03.26	LIBOR 3M+0.80		-	78,138,782
SCPB	Operation fund	Kookmin Bank China Limited	2019.05.10	LIBOR 3M+0.80		-	2,766,920
	Operation fund	Bank of Communication	2020.05.28	LIBOR 3M+0.90		28,158,005	-
SDITB	Operation fund	MIZUHO BANK CHINA, LTD.	2020.02.28	LIBOR 3M+0.90		5,448,322	-
	Operation fund	Woori Bank China Limited	2020.09.28	LIBOR 3M+0.88		21,556,638	-
Novaled	Operation fund	Shinhan Bank GmbH	2020.02.23	LIBOR 2M+0.95		6,946,800	5,634,527
	Operation fund	Ostsachsische Sparkasse Dresden	2020.12.30	LIBOR 3M+1.2		7,243,877	4,749,388
Total					₩	377,887,395	420,863,650

16. Borrowings, Continued

(4) Long-term borrowings in foreign currency as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)

Borrower	Description	Financial institution	Date of maturity	Annual interest rate (%)		2019	2018
SDIBS	Facility loan	Sumitomo Mitsui Banking Corp. Europe Limited	2021.04.30	EURIBOR 3M+0.78		57,086,920	67,795,480
NOVALED	Energy saving loan	Ostsachsische Sparkasse Dresden	2020.12.30	LIBOR 3M+0.95		115,623,539	1,065,964
TSDI	Facility loan	UNITED OVERSEAS BANK	2020.09.17	LIBOR 3M+0.95		115,623,539	111,705,444
		MIZUHO BANK CHINA, LTD.	2020.12.17	LIBOR 3M+0.95		46,202,477	44,478,290
SDIHU	Facility loan	Unicredit Bank	2020.07.16	EURIBOR 3M+0.80		-	249,436,200
			2021.05.28	EURIBOR 6M+0.65		389,229,000	383,748,000
		Raiffeisen	2023.12.20	EURIBOR 6M+0.79		259,486,000	-
		ING	2020.11.18	EURIBOR 6M+0.65		220,563,100	217,457,200
		THE EXPORT-IMPORT BANK OF KOREA	2022.12.13	EURIBOR 6M+0.55		252,998,850	-
SDITB	Facility loan	SHINHAN BANK	2020.12.30	LIBOR 3M+1.10		115,623,539	-
		HSBC	2021.06.09	LIBOR 3M+0.90		92,498,831	-
Sub total						1,664,935,795	1,075,686,578
Less current portion of long-term borrowings						(451,810,178)	(249,649,393)
Total					₩	1,213,125,617	826,037,185

17. Provisions

Changes in provisions for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)

		Current			Non-current				
		Quality assurance	Onerous contract	Others	Incentives	Quality assurance	Onerous contract	Others	Total
Balance at Jan. 1, 2018	₩	128,802,069	29,708,531	1,510,209	9,734,670	9,077,912	9,997,291	8,859,942	197,690,624
Provisions made		135,535,778	25,391,055	1,240,679	23,531,655	-	15,393,764	184,132	201,277,063
Provisions used		(114,871,842)	(44,230,829)	-	-	(251,570)	(25,391,055)	(8,712,691)	(193,457,987)
Balance at Dec. 31,2018	₩	149,466,005	10,868,757	2,750,888	33,266,325	8,826,342	-	331,383	205,509,700
Balance at Jan. 1, 2019	₩	149,466,005	10,868,757	2,750,888	33,266,325	8,826,342	-	331,383	205,509,700
Provisions made		300,428,978	-	2,396,175	27,651,574	18,354,883	-	2,721,679	351,553,289
Provisions used		(95,383,352)	(10,868,757)	(929,364)	(20,600,000)	(15,532,824)	-	(24,157)	(143,338,454)
Balance at Dec. 31,2019	₩	354,511,631	-	4,217,699	40,317,899	11,648,401	-	3,028,905	413,724,535

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

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

The Group recognized provision for estimated net loss from onerous contract, as unavoidable incremental cost regarding non-cancellable long-term contracts with customers are expected to exceed their economic benefit.

Other than provisions stated above, the Group recognized provision for litigations and restructuring expenses. As stated in Note 19 to the consolidation financial statements, details of provisions for litigations and restructuring are not disclosed as it may affect the result of pending litigations and further proceedings of restructuring process.

