S-OIL Corporation and Subsidiaries

Consolidated Financial Statements
December 31, 2019 and 2018

S-OIL Corporation and Subsidiaries
Index
December 31, 2019 and 2018

Page(s)

Independent Auditor's Report

(English Translation of a Report Originally Issued in Korean)

To the Board of Directors and Shareholders of
S-OIL Corporation

Opinion

We have audited the accompanying consolidated financial statements of S-OIL Corporation and its subsidiaries (collectively referred to as the "Group"), which comprise the consolidated statements of financial position as at December 31, 2019 and 2018, and the consolidated statements of comprehensive income, consolidated statements of changes in equity and consolidated statements of cash flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Group as at December 31, 2019 and 2018, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS).

Basis for Opinion

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

Key Audit Matters

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

Related Party Transactions - Existence and Disclosure

Why it is determined to be a key matter

Sales and purchases transactions with related parties of the Group in 2019 are ₩ 4,093,517 million and ₩ 17,646,699 million, respectively. These amounts represent 17% of total sales and 77% of total purchases. We focused on impact of these significant related party transactions on the consolidated financial statements. See Note 33 for details.

More specifically, sales transactions with Aramco Trading Company (Formerly Saudi Aramco Products Trading Company) and its subsidiaries amount to ₩ 3,994,821 million and purchase transactions with Saudi Arabian Oil Company and Aramco Trading Company (Formerly Saudi Aramco Products Trading Company) and its subsidiaries amount to ₩ 17,456,105 million. Given the significant size of transactions, we considered related party transactions with these particular related parties (existence and disclosure) as key audit matter.

How our audit addressed the key audit matter

Our procedures with respect to existence and disclosure of sales and purchases from related parties include:

· Obtaining an understanding and evaluating process and relevant controls relating to the related party transactions

· Examining supporting documents , in a sample basis, to substantively test sales and purchases at transaction level

· Evaluating appropriateness of disclosure in accordance with the applicable financial reporting framework.

Inventory Valuation

Why it is determined to be a key matter

Valuation allowance for inventories of ₩ 33,460 million and reversal of loss on valuation of inventories of ₩ 210,430 million were recognized as at and for the year ended December 31, 2019. See Note 12 for details.

In measuring allowance for inventories, significant management's estimates and judgment are made as to future estimated sales price. Given the size of the balance and the extent of judgment involved, we considered inventory valuation to be a key audit matter.

How our audit addressed the key audit matter

Our procedures with respect to inventory valuation include:

· Obtaining an understanding and evaluating process and relevant controls relating to inventory valuation

· Examining supporting documents for future estimated sales price which is one of the assumptions management used

· Recalculating mathematical accuracy of allowance for inventories

Other Matter

Auditing standards and their application in practice vary among countries. The procedures and practices used in the Republic of Korea to audit such 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 Korean IFRS, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

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

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

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

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

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

· Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

· Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.

· Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

· Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

· Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

· Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

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

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

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

The engagement partner on the audit resulting in this independent auditor's report is Sangho Kang, Certified Public Accountant.

Samil PricewaterhouseCoopers

Seoul, Korea

March 18, 2020

This report is effective as of March 18, 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 there is a possibility that the above audit report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

S-OIL Corporation and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2019 and 2018

(In millions of Korean won)

	Notes		2019		2018
Assets					
Current assets					
Cash and cash equivalents	3,7,11	₩	291,005	₩	664,506
Trade receivables	3,8,11		1,312,318		1,641,468
Other receivables	3,8,11,35		264,710		189,509
Other current financial assets	3,4,9,11		264,322		46,254
Derivative financial instruments	3,4,10,11		566		4,590
Inventories	12		3,196,033		3,139,082
Other current assets	9		297,945		125,767
Current income tax assets			1,963		43,330
			5,628,862		5,854,506
Non-current assets					
Other receivables	3,8,11,35		76,305		66,394
Other non-current financial assets	3,4,9,11		58,332		47,684
Investments in associate and joint venture	13		30,317		31,552
Property, plant and equipment	6,14,16		10,139,139		9,740,727
Intangible assets	6,15		101,329		104,447
Other non-current assets	9,35		299,033		73,171
Net defined benefit assets	20		-		36,394
Deferred income tax assets	30		84		169
			10,704,539		10,100,538
Total assets		₩	16,333,401	₩	15,955,044
Liabilities					
Current liabilities					
Trade payables	3,11,17	₩	1,655,203	₩	1,437,254
Other payables	3,11,17,35		607,960		756,609
Borrowings	3,11,18		2,825,112		2,934,770
Derivative financial instruments	3,4,10,11		8,160		9,768
Current income tax liabilities			829		13,124
Provisions for other liabilities and charges	19		3,594		2,768
Contract liabilities	19		21,601		23,080
Other current liabilities	17		626,201		611,674
			5,748,660		5,789,047
Non-current liabilities					
Other payables	3,11,17,35		280,779		99,039
Net defined benefit liabilities	20		11,557		-
Borrowings	3,11,18		3,554,805		3,400,627
Deferred income tax liabilities	30		240,974		197,097
			4,088,115		3,696,763
Total liabilities			9,836,775		9,485,810
Equity					
Share capital	22		291,512		291,512
Share premium	22		379,190		379,190
Reserves	25		979,629		977,351
Treasury share	23		(1,876)		(1,876)
Retained earnings	24		4,848,171		4,823,057
Total equity			6,496,626		6,469,234
Total liabilities and equity		₩	16,333,401	₩	15,955,044

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

S-OIL Corporation and Subsidiaries
Consolidated Statements of Comprehensive Income
Years Ended December 31, 2019 and 2018

(In millions of Korean won, except per share data)	**Notes**	**2019**	**2018**
Sales	6	₩ 24,394,173	₩ 25,463,295
Cost of sales	26,31	(23,346,806)	(24,200,246)
Gross profit		1,047,367	1,263,049
Selling expenses	27,31	(507,462)	(510,557)
Administrative expenses	27,31	(119,828)	(113,032)
Operating profit		420,077	639,460
Other income	28	370,423	261,777
Other expenses	28	(440,571)	(452,899)
Finance income	29	163,408	116,667
Finance costs	29	(405,536)	(237,336)
Share of net profit of associate and joint venture	13	2,550	4,120
Profit before income tax		110,351	331,789
Income tax expense	30	(44,922)	(73,754)
Profit for the year		65,429	258,035
Other comprehensive income(loss), net of tax			
Items that will not be reclassified to profit or loss			
Remeasurements of net defined benefit liabilities	20	(11,114)	(15,977)
Gains on valuation of financial assets at fair value through other comprehensive income		2,271	432
Losses on disposal of financial assets at fair value through other comprehensive income		-	(8)
Items that may be subsequently reclassified to profit or loss			
Cash flow hedges	25	-	1,234
Share of other comprehensive income of joint venture and associate	25	(25)	(15)
Currency translation differences	25	32	38
Total other comprehensive loss for the year		(8,836)	(14,296)
Total comprehensive income for the year		₩ 56,593	₩ 243,739
Earnings per share			
Basic and diluted earnings per ordinary share	32	₩ 561	₩ 2,216
Basic and diluted earnings per preferred share	32	₩ 586	₩ 2,241

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

S-OIL Corporation and Subsidiaries
Consolidated Statements of Changes in Equity
Years ended December 31, 2019 and 2018

(In millions of Korean won)	Share Capital	Share Premium	Reserves	Treasury Share	Retained Earnings	Total Equity
Balance at January 1, 2018	₩ 291,512	₩ 379,190	₩ 975,662	₩ (1,876)	₩ 5,198,132	₩ 6,842,620
Profit for the year	-	-	-	-	258,035	258,035
Other comprehensive income(loss)						
Gains on valuation of financial assets at fair value through other comprehensive income	-	-	432	-	-	432
Losses on disposal of financial assets at fair value through other comprehensive income	-	-	-	-	(8)	(8)
Cash flow hedges	-	-	1,234	-	-	1,234
Share of other comprehensive income in associate and joint venture	-	-	(15)	-	-	(15)
Currency translation differences	-	-	38	-	-	38
Remeasurements of net defined benefit liabilities	-	-	-	-	(15,977)	(15,977)
Other comprehensive income(loss) for the year	-	-	1,689	-	(15,985)	(14,296)
Total comprehensive income for the year	-	-	1,689	-	242,050	243,739
Transactions with owners						
Dividends paid for 2017	-	-	-	-	(547,273)	(547,273)
Interim dividends paid for 2018	-	-	-	-	(69,852)	(69,852)
Balance at December 31, 2018	₩ 291,512	₩ 379,190	₩ 977,351	₩ (1,876)	₩ 4,823,057	₩ 6,469,234