18. Employee Benefits

(1) Employee benefit liabilities as of December 31, 2019 and 2018 are summarized as follows:

1) Present value of defined obligations

(In thousands of won)		2019	2018
Defined Benefit Obligations:			
Beginning balance	₩	572,156,310	505,016,399
Current service cost		66,051,488	60,786,053
Interest cost		17,484,142	17,870,995
Obligations transferred from(to) related parties		2,503,166	(252,864)
Gross benefit payments		(8,022,440)	(16,228,491)
Actuarial loss (gain) arising from assumptions		(12,204,062)	21,061,106
Contribution to the defined contribution plan		(13,271,914)	(16,122,900)
Exchange rate fluctuations		(99,247)	26,012
Ending balance	₩	624,597,443	572,156,310
Plan Assets		(563,108,283)	(502,009,556)
Net defined benefit liability		61,489,160	70,146,754

2) Fair value of plan assets

(In thousands of won)		2019	2018
Beginning balance	₩	502,009,556	479,394,771
Contributions paid into plan		67,173,512	40,279,967
Obligations paid by the plan		(4,886,459)	(10,151,633)
Plan assets transferred from(to) related parties		(13,271,914)	(34,584)
Contribution to the defined contribution plan		15,573,639	(16,122,900)
Interest income		(5,778,799)	17,238,899
Actuarial gain (loss) arising from assumptions		2,248,542	(8,753,975)
Exchange rate fluctuations		40,206	159,011
Ending balance	₩	563,108,283	502,009,556

3) Other liabilities for employee benefits as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Liabilities for paid absence	₩	55,701,037	48,083,997
Long-term incentive provisions		39,467,743	32,397,700
Other long-term employee benefits		44,993,595	41,633,742
Total	₩	140,162,375	122,115,439

18. Employee Benefits, Continued

(2) Expenses for employee benefits for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Current service costs	₩	66,051,488	60,786,053
Interest cost		17,484,142	17,870,995
Interest income		(15,523,056)	(17,238,899)
Payment on defined contribution plans		6,973,690	3,274,971
Total	₩	74,986,264	64,693,120

(3) Fair value of plan assets as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Severance insurance bonds (*)	₩	562,826,133	501,726,826
National pension fund		282,150	282,730
Total	₩	563,108,283	502,009,556

(*) Plan assets include bank deposits, investment in government securities and corporate bond, etc.

(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, 2019 and 2018 are summarized as follows:

	2019	2018
Expected rate of salary increase	4.71%	4.85%
Discount rate for defined benefit obligations	3.07%	3.20%

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, 2019, 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	₩	50,245,626	(44,872,068)
Discount rate		(43,980,997)	50,141,313

19. Commitment and Contingencies

(1) As of December 31, 2019, the Group has been provided a guarantee of ₩ 118,007 million by Seoul Guarantee Insurance Co., Ltd. in relation to a court deposit and licensing procedures.

(2) The Group is defending several claims in North America and Europe related to price fixing of CRT and lithium-ion batteries. The Group has estimated its potential loss, 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) and (3) of this note to the consolidated financial statements, the Group is defendant of 79 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 following borrowing commitments as of December 31, 2019.

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

	Currency	Credit limit	Name of financial institution
Bank overdrafts	KRW	55	Woori Bank and one other bank.
General purpose loans	KRW	350	KEB Hana Bank
	USD	578,157	Shinhan Bank and eight other banks
	CNY	2,480,000	Woori Bank and two other banks
	EUR	14,000	SMBC and 1 Bank
Trade financing(Local L/C)	KRW	350	Shinhan Bank and two other banks
A/S, Usance	USD	55,600	Woori Bank and three other banks
Loans for Import trade	USD	30,000	DBS
Guarantee payments for foreign currency	USD	160,000	Woori Bank and three other banks
D/A, D/P, O/A	USD	1,654,000	Woori Bank and seven other banks
Secured loan of credit sales	KRW	1,376	Woori Bank and five other banks
Total	KRW	2,131	
	USD	2,423,757	
	CNY	2,480,000	
	EUR	14,000	

(5) In accordance with technical license agreements, the Group recorded royalty expenses of ₩ 20,749 million and ₩ 1,344 million for the years ended December 31, 2019 and 2018, respectively.

(6) As of December 31, 2019, the Group provides a guarantee of ₩ 8,868 million for its employees' borrowings for house rental.

(7) In accordance with the Share Purchase Agreement between Hanwha Solutions Corporation (formerly, Hanwha Chemical Corporation), Hanwha Energy Corporation (together referred as "the Buyer") and the Group, dated November 26, 2014, if Hanwha General Chemical Co., Ltd. ("HGC") does not complete its public offerings within 6 years period beginning June 29, 2015, the Group and the Buyer owns put option and call option on the Group's 1,721,156 shares of HGC respectively. The exercise period of the options may be extended to 7 years, upon request of the Group. In case of the Group's decision to sell its HGC shares, the Buyer has pre-emptive right to purchase the Group's shares. The Group has sympathetic selling right when the Buyer decides to sell its HGC shares, while the Buyer has right to request the Group for sympathetic sale of the shares.

The Group did not measure the fair value of the options, as basis for fair value evaluation is unreliable and it may result in distortion of the fair value.