S-OIL Corporation and Subsidiaries
Consolidated Statements of Changes in Equity
Years ended December 31, 2019 and 2018

(In millions of Korean won)	Share Capital	Share Premium	Reserves	Treasury Share	Retained Earnings	Total Equity
Balance at January 1, 2019	₩ 291,512	₩ 379,190	₩ 977,351	₩ (1,876)	₩ 4,823,057	₩ 6,469,234
Profit for the year	-	-	-	-	65,429	65,429
Other comprehensive income(loss)						
Gains on valuation of financial assets at fair value through other comprehensive income	-	-	2,271	-	-	2,271
Share of other comprehensive income in associate and joint venture	-	-	(25)	-	-	(25)
Currency translation differences	-	-	32	-	-	32
Remeasurements of net defined benefit liabilities	-	-	-	-	(11,114)	(11,114)
Other comprehensive income(loss) for the year	-	-	2,278	-	(11,114)	(8,836)
Total comprehensive income for the year	-	-	2,278	-	54,315	56,593
Transactions with owners						
Dividends paid for 2018	-	-	-	-	(17,559)	(17,559)
Interim dividends paid for 2019	-	-	-	-	(11,642)	(11,642)
Balance at December 31, 2019	₩ 291,512	₩ 379,190	₩ 979,629	₩ (1,876)	₩ 4,848,171	₩ 6,496,626

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

S-OIL Corporation and Subsidiaries
Consolidated Statements of Cash Flows
Years ended December 31, 2019 and 2018

(In millions of Korean won)	Notes		2019		2018
Cash flows from operating activities					
Cash generated from operations	34	₩	810,225	₩	174,707
Interest received			13,169		30,644
Interest paid			(180,115)		(153,465)
Income tax refunded (paid)			31,471		(346,008)
Dividends received			4,697		5,937
Net cash inflow (outflow) from operating activities		₩	679,447	₩	(288,185)
Cash flows from investing activities					
Proceeds from disposal of property, plant and equipment		₩	6,219	₩	462
Proceeds from disposal of intangible assets			383		330
Decrease in other receivables			19,302		19,856
Proceeds from disposal of investments in associate			398		-
Decrease in other financial assets			4,500		1,673,099
Payments for property, plant and equipment	14		(827,344)		(2,041,370)
Payments for intangible assets	15		(263)		(339)
Payments for financial assets at fair value through profit or loss	4		(7,634)		-
Increase in other receivables			(9,156)		(27,545)
Settlement of derivative assets and liabilities			(32,509)		(36,597)
Increase in other financial assets			(222,084)		(5,472)
Others			(1,267)		2,373
Net cash outflow from investing activities		₩	(1,069,455)	₩	(415,203)
Cash flows from financing activities					
Proceeds from borrowings		₩	669,099	₩	1,520,510
Repayment of borrowings			(576,095)		(14,183)
Decrease in other payables			(47,310)		(1,430)
Dividends paid			(29,237)		(617,109)
Net cash inflow from financing activities		₩	16,457	₩	887,788
Net increase (decrease) in cash and cash equivalents		₩	(373,551)	₩	184,400
Cash and cash equivalents at the beginning of the year	7		664,506		480,052
Effects of exchange rate changes on cash and cash equivalents			50		54
Cash and cash equivalents at the end of the year in the consolidated statement of financial position	7	₩	291,005	₩	664,506

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

1. General Information

The general information of S-OIL Corporation (the "Company" or the "Parent Company") and its subsidiaries, S-International Ltd., North East Chemicals Co., Ltd. and S-OIL Singapore PTE. LTD (the "Subsidiaries") (collectively referred to as the “Group”) under Korean IFRS 1110 Consolidated Financial Statements, are as follows:

The Company

S-OIL Corporation was established in 1976 to manufacture and sell oil refining products, lube products and petrochemical products, and to import and export crude oil and products. In 1987, the Company listed its stock on the Korea Exchange. The Company’s headquarters is located in Mapo-gu, Seoul, Korea.

As at December 31, 2019, the major shareholders of the Company and their respective shareholdings are as follows:

	2019	
Name of shareholders	**Number of Ordinary shares**	**Percentage of Ownership (%)**
Aramco Overseas Co., B.V.	71,387,560	63.41
Institutional and individual investors	41,195,232	36.59
Total	112,582,792	100.00

Consolidated Subsidiaries

Details of the consolidated subsidiaries as at December 31, 2019 and 2018, are as follows:

	Number of Shares	Location	2019 Ownership interest held by the Group (%)	2018 Ownership interest held by the Group (%)	Main business	Closing Month
S-International Ltd.	10	Samoa	100	100	Purchasing and sales of crude oil and petroleum goods	December
North East Chemicals Co., Ltd.	473,000	Korea	100	100	Warehousing and handling of liquid chemicals	December
S-OIL Singapore PTE. LTD.	1,200,000	Singapore	100	-	Lube base oil trading and overseas services	December

Summarized financial information for consolidated subsidiaries as at and for the years ended December 31, 2019 and 2018, is as follows:

(In millions of Korean won)

	2019					
Subsidiary	Assets	Liabilities	Equity	Sales	Profit for the year	Total comprehensive income (loss)
S-International Ltd.	₩ 1,343	₩ -	₩ 1,343	₩ -	₩ 16	₩ 61
North East Chemicals Co., Ltd.	143,678	65,510	78,168	10,729	2,781	2,809
S-OIL Singapore PTE. LTD.[1]	1,030	-	1,030	-	-	(1)

[1] In 2019, S-OIL Singapore PTE. LTD. became a subsidiary of the Group.

(In millions of Korean won)

	2018					
Subsidiary	Assets	Liabilities	Equity	Sales	Profit for the year	Total comprehensive income
S-International Ltd.	₩ 1,283	₩ -	₩ 1,283	₩ -	₩ 22	₩ 75
North East Chemicals Co., Ltd.	148,691	73,331	75,360	7,910	21,776	21,619

Changes in Scope for Consolidation

S-OIL Singapore PTE. LTD. is newly included in the consolidation for the year ended December 31, 2019.

2. Significant Accounting Policies

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

2.1 Basis of Preparation

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

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

The consolidated financial statements of the Group have been prepared in accordance with Korean IFRS. These are the standards, subsequent amendments and related interpretations issued by the International Accounting Standards Board (IASB) that have been adopted by the Republic of Korea.

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

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

The preparation of consolidated financial statements requires the use of critical accounting estimates. Management also needs to exercise judgement in applying the Group’s accounting policies. The areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to the consolidated financial statements are disclosed in Note 5.

(1) New and amended standards adopted by the Group

The Group has applied the following standards and amendments for the first time for their annual reporting period commencing January 1, 2019.

- Enactment of Korean IFRS 1116 *Leases*

Under the new standard, with implementation of a single lease model, lessee is required to recognize assets and liabilities for all lease which lease term is over 12 months and underlying assets are not low value assets. A lessee is required to recognize a right-of-use asset and a lease liability representing its obligation to make lease payments.

With implementation of Korean IFRS 1116 *Lease*, the Group has changed accounting policy. The Group has adopted Korean IFRS 1116 retrospectively, as permitted under the specific transitional provisions in the standard, and recognized the cumulative impact of initially applying the standard as at January 1, 2019, the date of initial application. The Group has not restated comparatives for the 2018 reporting period. The impact of the adoption of the leasing standard and the new accounting policies are disclosed in Note 36.

- Amendment to Korean IFRS 1109 *Financial Instruments – Prepayment Features with Negative Compensation*

The narrow-scope amendments made to Korean IFRS 1109 *Financial Instruments* enable entities to measure certain prepayable financial assets with negative compensation at amortized cost. When a modification of a financial liability measured at amortized cost that does not result in the derecognition, a modification gain or loss shall be recognized in profit or loss. The amendment does not have a significant impact on the financial statements.

- Amendments to Korean IFRS 1019 *Employee Benefits –Amendment, Curtailment or Settlement of the Plan*

The amendments require that an entity shall calculate current service cost and net interest for the remainder of the reporting period after a plan amendment, curtailment or settlement based on updated actuarial assumptions from the date of the change. The amendments also require that a reduction in a surplus must be recognized in profit or loss even if that surplus was not previously recognized because of the impact of the asset ceiling. The amendment does not have a significant impact on the financial statements.

- Amendments to Korean IFRS 1028 *Investments in Associates and Joint Ventures – Long-term Interests in Associates and Joint Ventures*

The amendments also clarify that Korean IFRS 1109 requirements are applied to long-term interests that form part of the entity's net investment in an associate or joint venture before applying the impairment requirements of Korean IFRS 1028. The amendment does not have a significant impact on the financial statements.

- Enactment to Interpretation of Korean IFRS 2123 *Uncertainty over Income Tax Treatments*

The Interpretation explains how to recognize and measure deferred and current income tax assets and liabilities where there is uncertainty over a tax treatment, and includes guidance on how to determine whether each uncertain tax treatment is considered separately or together. It also presents examples of circumstances where a judgement or estimate is required to be reassessed. The amendment does not have a significant impact on the financial statements.

- Annual Improvements to Korean IFRS 2015 – 2017 Cycle:

· Amendments to Korean IFRS 1103 *Business Combination*

The amendments clarify that when a party to a joint arrangement obtains control of a business that is a joint operation, and had rights to the assets and obligations for the liabilities relating to that joint operation immediately before the acquisition date, the transaction is a business combination achieved in stages. In such cases, the acquirer shall remeasure its entire previously held interest in the joint operation. The amendment does not have a significant impact on the financial statements.

· Amendments to Korean IFRS 1111 *Joint Agreements*

The amendments clarify that when a party that participates in, but does not have joint control of, a joint operation might obtain joint control of the joint operation in which the activity of the joint operation constitutes a business. In such cases, previously held interests in the joint operation are not remeasured. The amendment does not have a significant impact on the financial statements.

· Amendments to Paragraph 57A of Korean IFRS 1012 *Income Tax*

The amendment is applied to all the income tax consequences of dividends and requires an entity to recognize the income tax consequences of dividends in profit or loss, other comprehensive income or equity according to where the entity originally recognized those past transactions or events. The amendment does not have a significant impact on the financial statements.

· Korean IFRS 1023 *Borrowing Costs*

The amendments clarify that if a specific borrowing remains outstanding after the related qualifying asset is ready for its intended use (or sale), it becomes part of general borrowings. The amendment does not have a significant impact on the financial statements.

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

The following new accounting standards and interpretations have been published that are not mandatory for December 31, 2019 reporting periods and have not been adopted.

- Amendments to Korean IFRS 1001 *Presentation of Financial Statements* and Korean IFRS 1008 *Accounting policies, changes in accounting estimates and errors – Definition of Material*

The amendments clarify the explanation of the definition of material and amended Korean IFRS 1001 and Korean IFRS 1008 in accordance with the clarified definitions. Materiality is assessed by reference to omission or misstatement of material information as well as effects of immaterial information, and to the nature of the users when determining the information to be disclosed by the Group. These amendments should be applied for annual periods beginning on or after January 1, 2020, and earlier application of permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

- Amendments to Korean IFRS 1103 *Business Combination – Definition of a Business*

To consider the integration of the required activities and assets as a business, the amended definition of a business requires an acquisition to include an input and a substantive process that together significantly contribute to the ability to create outputs and excludes economic benefits from the lower costs. An entity can apply a concentration test, an optional test, where substantially all of the fair value of gross assets acquired is concentrated in a single asset or a group of similar assets, the assets acquired would not represent a business. These amendments should be applied for annual periods beginning on or after January 1, 2020, and earlier application of permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

2.2 Consolidation

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

(1) Subsidiaries

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

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

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

Intercompany transactions, balances and unrealized gains on transactions between group companies are eliminated. Accounting policies of subsidiaries have been changed where necessary to ensure consistency with the policies adopted by the Group.

(2) Associates

Associates are entities over which the Group has significant influence. Investments in associates are accounted for using the equity method of accounting, after initially being recognized at cost. Unrealized gains on transactions between the Group and its associates are eliminated to the extent of the Group's interest in the associates. If the Group's share of losses of an associate equals or exceeds its interest in the associate (including long-term interests that, in substance, form part of the Group's net investment in the associate), the Group discontinues recognizing its share of further losses. After the Group's interest is reduced to zero, additional losses are provided for, and a liability is recognized, only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate. If there is an objective evidence of impairment for the investment in the associate, the Group recognizes the difference between the recoverable amount of the associate and its book amount as impairment loss. If an associate uses accounting policies other than those of the Group for like transactions and events in similar circumstances, if necessary, adjustments shall be made to make the associate′s accounting policies conform to those of the Group when the associate′s financial statements are used by the entity in applying the equity method.

(3) Joint Arrangements

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

2.3 Foreign Currency Translation

(1) Functional and presentation currency

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

(2) Transactions and balances

Foreign currency transactions are translated into the functional currency using the exchange rates at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies at year end exchange rates are generally recognized in profit or loss.

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

(3) Translation to presentation currency

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

- assets and liabilities for each statement of financial position presented are translated at the closing rate at the end of the reporting period,
- income and expenses for each statement of profit or loss are translated at average exchange rates,
- equity is translated at the historical exchange rate, and
- all resulting exchange differences are recognized in other comprehensive income.

2.4 Financial Assets

(1) Classification

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

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

The classification depends on the Group’s business model for managing the financial assets and the contractual terms of the cash flows.

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

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

(2) Measurement

At initial recognition, the Group measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed in profit or loss.

Financial assets with embedded derivatives are considered in their entirety when determining whether their cash flows are solely payment of principal and interest.

A. Debt instruments

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

- Amortized cost: Assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest are measured at amortized cost. A gain or loss on a debt investment that is subsequently measured at amortized cost and is not part of a hedging relationship is recognized in profit or loss when the asset is derecognized or impaired. Interest income from these financial assets is included in 'finance income' using the effective interest rate method.

- Fair value through other comprehensive income: Assets that are held for collection of contractual cash flows and for selling the financial assets, where the assets' cash flows represent solely payments of principal and interest, are measured at fair value through other comprehensive income. Movements in the carrying amount are taken through other comprehensive income, except for the recognition of impairment loss (reversal of impairment loss), interest income and foreign exchange gains and losses which are recognized in profit or loss. When the financial asset is derecognized, the cumulative gain or loss previously recognized in other comprehensive income is reclassified from equity to profit or loss. Interest income from these financial assets is included in 'finance income' using the effective interest rate method. Foreign exchange gains and losses are presented in 'other income or expenses' and impairment losses are presented in 'other expenses'.

- Fair value through profit or loss: Assets that do not meet the criteria for amortized cost or fair value through other comprehensive income are measured at fair value through profit or loss. A gain or loss on a debt investment that is subsequently measured at fair value through profit or loss and is not part of a hedging relationship is recognized in profit or loss and presented net in the statement of profit or loss within 'other income or expenses' in the year in which it arises.

B. *Equity instruments*

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

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

(3) Impairment

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

(4) Recognition and Derecognition

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

(5) Offsetting of financial instruments

Financial assets and liabilities are offset and the net amount reported in the statements of financial position where there is a legally enforceable right to offset the recognized amounts and there is an intention to settle on a net basis or realize the assets and settle the liability simultaneously. The legally enforceable right must not be contingent on future events and must be enforceable in the normal course of business and in the event of default, insolvency or bankruptcy of the Group or the counterparty.

2.5 Derivative Instruments

Derivatives are initially recognized at fair value on the date when a derivative contract is entered into and are subsequently remeasured at their fair value at the end of each reporting period. Changes in the fair value of any derivative instrument that does not qualify for hedge accounting are recognized immediately in profit or loss within 'other income (expenses)' based on the nature of transactions.

The Group applies cash flow hedge accounting to hedge the foreign currency risk associated with forecast sale. The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognized in the cash flow hedge reserve within equity, limited to the cumulative change in fair value (present value) of the hedged item (the present value of the cumulative change in the future expected cash flows of the hedged item) from the inception of the hedge. The ineffective portion is recognized in 'other income (expenses)'.