19. Commitment and Contingencies, Continued

(8) As of December 31, 2019, 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 applies cash flow hedges and fair value hedge accounting in accordance with the entity's GAAP, and derivatives that are not effective in hedging gains and losses are 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 by the counterparty.

Details of the Group's foreign exchange forwards are as follows:

(In CNY, USD)

Subsidiaries	Selling Currency	Selling Amount	Buying Currency	Buying Amount	Forward Rate	Expiry
SAPB	CNY	517,680,000	USD	80,000,000	6.47	2020-04-10
	CNY	130,000,000	USD	20,000,000	6.5	2020-04-10
	CNY	139,556,000	USD	20,000,000	6.98	2020-06-15
	CNY	289,440,000	USD	40,000,000	7.24	2021-10-14
	CNY	216,900,000	USD	30,000,000	7.23	2021-10-21
TSDI	CNY	135,102,000	USD	20,000,000	6.76	2020-12-17

As of December 31, 2019, the net carrying amount of the foreign exchange forwards is ₩ 7,201 million, and the Group recognized gain and loss on valuation of derivatives that are not effective in hedging gains and losses are recognized in profit or loss amounting ₩ 4,970 million and ₩ 7,239 million, respectively. The Group also recognized profit or loss from settlement of foreign exchange forward amounting ₩ 1,182 million and ₩ 73 million, respectively.

(9) 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:

Expiry	Remaining Quantity	Contract Price
2020-08-31	2,000 ton	USD 12,800/ton

As of December 31, 2019, the net carrying amount of the commercial swap is ₩ 3,174 million, and the Group recognized effective portion of loss on valuation of derivatives amounting ₩ 21,845 million as other comprehensive income, net of tax.

19. Commitment and Contingencies, Continued

(10) The Group entered into a currency swap agreement with HSBC Bank (China) Company Limited to hedge the risk of exchange rate changes and interest rate changes that would occur in the event of principal and interest repayment of foreign currency variable rate borrowings during the current term. The details of currency swap contracts entered into by the group as of the end of the current term are as follows:

(In CNY, USD)

Subsidiary	Currency swap amount (USD)	Settlement exchange rate	USD interest rate	CNY interest rate	Transaction purpose	Expiry
SDITB	85,000,000	6.7	LIBOR3M+110	3.89	Fair value hedge	2021-03-12
	15,000,000	6.72	LIBOR3M+110	4.14	Fair value hedge	2021-03-12
	40,000,000	6.89	LIBOR3M+90	3.56	Fair value hedge	2021-06-09
	20,000,000	6.88	LIBOR3M+90	3.52	Fair value hedge	2021-06-09
	11,000,000	7.15	LIBOR3M+90	3.27	Fair value hedge	2021-06-09
	9,000,000	7.1	LIBOR3M+90	3.52	Fair value hedge	2021-06-09
TSDI	10,000,000	6.92	LIBOR3M+95	3.84	Fair value hedge	2020-12-17
	30,000,000	6.88	LIBOR3M+95	3.38	Fair value hedge	2020-12-17

With the currency swap contract, the principal of the loan is paid the USD at the contract date, the CNY exchanged at the agreed exchange rate, and the transaction against the date of the loan is carried out at maturity.

In addition, it is required to collect variable interest rates on the promised USD of the borrowings and to pay a fixed rate on the CNY contracted in the currency swap contract.

And as of December 31, 2019, the Group recognized gain and loss on valuation of derivatives amounting ₩ 5,333 million and ₩ 491 million, respectively.

20. Capital Stock and Capital Surplus

(1) Capital stock

Ordinary shares and preferred shares issued and outstanding as of December 31, 2019 and 2018 are summarized as follows:

1) 2019

(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) 2018

(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) Capital surplus as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Additional paid-in-capital	₩	4,838,555,882	4,838,550,738
Other capital surpluses		163,418,811	199,386,046
Total	₩	5,001,974,693	5,037,936,784

(3) Dividends by the Parent Company for the reporting periods ending December 31, 2019 and 2018 are summarized as follows. Dividends for the year ended December 31, 2019 will be presented to the general shareholders' meeting of the Parent Company.

(In thousands of won)		2019	2018
Ordinary shares (2019: ₩1,000 per share, 2018: ₩1,000 per share)	₩	65,433,139	65,433,139
Preferred shares (2019: ₩1,050 per share, 2018: ₩1,050 per share)		1,511,471	1,511,471
	₩	66,944,610	66,944,610

21. Other capital

Other capital comprise treasury shares of the Parent Company, which were acquired to raise value of its shareholders. Number of treasury shares and its carrying amount as of December 31, 2019 and 2018 are as follows:

(In thousands of won)	2019			2018		
	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. OCI accumulated in reserves