When forward contracts are used to hedge the foreign currency risk associated with forecast sale, the Group generally designates only the change in fair value of the forward contract related to the spot element as the hedging instrument. Gains or losses relating to the effective portion of the change in the spot element of the forward contracts are recognized in the cash flow hedge reserve within equity. Amounts accumulated in equity are reclassified to 'sale' in the periods when the hedged item affects profit or loss.

2.6 Inventories

Inventories are stated at the lower of cost and net realizable value. Cost is determined using the first-in, first-out (FIFO) method except for in-transit inventories which are determined using the specific identification method and supplies which are determined using the moving weighted average method.

2.7 Property, Plant and Equipment

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

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

	Estimated useful lives
Buildings	20 - 40 years
Structures	20 - 40 years
Machinery and equipment	15 - 30 years
Vehicles	5 years
Other property, plant and equipment	3 - 5 years
Catalysts	Units-of-production method

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

2.8 Borrowing Costs

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

2.9 Intangible Assets

Goodwill is measured as described in Note 2.2 (1), and carried at cost less accumulated impairment losses.

Intangible assets, except for goodwill, are initially recognized at its historical cost and carried at its cost less accumulated amortization and accumulated impairment losses. Membership rights that have an indefinite useful life are not subject to amortization because there is no foreseeable limit to the period over which the assets are expected to be utilized. The Group amortizes intangible assets with a limited useful life using the straight-line method over the following periods:

	Estimated useful lives
Facility usage rights	Periods with exclusive supply rights or contract periods
Other intangible assets	5 years

2.10 Impairment of Non-financial Assets

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

2.11 Financial Liabilities

(1) Classification and measurement

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

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

(2) Derecognition

Financial liabilities are removed from the consolidated statement of financial position when it is extinguished; for example, when the obligation specified in the contract is discharged or cancelled or expired or when the terms of an existing financial liability are substantially modified.

2.12 Current and Deferred Tax

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

The tax expense is measured at the amount expected to be paid to the taxation authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation. The Group recognizes current income tax on the basis of amounts expected to be paid to the tax authorities.

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

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

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

2.13 Post-employment Benefits

The Group operates both defined contribution and defined benefit pension plans.

For defined contribution plans, the Group pays contribution to publicly or privately administered pension insurance plans on mandatory, contractual or voluntary basis. The Group has no further payment obligation once the contribution have been paid. The contribution are recognized as employee benefit expense when they are due.

A defined benefit plan is a pension plan that is not a defined contribution plan. Generally, post-employment benefits are payable after the completion of employment, and the benefit amount depended on the employee's age, periods of service or salary levels. The liability recognized in the consolidated statement of financial position in respect of defined benefit pension plans is the present value of the defined benefit obligation at the end of the reporting period less the fair value of plan assets. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds that are denominated in the currency in which the benefits will be paid, and that have terms approximating to the terms of the related obligation. Remeasurement gains and losses arising from experience adjustments and changes in actuarial assumptions are recognized in the period in which they occur, directly in other comprehensive income.

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

2.14 Provisions

Provisions are measured at the present value of management's best estimate of the expenditure required to settle the present obligation at the end of the reporting period, and the increase in the provision due to the passage of time is recognized as interest expense.

2.15 Customer Loyalty Program

The award credits ("points") provide the customers with benefits that they would not have if there is no contract entered into. Accordingly, providing points to customers is a separate performance obligation. Transaction price per performance obligation is allocated based on relative stand-alone selling price of goods and points. The management estimates the stand-alone selling price of points based on discounts to be provided when the points are redeemed and the probability of redemption from past experience. Stand-alone selling price of goods are estimated based on the retail price.

2.16 Share Capital

Ordinary shares and preferred shares that are not mandatorily redeemable are classified as equity.

Where the Company purchases its own equity share capital (treasury share), the consideration paid, including any directly attributable incremental costs is deducted from equity attributable to the subsequently reissued, any consideration received is included in equity attributable to the Company's equity holders.

2.17 Revenue Recognition

The Group manufactures and sells oil refining products, lube products and petrochemical products, and imports and exports crude oil and products. Revenue from the sale of goods is recognized when the Group sells a product to the customer based on the contract.

The Group estimates an amount of variable consideration by using the expected value which the Group expects to better predict the amount of consideration. The Group recognize revenue with transaction price including variable consideration only to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the refund period has lapsed. The refund liability is measured at the amount of consideration received for which the Group does not expect to be entitled.

The transaction price in an arrangement must be allocated to each separate performance obligation based on the relative stand-alone selling prices of the goods or services being provided to a customer. The Group determines the stand-alone selling price for each separate performance obligation by using 'adjust market assessment approach'. In limited circumstances, the Group plans to use 'expected cost plus a margin approach' to estimate expected cost plus a reasonable margin.

A gross contract liability (refund liability) for the expected refunds to customers is recognized and sales are adjusted. At the same time, the Group has a right to collect the product from the customer when the customer exercises the right of return and recognizes an asset and adjusts cost of sales.
Right to collect the product from the customer is measured by previous book amount of the product less cost to collect the product.

2.18 Lease

As explained in Note 2.1 (1) above, the Group has changed its accounting policy for leases. The impact of the new accounting policies is disclosed in Note 36.

(1) Financial statements in prior year – Lessee accounting under Korean IFRS 1017

As at December 31, 2018, leases of property, plant and equipment where the Group, as lessee, had substantially all the risks and rewards of ownership were classified as finance leases. Finance leases were capitalized at the lease's inception at the fair value of the leased property or, if lower, the present value of the minimum lease payments. The corresponding lease payments, net of finance charges, were included in 'other payables'. Each lease payment was allocated between the liability and finance cost. The finance cost was charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. The property, plant and equipment acquired under finance leases was depreciated over the asset's useful life, or over the shorter of the asset's useful life and the lease term if there is no reasonable certainty that the Group will obtain ownership at the end of the lease term.

Leases in which a significant portion of the risks and rewards of ownership were not transferred to the Group as lessee were classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

(2) Lessor accounting under Korean IFRS 1116

Lease income from operating leases where the Group is a lessor is recognized in income on a straight-line basis over the lease term. Initial direct costs incurred in obtaining an operating lease are added to the carrying amount of the underlying asset and recognized as expense over the lease term on the same basis as lease income. The respective leased assets are included in the statement of financial position based on their nature. The Group did not need to make any adjustments to the accounting for assets held as lessor as a result of adopting the new leasing standard.

(3) Lessee accounting under Korean IFRS 1116

The Group leases vessels, storage facilities, sites for gas station and charging station and other facilities and machinery. Lease contracts are made for fixed periods of 1 to 20 years, but may have extension options.

Contracts may contain both lease and non-lease components. The Group allocates the consideration in the contract to the lease and non-lease components based on their relative stand-alone prices.

Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions.

The lease agreements do not impose any covenants, but leased assets may not be used as security for borrowing purposes.

Until the 2018 financial year, leases of property, plant and equipment were classified as either finance or operating leases. Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

From January 1, 2019, leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the Group.

The Group determines the lease term, including the period, in which it is reasonably certain for lessee to exercise an option to extend the lease for the non-cancellable period within the enforceable period of the contract. In the event that the lessee and the lessor have the respective right to terminate the contract without the consent of other parties, the enforceable period is determined by considering the economic disadvantages to be incurred when the contract is terminated.

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

- Fixed payments (including in-substance fixed payments), less any lease incentives receivable

- Variable lease payment that are based on an index or a rate, initially measured using the index or rate as at the commencement date

- Amounts expected to be payable by the Group (the lessee) under residual value guarantees

- The exercise price of a purchase option if the Group (the lessee) is reasonably certain to exercise that option, and

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

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

To determine the incremental borrowing rate, the Group:

- where possible, uses recent third-party financing received by the individual lessee as a starting point, adjusted to reflect changes in financing conditions since third party financing was received, and

- makes adjustments specific to the lease, for example term, country, currency and security.

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

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

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

- the amount of the initial measurement of lease liability

- any lease payments made at or before the commencement date less any lease incentives received

- any initial direct costs, and

- restoration costs

The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. If the Group is reasonably certain to exercise a purchase option, the right-of-use asset is depreciated over the underlying asset's useful life of 1 to 20 years.

Payments associated with short-term leases and leases of low-value assets are recognized on a straight-line basis as an expense in profit or loss. Short-term leases are leases with a lease term of 12 months or less. Low-value assets comprise IT-equipment and others.

2.19 Dividends

Dividends paid to the Group’s shareholders is recognized as a liability in the consolidated financial statements in the period in which the dividends are approved by the Group’s shareholders.

2.20 Earnings per Share

Basic earnings per share is calculated by dividing the profit attributable to equity holders of the Group by the weighted average number of ordinary shares in issue during the year. Basic earnings per preferred share is also calculated by dividing the profit attributable to participating shares with right to participate in distribution of earnings by the weighted average number of preferred shares in issue during the year.

2.21 Segment Reporting

Information of each operating segment is reported in a manner consistent with the internal business segment reporting provided to the chief operating decision-maker. The chief operating decision-maker, who is responsible for allocating resources and assessing performance of the operating segments, has been identified as the Board of Directors that makes strategic decisions.

2.22 Greenhouse Gas Emission Permits and Obligations

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

2.23 Approval of Issuance of the Consolidated Financial Statements

The issuance of the consolidated financial statements for the year 2019 of the Group is expected to be approved by the Board of Directors on March 7, 2020, which is subject to change with the approval of shareholders at the general shareholders' meeting.

3. Financial Risk Management

3.1 Financial Risk Factors

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

Risk management is carried out by each relevant department under policies approved by the Board of Directors. The Group identifies, evaluates and hedges financial risks in close co-operation with the Group's operating units.

(1) Market risk

a. Foreign exchange risk

The Group operates internationally and is exposed to foreign exchange risk arising from foreign currency transactions, primarily with respect to the US dollar. Foreign exchange risk arises when future commercial transactions, recognized asset and liabilities are presented in currencies other than the functional currency.

The purpose of foreign exchange risk management is to maximize the Group's value by minimizing the uncertainty and volatility of foreign exchange gains and losses from foreign exchange rate fluctuations.

The Group maintains foreign exchange risk management system to offset foreign exchange effects arising from recognized income/expense and assets/liabilities.

As at December 31, 2019, if the Korean won had weakened/strengthened by 10% against the foreign currencies with all other variables held constant, profit for the period would have been decreased/increased by ₩ 216,641 million (2018: ₩ 156,747 million) in relation to foreign currency-denominated trade receivables, trade payables, and usance borrowings. However, the Group's foreign exchange risk is controlled effectively as the above foreign exchange risk has offsetting effect with other foreign exchange effects affecting operating income.

The Group's financial instruments denominated in major foreign currencies as at December 31, 2019 and 2018, are converted into Korean won as follows:

(In millions of Korean won)		**2019**		**2018**
Trade receivables				
KRW	₩	376,064	₩	326,541
USD		930,503		1,309,591
EUR		3,845		4,770
AUD		1,906		566
Total	₩	1,312,318	₩	1,641,468
Trade payables				
KRW	₩	57,341	₩	51,754
USD		1,597,862		1,384,514
JPY		-		986
Total	₩	1,655,203	₩	1,437,254
Borrowings				
KRW	₩	4,180,179	₩	3,976,189
USD		2,199,738		2,359,208
Total	₩	6,379,917	₩	6,335,397

b. Product margin risk

The Group is exposed to product margin risk arising from difference in timing of purchase and sale. The purpose of product margin risk management is to maximize the Group's value by minimizing the uncertainty of volatility of product margin.

In order to minimize the product margin risk, the Group tries to sell products produced within the month. For the products that need to be stored for a longer period, the Group secures the product margin by executing product swap to mitigate a risk of future price fluctuation.

c. Interest rate risk

Interest rate risk is defined as the risk that the interest income or expenses arising from deposits and borrowings will fluctuate because of changes in future market interest rate. The interest rate risk mainly arises on floating rate deposits and borrowings. As a result, the Group is exposed to cash flow interest rate risk.

The objective of interest rate risk management lies in maximizing the Group's value by minimizing uncertainty caused by fluctuations in interest rates and minimizing net interest expense.

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

(In millions of Korean won)	**2019**				**2018**			
	Impact on post-tax profit		**Impact on equity**		**Impact on post-tax profit**		**Impact on equity**	
One percent increase	₩	(5,901)	₩	(5,901)	₩	(15)	₩	(15)
One percent decrease		5,901		5,901		15		15

d. Price risk of financial assets at fair value through other comprehensive income and financial assets at fair value through profit or loss

The Group is exposed to equity securities price risk arises from investments held by the Group that are classified as financial assets at fair value through other comprehensive income and financial assets at fair value through profit or loss in the consolidated statement of financial position. To manage its price risk arising from investments in equity securities, the Group diversifies its portfolio.

The table below summarizes the impact of increases/decreases of these two indexes on the Group's total comprehensive income for the year. The analysis is based on the assumption that the equity indexes has increased/decreased by 10% with all other variables held constant, and that all the Group's equity instruments moved in line with the indexes.

(In millions of Korean won)	**2019**		**2018**	
Listed stocks	₩	16	₩	15
Unlisted stocks		3,575		3,349
Fund		624		70

(2) Credit risk

a. Risk management

Credit risk arises from receivables, cash and cash equivalents, derivative financial instruments and deposits with banks and financial institutions. For banks and financial institutions, only independently rated parties with high ratings are accepted. If customers are independently rated, these ratings are used. If there is no independent rating, the credit quality of the customer is evaluated taking into account its financial position, past experience and other factors.

Individual risk limits are set based on internal or external ratings in accordance with limits set by the Group. The utilization of credit limits is strictly executed.

The maximum exposure to credit risk as at December 31, 2019 and 2018, is as follows:

(In millions of Korean won)		**2019**		**2018**
Financial assets				
Cash and cash equivalents	₩	290,925	₩	664,411
Trade receivables		1,312,318		1,641,468
Other receivables		341,015		255,903
Other financial assets		264,515		46,567
Derivative financial assets		566		4,590
Total	₩	2,209,339	₩	2,612,939

With the exception of trade receivables and other receivables, none of financial assets is past due or impaired. There is no collateral held by the Group except for trade receivables and other receivables.

b. Impairment of financial assets

The Group has three types of financial assets that are subject to the expected credit loss model:

- trade receivables for sales of goods and provision of services,
- other receivables and other financial assets at amortized cost, and
- debt investments carried at fair value through other comprehensive income.
- lease receivables, which are subject to application of *Korean IFRS 1116 Leases*.

The identified impairment loss in lease receivables was immaterial. While cash equivalents are also subject to the impairment requirement, the identified impairment loss was immaterial.

(i) Trade receivables

The Group applies the simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance for all trade receivables.

Expected credit losses are estimated based on the information that has impact on credit risk related to customers.

On that basis, the loss allowance as at December 31, 2019 and January 1, 2019 was determined as follows for both trade receivables:

(In millions of Korean won)		**December 31, 2019**		**January 1, 2019**
Gross carrying amount – trade receivables	₩	1,314,664	₩	1,643,955
Loss allowance provision		(2,346)		(2,487)

Movements in the loss allowance provision for trade receivables for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Trade receivables			
	2019		2018	
Beginning balance	₩	2,487	₩	2,995
Increase in loss allowance recognized in profit or loss during the year		-		1
Receivables written off during the year as uncollectible		(94)		(267)
Unused amounts reversed		(47)		(242)
Ending balance	₩	2,346	₩	2,487

Trade receivables are written off when there is no reasonable expectation of recovery.

Impairment losses on trade receivables are presented as net impairment losses within impairment loss in the statement of comprehensive income. Subsequent recoveries of amounts previously written off are credited against the same line item.

(ii) Other receivables and other financial assets at amortized cost

There are no movements in loss allowance provision for other receivables and other financial assets at amortized cost for the year ended December 31, 2019.

All of the other receivables and other financial assets at amortized costs other than lease receivables are considered to have low credit risk, and the loss allowance recognized during the period was, therefore, limited to 12 months expected losses. Other instruments are considered to be low credit risk when they have a low risk of default and the issuer has a strong capacity to meet its contractual cash flow obligations in the near term. The Group applies the simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance for all lease receivables.

(iii) Debt investments at fair value through other comprehensive income

Debt investments at fair value through other comprehensive income include government bonds, corporate bonds and trade receivables subject to be sold or discounted. The loss allowance for debt investments at fair value through other comprehensive income is recognized in profit or loss and reduces the fair value loss otherwise recognized in other comprehensive income.