OCI accumulated in reserves, net of tax, as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Equity instruments at FVOCI – net change in fair value	₩	165,903,979	134,422,435
Cash flow hedges – effective portion of changes in fair value		2,405,607	(19,439,526)
Unrealized gain on equity method investments		613,637,673	598,594,263
Unrealized loss on equity method investments		(287,181,586)	(288,737,798)
Loss on translation of foreign operations		(90,252,669)	(151,370,959)
Loss on translation of foreign operations – Held for sale		-	(1,478,755)
Total	₩	404,513,004	271,989,660

23. Retained earnings

(1) Retained earnings as of December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Legal reserve	₩	159,198,482	152,012,652
Discretionary reserve		5,401,128,000	4,578,728,000
Unappropriated retained earnings		1,346,541,996	1,881,775,102
Total	₩	6,906,868,478	6,612,515,754

23. Retained earnings, Continued

(2) Statement of retained earnings of the Parent Company for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019		2018	
(i) Unappropriated retained earnings	₩		205,046,245		896,042,112
- Retained Earnings from Previous Year		3,041		9,811	
- Defined benefit plan actuarial gain		5,374,683		(22,777,851)	
- Change in accounting policies		-		392,973,236	
- Profit for the Year		199,668,522		525,836,916	
(ii) Transfer of discretionary reserve			-		-
(iii) Changed retained earnings			(205,039,071)		(896,039,071)
- Legal reserve		(6,694,461)		(6,694,461)	
- Dividends		(66,944,610)		(66,944,610)	
- Reserve of facility		(131,400,000)		(822,400,000)	
Total	₩		7,174		3,041

24. Selling, General, and Administrative Expenses

Details of selling, general and administrative expenses for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Salaries and wages	₩	231,432,116	238,118,363
Severance and retirement benefits		13,232,175	12,704,728
Employee fringe benefits		78,447,954	69,725,845
Depreciation		92,098,023	92,089,503
Research and development expenses		712,409,371	603,952,111
Selling and distribution cost		74,529,270	71,635,677
Fees and commissions		117,063,108	91,313,845
(Reversal of)Bad debt expenses		32,684	(7,670,218)
Others		433,749,550	153,243,466
Total	₩	1,752,994,251	1,325,113,320

25. The Nature of Expenses

The nature of expenses for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Salaries and wages	₩	1,062,899,844	977,764,132
Severance and retirement benefits		74,780,220	64,182,933
Employee benefits		332,562,819	297,369,417
Depreciation		762,589,735	491,160,544
Amortization		93,406,425	91,079,439
Total	₩	2,326,239,043	1,921,556,465

26. Other Income and Other Expenses

(1) Other income for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Dividends income	₩	17,560,342	25,532,902
Commission income		46,178	-
Rental income		72,275	-
Reversal of other bad debt expenses		20,034	20,590
Gain on sale of property, plant and equipment		10,122,453	1,046,035
Gain on sale of intangible assets		8,385	155,930
Gain on sale of investment property		-	79,295
Gain on sale of non-current assets held-for-sale		13,938,674	-
Miscellaneous income		40,951,999	100,267,946
Total	₩	82,720,340	127,102,698

(2) Other expenses for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Loss on disposal of subsidiaries	₩	11,625,143	21,112,944
Donations		4,774,422	3,170,710
Loss on sale of property, plant and equipment		26,903,449	52,142,372
Loss on impairment of property, plant and equipment		28,119,246	18,474,276
Loss on sale of intangible assets		138,087	379,703
Loss on impairment of intangible assets		1,134	234,159
Loss on sale of non-current assets held-for-sale		-	11,329,145
Legal expenses and other miscellaneous expenses		18,063,236	86,627,356
Total	₩	89,624,717	193,470,665

27. Financial Income and Financial Cost

Finance income and costs for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Financial income			
Interest income	₩	18,382,213	18,136,500
- Bank deposit		13,466,851	14,450,578
- Other		4,915,362	3,685,922
Gain on foreign currency transaction		236,025,831	196,700,664
Gain on foreign currency translation		27,170,612	20,529,087
Gain on valuation of derivatives		10,303,161	21,874,134
Gain on transaction of derivatives		1,182,418	1,311,824
Gain on valuation of financial assets at fair value through profit or loss		17,873,374	123,202,488
Gain on disposal of financial assets at fair value through profit or loss		3,473,468	2,409,619
Subtotal		314,411,077	384,164,316
Financial expense			
Interest expense		82,174,764	51,759,499
- Borrowing		56,531,287	39,597,670
- Debentures		16,162,946	9,475,129
- Other		9,480,531	2,686,700
Loss on foreign currency transactions		234,397,037	202,612,346
Loss on foreign currency translation		54,050,663	59,190,930
Loss on valuation of derivatives		7,734,569	5,086,462
Loss on transaction of derivatives		73,488	17,965,411
Loss on valuation of financial assets at fair value through profit or loss		5,240,141	2,100,493
Subtotal		383,670,662	338,715,141
Net financial expense	₩	69,259,585	(43,039,556)