All of the debt investments at fair value through other comprehensive income other than trade receivables subject to be sold or discounted are considered to have low credit risk, and the loss allowance recognized during the period was, therefore, limited to 12 months expected losses. Management considers 'low credit risk' for listed bonds to be an investment grade credit rating with at least one major rating agency. Other instruments are considered to be low credit risk when they have a low risk of default and the issuer has a strong capacity to meet its contractual cash flow obligations in the near term.

The Group applies the simplified approach to measure expected credit losses which uses a lifetime expected loss allowance for all trade receivables. There are no movements in loss allowance provision for other financial assets at fair value through other comprehensive income other than trade receivables subject to be sold or discounted for the year ended December 31, 2019.

c. Impairment loss

Following losses are recognized in profit or loss in relation to impaired financial assets for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	**Trade receivables**			
	2019		**2018**	
Impairment loss	₩	-	₩	(1)
Reversal of impairment loss		47		242
Net impairment loss	₩	47	₩	241

(3) Liquidity risk

Liquidity risk is defined as the risk that the Group is unable to meet its short-term payment obligations on time due to deterioration of its business performance or inability to access financing.

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

Details of the Group's liquidity risk analysis as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	**Less than 1 year**	**Between 1 and 2 years**	**Over 2 years**	**Total**
December 31, 2019				
Trade payables	₩ 1,655,203	₩ -	₩ -	₩ 1,655,203
Other payables	620,458	63,787	240,154	924,399
Borrowings	2,952,053	964,388	2,856,180	6,772,621
Currency forward (gross)				
Inflow	293,867	-	-	293,867
Outflow	(298,771)	-	-	(298,771)
Commodity Swap (net)	2,709	-	-	2,709
Total	₩ 5,225,519	₩ 1,028,175	₩ 3,096,334	₩ 9,350,028

(In millions of Korean won)	**Less than 1 year**	**Between 1 and 2 years**	**Over 2 years**	**Total**
December 31, 2018				
Trade payables	₩ 1,437,254	₩ -	₩ -	₩ 1,437,254
Other payables	766,525	28,327	77,490	872,342
Borrowings	3,066,880	589,584	3,086,114	6,742,578
Currency forward (gross)				
Inflow	795,144	-	-	795,144
Outflow	(795,784)	-	-	(795,784)
Commodity Swap (net)	7,163	-	-	7,163
Total	₩ 5,277,182	₩ 617,911	₩ 3,163,604	₩ 9,058,697

The amounts disclosed in the above table are undiscounted cash flows.

3.2 Capital Risk Management

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

The Group monitors financial ratios, such as debt-to-equity ratio and net borrowings-to-equity ratio each month and implements required action plan to maintain or adjust the capital structure.

Debt-to-equity ratio and net borrowings-to-equity ratio as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won, except for ratios)	**2019**	**2018**
Interest bearing liabilities (A)	₩ 6,692,690	₩ 6,403,069
Cash and cash equivalents and current financial deposits (B)	555,206	707,031
Net borrowings (C=A-B)	6,137,484	5,696,038
Equity (D)	6,496,626	6,469,234
Debt-to-equity ratio (A/D)	103%	99%
Net borrowings-to-equity ratio (C/D)	94%	88%

4. Fair Value

4.1 Fair Value of Financial Instruments by Category

Carrying amount and fair value of financial instruments by category as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019		2018	
	Carrying amount	**Fair value**	**Carrying amount**	**Fair value**
Financial assets				
Financial assets at fair value through other comprehensive income	₩ 49,837	₩ 49,837	₩ 50,431	₩ 50,431
Financial assets at fair value through profit or loss	9,172	9,172	5,562	5,562
Total	₩ 59,009	₩ 59,009	₩ 55,993	₩ 55,993
Financial liabilities				
Derivative financial liabilities	₩ 8,160	₩ 8,160	₩ 9,768	₩ 9,768
Total	₩ 8,160	₩ 8,160	₩ 9,768	₩ 9,768

Carrying amount of other financial assets and liabilities other than financial assets at fair value and derivative financial instruments is a reasonable approximation of fair value.

4.2 Fair Value Hierarchy

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

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

Fair value hierarchy classifications of the financial instruments that are measured at fair value as at December 31, 2019, are as follows:

(In millions of Korean won)		**Level 1**		**Level 2**		**Level 3**		**Total**
Financial assets/liabilities that are measured at fair value								
Assets								
Financial assets at fair value through other comprehensive income								
Equity securities	₩	220	₩	-	₩	49,313	₩	49,533
Debt securities		304		37,793		-		38,097
Financial assets at fair value through profit or loss								
Derivative financial assets held for trading		-		566		-		566
Equity securities		-		-		8,606		8,606
Total	₩	524	₩	38,359	₩	57,919	₩	96,802
Liabilities								
Financial liabilities at fair value through profit or loss								
Derivative financial liabilities held for trading	₩	-	₩	8,160	₩	-	₩	8,160
Total	₩	-	₩	8,160	₩	-	₩	8,160

Fair value hierarchy classifications of the financial instruments that are measured at fair value as at December 31, 2018, are as follows:

(In millions of Korean won)		**Level 1**		**Level 2**		**Level 3**		**Total**
Financial assets/liabilities that are measured at fair value								
Assets								
Financial assets at fair value through other comprehensive income								
Equity securities	₩	207	₩	-	₩	46,192	₩	46,399
Debt securities		4,032		12,859		-		16,891
Financial assets at fair value through profit or loss								
Derivative financial assets held for trading		-		4,590		-		4,590
Equity securities		-		-		972		972
Total	₩	4,239	₩	17,449	₩	47,164	₩	68,852
Liabilities								
Financial liabilities at fair value through profit or loss								
Derivative financial liabilities held for trading	₩	-	₩	9,768	₩	-	₩	9,768
Total	₩	-	₩	9,768	₩	-	₩	9,768

4.3 Transfers between Fair Value Hierarchy Levels of Recurring Fair Value Measurements

The Group's policy is to recognize transfers between levels of the fair value at the end of the reporting period. There were no transfers between levels 1 and 2 for recurring fair value measurements during the year. Changes in level 3 for recurring fair value measurements for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019	2018
Beginning balance	₩ 47,164	₩ 45,594
Acquisition	7,634	972
Total profit or loss		
Gains on valuation (other comprehensive income)	3,121	606
Losses on disposal (other comprehensive income)	-	(8)
Ending balance	₩ 57,919	₩ 47,164

4.4 Valuation Technique and the Inputs

Valuation techniques and inputs used in levels 2 and 3 fair value measurements are as follows:

(1) Level 3

(In millions of Korean won)	Fair value	Level	Valuation techniques	Inputs	Range of inputs
Equity instruments at fair value through other comprehensive income					
Equity securities	₩ 49,313	3	Present value technique	Discount rate	8.00%
Financial assets at fair value through profit or loss					
Equity securities	₩ 8,606	3	Net asset value approach	Discount rate	N/A

(2) Level 2

(In millions of Korean won)	Fair value	Level	Valuation techniques
Debt instruments at fair value through other comprehensive income			
Trade receivables	₩ 37,793	2	Present value technique
Financial assets at fair value through profit or loss			
Currency forward	566	2	Present value technique
Financial liabilities at fair value through profit or loss			
Currency forward	5,451	2	Present value technique
Commodity swap	2,709	2	Present value technique

4.5 Valuation Processes for Fair Value Measurements Categorized as Level 3

The accounting department of the Group that performs the fair value measurements required for financial reporting purposes, including Level 3 fair values. This department discusses valuation processes and result with the management.

4.6 Sensitivity Analysis for Recurring Fair Value Measurements Categorized as Level 3

Sensitivity analysis of financial instruments is performed to measure favorable and unfavorable changes in the fair value of financial instruments which are affected by the unobservable parameters, using a statistical technique. When the fair value is affected by more than two input parameters, the most favorable or most unfavorable amounts are presented. Changes in fair value of financial instruments categorized as level 3 subject to sensitivity analysis; such as, equity securities, are recognized in other comprehensive income or profit or loss.

5. Critical Accounting Estimates and Assumptions

The preparation of consolidated financial statements requires the Group to make estimates and assumptions concerning the future. Estimates and judgements are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. The resulting accounting estimates will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

5.1 Net Defined Benefit Liabilities

The present value of net defined benefit liability depends on a number of factors that are determined on an actuarial basis using a number of assumptions including the discount rate (Note 20).

5.2 Fair Value of Financial Instruments

The fair value of financial instruments that are not traded in an active market is determined by using valuation techniques. The Group uses its judgment to select a variety of methods and make assumptions that are mainly based on market conditions existing at the end of each reporting period (Note 4).

5.3 Income Taxes

The Group’s taxable income generated from these operations are subject to income taxes based on tax laws and interpretations of tax authorities in numerous jurisdictions. There are many transactions and calculations for which the ultimate tax determination is uncertain (Note 30).

If certain portion of the taxable income is not used for investments or increase in wages or dividends, the Group is liable to pay additional income tax calculated based on the tax laws for the specified periods. Accordingly, the measurement of current and deferred income tax is affected by the tax effects. As the Group's income tax is dependent on the investments, increase in wages and dividends, there is an uncertainty measuring the final tax effects.

5.4 Provisions for Other Liabilities and Charges

As at December 31, 2019, the Group records environmental restoration provisions. These provisions are estimated based on past experience (Note 19).

5.5 Estimated Goodwill Impairment

The recoverable amount of a cash generating unit (CGU) is determined based on value-in-use calculations (Note 15).

5.6 Impairment of Financial Assets

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

5.7 Lease

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

Most extension options in offices and others have not been included in the lease liability, because the Group could replace the assets without significant cost or business disruption.

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

In addition, the Group initially estimates and recognizes amounts expected to be payable under residual value guarantees as part of the lease liability. Typically, the expected residual value at lease commencement is equal to or higher than the guaranteed amount, and so the Group does not expect to pay anything under the guarantees.

6. Operating Segment Information

The reportable operating segments of the Group are oil refining business, lube oil business and petrochemical business.

Financial information by operating segments as at and for the years ended December 31, 2019 and 2018, is as follows:

(In millions of Korean won)	2019							
	Oil Refining Business		**Lube Oil Business**		**Petrochemical Business**		**Total**	
Sales from external customers	₩	19,002,944	₩	1,516,086	₩	3,875,143	₩	24,394,173
Inter-segment sales		5,249,636		180,030		1,213,634		6,643,300
Total sales		24,252,580		1,696,116		5,088,777		31,037,473
Operating profit (loss)	₩	(52,349)	₩	216,924	₩	255,502	₩	420,077
Property, plant, equipment and intangible assets	₩	7,053,100	₩	183,949	₩	3,003,419	₩	10,240,468
Depreciation and amortization and others		388,495		14,258		169,193		571,946

(In millions of Korean won)	2018							
	Oil Refining Business		**Lube Oil Business**		**Petrochemical Business**		**Total**	
Sales from external customers	₩	20,126,477	₩	1,635,366	₩	3,701,452	₩	25,463,295
Inter-segment sales		5,437,814		170,087		1,296,074		6,903,975
Total sales		25,564,291		1,805,453		4,997,526		32,367,270
Operating profit	₩	33,015	₩	255,569	₩	350,876	₩	639,460
Property, plant, equipment and intangible assets	₩	6,702,630	₩	195,226	₩	2,947,318	₩	9,845,174
Depreciation and amortization and others		235,726		15,084		103,351		354,161

Sales by geographic region for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)		**2019**		**2018**
Korea	₩	10,804,676	₩	10,470,542
Southeast Asia		4,191,823		3,839,204
China		2,743,140		3,612,165
America		1,094,355		1,453,466
Japan		1,952,792		1,828,850
Australia		1,064,794		1,845,348
Europe		797,854		262,291
Others		1,744,739		2,151,429
Total	₩	24,394,173	₩	25,463,295

Details of a customer, who contributes more than ten percent of the Group sales for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)		**2019**		**2018**	**Segments**
Customer 1 [1]	₩	3,994,821	₩	2,917,606	Oil refining and petrochemical business

[1] Aramco Trading Company (Formerly, Saudi Aramco Products Trading Company), Aramco Trading Singapore PTE. LTD. and Aramco Trading Fujairah FZE, related parties of the Group

7. Cash and Cash Equivalents

Cash and cash equivalents as at December 31, 2019 and 2018, consists of:

(In millions of Korean won)		**2019**		**2018**
Cash on hand	₩	80	₩	95
Checking accounts		7		16
Passbook accounts		7,831		6,095
Foreign currency deposits		95,437		273,190
Time deposits		-		280,500
MMDA and others		187,650		104,610
Total	₩	291,005	₩	664,506

Cash and cash equivalents recognized in the consolidated statements of financial position and cash flows are identical.

8. Trade and Other Receivables

Trade and other receivables as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	**2019**		**2018**	
	Current	**Non-current**	**Current**	**Non-current**
Trade receivables	₩ 1,314,664	₩ -	₩ 1,643,955	₩ -
Less : provision for impairment	(2,346)	-	(2,487)	-
Trade receivables - net	1,312,318	-	1,641,468	-
Other receivables				
Non-trade receivables	250,328	-	177,709	-
Accrued revenues	1,399	-	607	-
Loans	7,149	39,951	11,193	41,185
Lease receivables (Note 35)	5,834	10,323	-	-
Guaranty deposits	-	26,031	-	25,209
	264,710	76,305	189,509	66,394
Net book amount	₩ 1,577,028	₩ 76,305	₩ 1,830,977	₩ 66,394

The aging analysis of trade receivables as at December 31, 2019 and 2018, is as follows:

(In millions of Korean won)		**2019**		**2018**
Receivables not past due	₩	1,308,247	₩	1,637,233
Up to one month		4,774		5,025
One to three months		401		290
Three to six months		95		184
Six to twelve months		46		230
Over one year		1,101		993
Total	₩	1,314,664	₩	1,643,955

As at December 31, 2019, trade receivables of ₩ 647,347 million (2018: ₩ 871,864 million) have collateral provided by customers. Among those trade receivables, ₩ 4,690 million (2018: ₩ 4,299 million) is past due but not impaired.

The aging analysis of other receivables as at December 31, 2019 and 2018, is as follows:

(In millions of Korean won)		**2019**		**2018**
Receivables not past due	₩	340,992	₩	255,872
Up to one month		23		23
One to three months		-		8
Total	₩	341,015	₩	255,903

See Note 3.1 (2) b for the impairment of trade receivables, other financial assets at amortized cost and the Group's exposure to credit risk.

As at December 31, 2019, the balance of trade receivables that are not past due amounts to USD 280 million (2018: USD 149 million). As at December 31, 2019, the Group transferred the trade receivables to Mizuho Corporate Bank and two other financial institutions and derecognized the transferred receivables as all the risks and rewards are substantially transferred (Note 21).

The Group holds the trade receivables with the objective to collect the contractual cash flows and, therefore, the Group's business model for managing trade receivables is to collect the contractual cash flows. When discount agreements have been made on certain types of trade receivables, judgment on the business model is assessed. If selling price is infrequently observed or individually or collectively not significant, it is probable that the judgment is consistent with the business model with the objective of collecting the contractual cash flows. Portfolio for certain types of trade receivables which are discounted are classified as business model for selling or for collection of contractual cash flows, while undiscounted portfolio are classified as business model with the objective of collection of contractual cash flows. Trade receivables that are held for selling or for collection of contractual cash flows are measured at fair value and gains or losses on valuation are recognized as other comprehensive income.

9. Other Financial Assets and Other Assets

9.1 Other financial assets fair value through profit or loss

Other financial assets fair value through profit or loss as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)		2019		2018
Non-current				
Fund	₩	8,606	₩	972

9.2 Other financial assets at fair value through other comprehensive income

Other financial assets at fair value through other comprehensive income as at December 31, 2019 and 2018, are as follows:

(1) Equity investments at fair value through other comprehensive income

(In millions of Korean won)		2019		2018
Non-current				
Listed equities	₩	220	₩	207
Non-listed equities		49,313		46,192
Total	₩	49,533	₩	46,399

The fair value of unlisted equities is determined using discounted cash flow analysis based on the risk adjusted yield.

Upon disposal of these equity investments, any balance within the accumulated other comprehensive income for these equity investments is reclassified to retained earnings and is not reclassified to profit or loss.

(2) Debt investments at fair value through other comprehensive income

Debt investments at fair value through other comprehensive income comprise the following investments in bonds having solely payments of principal and interest:

(In millions of Korean won)		2019		2018
Government bonds				
Current	₩	121	₩	3,729
Non-current		183		303
Total	₩	304	₩	4,032

Upon disposal of these debt investments, any balance within the accumulated other comprehensive income for these debt investments is reclassified to profit or loss.