28. Income Tax Expense

(1) Income tax expense for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Current income taxes	₩	139,174,210	130,789,876
Deferred income taxes from changes in temporary differences		(14,283,682)	80,693,772
Deferred income taxes from changes in unused tax losses		-	33,242,216
Deferred income taxes from changes in tax credit carry forward		37,470,485	46,754,955
Others		(85,211)	(296,366)
Income tax expense	₩	162,275,802	291,184,453

(2) Deferred tax assets and liabilities recognized at stockholders' equity as of December 31, 2019 and 2018 are summarized as follows:

1) 2019

(In thousands of won)		Before tax	Deferred tax assets (liabilities)	After tax
Capital surplus of equity-accounted investees	₩	37,773,265	5,421,821	43,195,086
Actuarial gain (losses) from defined benefit plan		(35,014,073)	23,041,058	(11,973,015)
Change in equity of equity-accounted investees		438,756,478	(107,172,745)	331,583,733
Cash flow hedges – effective portion of changes in fair value		3,173,624	(768,017)	2,405,607
Equity instruments at FVOCI – net change in fair value		218,870,684	(52,966,706)	165,903,978
Total	₩	663,559,978	(132,444,589)	531,115,389

2) 2018

(In thousands of won)		Before tax	Deferred tax assets (liabilities)	After tax
Capital surplus of equity-accounted investees	₩	23,237,831	8,939,396	32,177,227
Actuarial gain (losses) from defined benefit plan		(132,272,040)	32,009,834	(100,262,206)
Change in equity of equity-accounted investees		390,656,085	(106,843,498)	283,812,587
Cash flow hedges – effective portion of changes in fair value		(25,658,004)	6,218,478	(19,439,526)
Equity instruments at FVOCI – net change in fair value		177,338,305	(42,915,870)	134,422,435
Total	₩	433,302,177	(102,591,660)	330,710,517

28. Income Tax Expense, Continued

(3) Reconciliation of effective tax rate for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019	2018
Profit before income tax	₩	564,642,231	1,036,233,637
Income tax using the Group's statutory tax rate		136,643,420	250,768,540
Adjustments			
Foreign withholding tax		8,383,418	11,385,776
Permanent differences		(5,445,562)	2,376,476
Carry-over deficit effect		(10,013,275)	-
Unrecognized temporary differences		92,891,911	88,710,555
Tax credits		(68,966,145)	(59,523,177)
Difference in tax rate		10,935,523	(456,807)
Consolidation adjustments, and others		(2,153,488)	(2,076,910)
Income tax expense	₩	162,275,802	291,184,453
Average effective tax rate		28.7%	28.1%

(4) As of December 31, 2019, 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. Applied tax rate is 24.2% for the realized portion after year of 2019.

(5) Change in deferred tax assets (liabilities) for the years ended December 31, 2019 and 2018 are summarized as follows:

(In thousands of won)		2019			2018		
		Beginning balance	Changes	Ending balance	Beginning balance	Changes	Ending balance
Tangible/Intangible assets	₩	87,681,654	(456,472)	87,225,182	123,079,786	(35,398,132)	87,681,654
Investment in subsidiaries and associates		(1,237,449,625)	(115,276,526)	(1,352,726,151)	(1,169,588,984)	(67,860,641)	(1,237,449,625)
Inventories		9,380,282	(1,144,261)	8,236,022	11,676,113	(2,295,831)	9,380,282
Accrued expenses		99,493,277	52,513,012	152,006,288	137,469,021	(37,975,744)	99,493,277
Available-for-sale financial assets		(167,879,957)	48,532,689	(119,347,268)	(136,265,640)	(31,614,317)	(167,879,957)
Others		(7,496,105)	24,255,834	16,759,729	24,478,222	(31,986,519)	(7,508,297)
Sub total		(1,216,270,474)	8,424,276	(1,207,846,198)	(1,009,151,482)	(207,131,184)	(1,216,282,666)
Deferred tax added to capital		(102,591,659)	(29,852,929)	(132,444,588)	(214,329,392)	111,737,733	(102,591,659)
Loss carry forwards		-	-	-	33,242,216	(33,242,216)	-
Tax credit		154,165,237	(37,470,485)	116,694,752	200,920,192	(46,754,955)	154,165,237
Temporary differences of subsidiaries		37,521,163	31,276,605	68,797,768	21,486,244	16,034,919	37,521,163
Total	₩			(1,154,798,266)			(1,127,187,925)

29. Earning per Share

(1) Basic earnings per share

1) Basic earnings per share for the years ended December 31, 2019 and 2018 are calculated as follows:

(i) Ordinary Shares

(In thousands of won, except earnings per share)		2019	2018
Profit attributable to the owners of the Company	₩	356,548,861	701,166,337
Profit attributable to ordinary shares		348,801,838	686,002,650
Weighted average number of ordinary shares (basic)		65,433,139	65,433,139
Basic earnings per share (won)		5,331	10,484

(ii) Preferred Shares

(In thousands of won, except earnings per share)		2019	2018
Profit attributable to the owners of the Company	₩	356,548,861	701,166,337
Profit attributable to preferred shares		7,747,022	15,163,687
Weighted average number of preferred shares (basic)		1,439,496	1,439,496
Basic earnings per share (won)		5,381	10,534

2) Weighted average number of shares for the years ended December 31, 2019 and 2018 are calculated as follows:

(i) Ordinary Shares

(In shares)	2019	2018
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)	2019	2018
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, 2019 and 2018.

30. Leases

See accounting policy in Note 3.(23), (25)

(1) Right-of-use assets

The details of the right-of-use assets, plant and equipment as a result of the introduction of K-IFRS 1116 'Lease' are as follows:

(In thousands of won)

		Land	Buildings and structures	Machinery	Tools, furniture and fixtures	Total
Balance at 1 January	₩	-	41,571,122	-	7,753,679	49,324,801
Additions to right-of-use assets		6,041,095	2,009,818	401,815	-	8,452,728
Depreciation		(4,151,642)	(13,258,182)	(48,181)	(1,915,590)	(19,373,595)
Disposals		-	-	-	(1,718,982)	(1,718,982)
Balance at 31 December	₩	1,889,453	30,322,758	353,634	4,119,107	36,684,952

(2) Amounts recognized in profit or loss

(In thousands of won)

		2019
Interest on lease liabilities	₩	964,253
Expenses relating to short-term leases		6,276,880
Expenses relating to leases of low-value assets, excluding short-term leases of low-value assets		1,422,920
Total	₩	8,664,053

(3) Maturity of lease liabilities

(In thousands of won)

		2019
Less than one year	₩	14,192,629
One to five year		18,819,694
More than five year		5,880,016
Total undiscounted lease receivable		38,892,339
Lease liabilities recognized in the statement of financial position as of 31 December 2019		36,651,228
Current Lease Liabilities		14,044,841
non-current lease liabilities		22,606,387

(4) Amounts recognized in statement of cash flow

(In thousands of won)

		2019
Total cash outflow for leases	₩	26,200.032

(5) Extending option

Some leases include an option for the Group to extend the lease period before the termination of the non-release period of the contract. The Group tries to include the option of extension in the new lease agreement if possible for operational efficiency. The Group estimates the lease duration by assessing whether it is quite certain that the extension option will be exercised at the commencement of the lease.

31. Related Parties

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

Associates	Samsung Display Co., Ltd. ("SDC") and subsidiaries
	Samsung Economic Research Institute ("SERI")
	SD FLEX CO., LTD. ("SDFLEX")
	Intellectual Keystone Technology LLC ("IKT")
	Samsung SDI-Sungrow Energy Storage Battery Co., Ltd. ("SSEB") (*)
	Sungrow-Samsung SDI Energy Storage Power Supply Co., Ltd. ("SSEP")
Conglomerate entities	Samsung Electronics Co., Ltd.("SEC"), Samsung C&T Corporation, and etc.

(*) The Group lost control by selling its stake in SSEB during the current term. Subsidiary to associates has been classified accordingly.

(2) Significant transactions with related parties for the years ended December 31, 2019 and 2018 are summarized as follows:

1) 2019

(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	₩ 625,788,789	-	32,735,828	1,516,845	-	3,889,282
SERI	-	-	-	-	-	6,992,111
SD FLEX CO., LTD.	144,732	-	1,131,332	7,465,130	-	39,053
SSEP	22,350,824	-	-	-	-	-
SSEB	11,197,942	-	52,361	-	-	-
Conglomerate entities						
SEC	1,500,952,953	-	6,755,350	1,347,233	23,595,868	68,955,525
Others	4,254,896	9,627	16,794,767	886,837	112,567,616	174,862,922
Total	₩ 2,164,690,136	9,627	57,469,638	11,216,045	136,163,484	254,738,893

2) 2018

(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	₩ 667,150,217	-	35,568,078	642,345	-	4,316,651
SERI	-	-	-	-	-	6,506,487
SD FLEX CO., LTD.	137,232	-	871,461	7,405,081	-	47,323
SSEP	57,768,113	-	-	-	-	-
Conglomerate entities						
SEC	1,544,697,637	452,242	9,499,527	88,737	7,457,242	40,209,353
Others	23,940,419	-	14,665,388	87,888,094	417,704,240	226,814,632
Total	₩ 2,293,693,618	452,242	60,604,454	96,024,257	425,161,482	277,894,446

31. Related Parties, Continued

(3) Details of significant account balances with related parties as of December 31, 2019 and 2018 are summarized as follows:

1) 2019

(In thousands of won)		Account receivable	Other receivable, etc	Account payable	Other payable, etc
Associates					
SDC	₩	80,093,171	-	2,335	12,892
SERI		-	-	-	2,262,407
SDFLEX		12,910	111,191	383,029	2,979
SSEP		5,345,906	-	-	-
SSEB		-	-	-	-
Conglomerate entities					
SEC		134,282,383	26,186,947	4,945	105,057,988
Others		102,618	27,619,554	51,405	63,151,613
Total	₩	219,836,988	53,917,692	441,714	170,487,879

2) 2018

(In thousands of won)		Account receivable	Other receivable, etc	Account payable	Other payable, etc.
Associates					
SDC	₩	87,788,869	335	16,869	16,015
SERI		-	-	-	1,422,625
SDFLEX		-	104,774	599,887	3,814
SSEP		31,418,073	-	-	-
Conglomerate entities					
SEC		108,485,951	24,301,063	-	157,472,602
Others		3,733,679	55,200,077	225,030	307,748,305
Total	₩	231,426,572	79,606,249	841,786	466,663,361

(4) Personnel compensation to registered officers (the "key management") who have the authority and responsibility in planning, directing, and control of the Group are ₩2,969 million and ₩5,268 million, for the years ended December 31, 2019 and 2018, respectively.

As of December 31, 2019 and 2018, liabilities related to long-term employee benefits for key management are ₩4,347 million and ₩4,055 million, respectively. In addition, liabilities related to retirement benefits for key management as of December 31, 2019 and 2018 are ₩9,382 million and ₩7,652 million, respectively.

32. Non-controlling Interest

Non-controlling interests as of and for the years ended December 31, 2019 and 2018 are summarized as follows:

(1) 2019

(In millions of won)

		NOVALED	America (SDIA and 2 others)	China (TSDI and 7 others)	Others	Total
Current assets	₩	92,057	84,334	1,343,760	3,937	1,524,088
Non-current assets		350,865	60,035	1,690,695	86,933	2,188,528
Current liabilities		21,384	86,799	1,211,275	350	1,319,808
Non-current liabilities		8,751	17,010	471,965	-	497,726
Net assets		147,436	40,560	1,351,215	90,520	1,629,731
Carrying amount of non-controlling interest		144,009	3,596	186,777	1,026	335,408
Sales		127,432	124,482	2,152,003	-	2,403,917
Net income (loss)		47,976	(12)	85,863	18,001	151,828
Total comprehensive income		52,731	1,467	113,786	18,001	185,985
Net income (loss) distributed to non-controlling interest		23,558	(1)	22,023	237	45,817
Cash flow from operating activities		28,065	(857)	73,752	-	100,960
Cash flow from investing activities		(33,870)	(473)	(155,934)	-	(190,277)
Cash flow from financing activities before payment of dividends to non-controlling interest		1,293	655	71,311	-	73,259
Dividends attributed to non-controlling interest		-	-	(2,370)	-	(2,370)
Exchange rate changes		349	33	3,484	-	3,866
Changes in cash and cash equivalents	₩	(4,163)	(642)	(9,757)	-	(14,562)

The condensed information on cash flows is translated to Korean Won based on the cash flow of subsidiaries before consolidation adjustments.

32. Non-controlling Interest, Continued

(2) 2018

(In millions of won)

		NOVALED	America (SDIA and 2 others)	China (TSDI and 7 others)	Others	Total
Current assets	₩	95,052	73,070	1,222,727	34,631	1,425,480
Non-current assets		301,636	27,286	1,364,752	59,495	1,753,169
Current liabilities		(21,321)	52,701	982,802	1,850	1,016,032
Non-current liabilities		(15,311)	8,562	374,400	-	367,651
Net assets		(360,057)	39,093	1,230,277	92,276	1,001,589
Carrying amount of non-controlling interest		118,296	3,476	168,173	1,251	291,196
Sales		(135,765)	94,606	1,782,263	-	1,741,104
Net income (loss)		57,178	(2,976)	38,781	30,512	123,495
Total comprehensive income		56,588	(885)	49,003	20,079	124,785
Net income (loss) distributed to non-controlling interest		28,534	(248)	(12,647)	28,244	43,883
Cash flow from operating activities		32,089	(24,008)	73,813	92,300	174,194
Cash flow from investing activities		(29,867)	(1,708)	(258,191)	(15,802)	(305,568)
Cash flow from financing activities before payment of dividends to non-controlling interest		3,192	18,546	420,077	(2,485)	439,330
Dividends attributed to non-controlling interest		-	-	(4,488)	-	(4,488)
Exchange rate changes		379	286	(7,443)	3,245	(3,533)
Changes in cash and cash equivalents	₩	5,793	(6,884)	223,768	77,258	299,935

The condensed information on cash flows is translated to Korean Won based on the cash flow of subsidiaries 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, 2019 and 2018 are summarized as follows:

(1) Adjustment for cash flows from operating activities

(In thousands of won)		2019	2018
Severance & retirement benefits	₩	68,353,583	61,497,014
(Reversal) Loss on valuation of inventories		(18,318,704)	16,616,851
Depreciation		762,589,735	491,160,544
Amortization		93,406,425	91,079,439
Bad debt expense		38,067	(7,615,518)
Share of profit of equity accounted investees		(178,629,731)	(342,181,824)
Loss on disposal of subsidiary		11,625,143	21,112,944
Gain on sale of investment property		-	(79,295)
Loss (gain) on foreign currency translations, net		26,880,051	38,661,843
Effective portion of unrealized changes in fair values of cash flow hedges		(2,568,592)	(16,787,672)
Loss (gain) on sale of Derivative financial instruments		(1,108,929)	16,653,587
Loss (gain) on sale of property, plant and equipment, net		16,780,996	51,096,336
Impairment losses on property, plant and equipment		28,119,247	18,474,276
Loss (gain) on sale of intangible assets		129,700	223,771
Impairment losses on intangible assets		1,134	234,159
Gain on sale of non-current assets held-for-sale		(13,938,674)	11,329,145
Equity instruments at FVTPL – net change in fair value		(12,633,233)	(121,101,995)
Loss (gain) on sale of equity instruments at FVTPL		(3,473,468)	(2,409,619)
Miscellaneous income		(4,499,939)	(57,344)
Miscellaneous expense		550,413	2,538,897
Income tax expense		162,275,802	291,184,452
Interest expense		82,174,764	51,759,500
Interest income		(18,382,213)	(18,136,500)
Dividend income		(17,560,342)	(25,532,902)
Total	₩	981,811,235	629,720,089

33. Statement of Cash Flows, Continued

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

(In thousands of won)		2019	2018
Changes in assets and liabilities:			
Trade receivables	₩	(184,809,850)	(616,091,037)
Other receivables		(262,753,454)	180,430,236
Other current assets		34,383,280	(40,901,464)
Inventories		482,295,155	(504,481,018)
Non-current other receivables		192,127,670	(169,736,092)
Non-current other assets		(25,906,892)	53,793,479
Trade payables		(20,752,982)	147,498,086
Other payables		(441,209,189)	(44,645,746)
Advance received		(28,878,886)	(61,320,113)
Unearned revenue		(2,310,488)	(16,172,695)
Other current liabilities		1,407,781	(20,170,976)
Other non-current payables		21,769,821	171,430,067
Settlement of derivative instruments		1,110,668	(16,071,998)
Payment of retirement and employee benefits		(20,983,044)	(28,358,889)
Plan assets		(49,326,920)	(18,293,739)
Long-term unearned revenue		(2,688,452)	3,890,078
Total	₩	(306,525,782)	(979,201,821)

(3) Significant non-cash transactions for the years ended December 31, 2019 and 2018 are as follows:

(In thousands of won)		2019	2018
Increase (decrease) of payables related to acquisition of plant, property, and equipment	₩	(12,646,356)	149,699,544
Prepayment to acquire non-controlling interest		-	41,082,222

33. Statement of Cash Flows, Continued

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

① 2019

(In thousands of won)

				Non-cash changes			
		2018	Cash flow from financing activities	Interest expense, etc.	Reclassify current portion	Changes in foreign exchange rates	2019
Current portion of debentures	₩	-	-	-	99,940,992	-	99,940,992
Short-term borrowings		1,739,389,710	(246,191,879)	-	451,810,178	(278,474,016)	1,666,533,993
Debentures		688,244,816	-	565,449	(99,940,992)	-	588,869,273
Long-term borrowings		826,037,185	563,477,978	-	(451,810,178)	275,420,632	1,213,125,617
Lease liabilities (*)		49,324,801	(26,200,032)	15,293,712	-	(1,767,253)	36,651,228
Total	₩	3,302,996,512	291,086,067	15,859,161	-	(4,820,637)	3,605,121,103

(*) The effect of introducing a new standard is reflected.

② 2018

(In thousands of won)

				Non-cash changes			
		2017	Cash flow from financing activities	Interest Expense, etc	Reclassify current portion	Changes in foreign exchange rates	2018
Current portion of debentures	₩	199,813,649	(200,000,000)	186,351	-	-	-
Short-term borrowings		879,491,549	687,034,682	-	249,649,394	(76,785,915)	1,739,389,710
Debentures		99,778,128	588,240,960	225,728	-	-	688,244,816
Long-term borrowings		245,525,223	743,426,932	-	(249,649,394)	86,734,424	826,037,185
Total	₩	1,424,608,549	1,818,702,574	412,079	-	9,948,509	3,253,671,711