9.3 Other financial assets at amortized cost

Other financial assets at amortized cost as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019			2018		
	Current	Non-current	Total	Current	Non-current	Total
Short-term financial instruments (Time deposits, etc.) [1]	₩ 264,201	₩ -	₩ 264,201	₩ 42,525	₩ -	₩ 42,525
Long-term deposit [1]	-	10	10	-	10	10
	264,201	10	264,211	42,525	10	42,535
Less: provision for impairment	-	-	-	-	-	-
	₩ 264,201	₩ 10	₩ 264,211	₩ 42,525	₩ 10	₩ 42,535

[1] Short-term financial instruments include ₩ 31,226 million which are subject to restricted use in relation to contractual guarantee (Note 16). Long-term deposit of ₩ 10 million is subject to withdrawal restrictions.

Movements in financial assets at fair value through other comprehensive income for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019	2018
Beginning balance	₩ 50,431	₩ 49,931
Acquisition	2	23
Disposal	(3,729)	(119)
Other comprehensive income	3,133	596
Ending balance	₩ 49,837	₩ 50,431
Less: non-current portion	₩ 49,716	₩ 46,702
Current portion	121	3,729

Other assets as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019		2018	
	Current	Non-current	Current	Non-current
Advance payments	₩ 6,287	₩ -	₩ 3,806	₩ 1,108
Prepaid expenses	5,300	3,688	7,078	4,630
Tax receivables	286,358	-	114,883	-
Right-of-use assets (Note 35)	-	295,345	-	67,433
	₩ 297,945	₩ 299,033	₩ 125,767	₩ 73,171

10. Derivative Financial Instruments

Details of derivative financial instruments as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019		2018	
	Assets	Liabilities	Assets	Liabilities
Trading purpose				
Forward foreign exchange	₩ 566	₩ 5,451	₩ 3,427	₩ 2,605
Commodity Swap	-	2,709	1,163	7,163
	₩ 566	₩ 8,160	₩ 4,590	₩ 9,768
Current portion	₩ 566	₩ 8,160	₩ 4,590	₩ 9,768

Derivatives financial instruments held for trading purposes are classified as current assets or liabilities.

11. Financial Instruments by Category

Carrying amounts of financial assets and liabilities by category as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019				
	Financial assets at amortized cost	Financial assets at fair value through other comprehensive income	Financial assets at fair value through profit or loss	Other financial assets[1]	Total
Assets					
Cash and cash equivalents	₩ 291,005	₩ -	₩ -	₩ -	₩ 291,005
Trade receivables	1,274,525	37,793	-	-	1,312,318
Other receivables	324,858	-	-	16,157	341,015
Other financial assets	264,211	49,837	8,606	-	322,654
Derivative financial instruments	-	-	566	-	566
Total	₩ 2,154,599	₩ 87,630	₩ 9,172	₩ 16,157	₩2,267,558

[1] Other financial assets represent lease receivables, which are not subject to categorizations.

(In millions of Korean won)	2019			
	Financial liabilities at amortized cost	Financial liabilities at fair value through profit or loss	Other financial liabilities[1]	Total
Liabilities				
Trade payables	₩ 1,655,203	₩ -	₩ -	₩ 1,655,203
Other payables	575,966	-	312,773	888,739
Borrowings	6,379,917	-	-	6,379,917
Derivative financial instruments	-	8,160	-	8,160
Total	₩ 8,611,086	₩ 8,160	₩ 312,773	₩ 8,932,019

[1] Other financial liabilities represent lease liabilities, which are not subject to categorizations.

(In millions of Korean won)	2018			
	Financial assets at amortized cost	**Financial assets at fair value through other comprehensive income**	**Financial assets at fair value through profit or loss**	**Total**
Assets				
Cash and cash equivalents	₩ 664,506	₩ -	₩ -	₩ 664,506
Trade receivables	1,628,609	12,859	-	1,641,468
Other receivables	255,903	-	-	255,903
Other financial assets	42,535	50,431	972	93,938
Derivative financial instruments	-	-	4,590	4,590
Total	₩ 2,591,553	₩ 63,290	₩ 5,562	₩ 2,660,405

(In millions of Korean won)	2018			
	Financial liabilities at amortized cost	**Financial liabilities at fair value through profit or loss**	**Other financial liabilities[1]**	**Total**
Liabilities				
Trade payables	₩ 1,437,254	₩ -	₩ -	₩ 1,437,254
Other payables	787,976	-	67,672	855,648
Borrowings	6,335,397	-	-	6,335,397
Derivative financial instruments	-	9,768	-	9,768
Total	₩ 8,560,627	₩ 9,768	₩ 67,672	₩ 8,638,067

[1] Other financial liabilities represent lease liabilities, which are not subject to categorizations.

Net gains or losses on each category of financial instruments for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	**2019**	**2018**
Financial assets at amortized cost		
Interest income	₩ 13,495	₩ 24,209
Foreign currency gains	43,495	64,940
Reversal of provision for impairment	47	241
Assets and liabilities at fair value through profit or loss		
Derivative financial instruments losses	(34,925)	(60,444)
Assets at fair value through other comprehensive income		
Gains on valuation and disposal (other comprehensive income)	3,133	596
Interest income	85	86
Dividend income	947	1,037
Other financial assets		
Interest income	380	-
Financial liabilities at amortized cost		
Foreign currency losses	(153,808)	(195,447)
Interest expenses[1]	(176,517)	(71,783)
Other financial liabilities		
Interest expenses	(6,299)	(526)
Foreign currency losses	(663)	-

[1] Interest expenses exclude capitalized borrowing costs on qualifying assets.

12. Inventories

Inventories as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)		2019		2018
Merchandise	₩	12,215	₩	71,855
Valuation allowance for merchandise		(14)		(1,658)
Finished goods		692,617		819,669
Valuation allowance for finished goods		(20,456)		(120,024)
Work in progress		434,851		451,897
Valuation allowance for work in progress		(12,509)		(74,062)
Raw materials and materials-in-transit		2,048,097		1,857,565
Valuation allowance for raw materials and materials-in-transit		(482)		(48,146)
Supplies		41,714		181,986
Total	₩	3,196,033	₩	3,139,082

Inventories at original cost that was recognized as cost of sales for the year ended December 31, 2019 amounted to ₩ 20,810,146 million (2018: ₩ 21,974,321 million). The Group recognized reversal of losses on valuation of inventories for ₩ 210,430 million for the year ended December 31, 2019 (2018: losses on valuation of inventories for ₩ 242,161 million).

13. Investments in Associate and Joint venture

Details of associate and joint venture as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won, except number of shares)

Investee	Location	Closing Month	Number of Shares	Percentage of Ownership (%)		Acquisition Cost		2019		2018
Joint venture[1]										
S-OIL TOTAL Lubricants Co., Ltd.	Korea	December	3,500,001	50% plus one share	₩	20,134	₩	30,317	₩	31,537
Associate[2]										
Korea Energy Terminal Co., Ltd. (Formerly Korea Oil Terminal Co., Ltd.)	Korea	December	18,910	18%		904		-		15
Total					₩	21,038	₩	30,317	₩	31,552

[1] Although the Company owns more than 50% of the voting rights of S-OIL TOTAL Lubricants Co., Ltd., it is excluded from the consolidated subsidiaries as the Company is unable to exercise controls by virtue of an agreement with other investors.

[2] The Group acquired 18% ownership interest in Korea Energy Terminal Co., Ltd.(Formerly Korea Oil Terminal Co., Ltd.). Although the Group owns less than 20% of the voting rights of Korea Energy Terminal Co., Ltd.(Formerly Korea Oil Terminal Co., Ltd.), the Group is considered to have a significant influence over Korea Energy Terminal Co., Ltd.(Formerly Korea Oil Terminal Co., Ltd.), which is classified as an associate, as the Group has a seat in the investee's Board of Directors. The Group's entire ownership interest in Korea Energy Terminal Co., Ltd.(Formerly Korea Oil Terminal Co., Ltd. was disposed of during the year ended December 31, 2019.

Details of adjustments from financial information of associate and joint venture to the book amount of investments in associate and joint venture for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)

		2019				
		Net assets at the end of the year	**Group's share in (%)**	**Group's share in KRW**	**Intergroup transactions and etc.**	**Book amount**
Joint venture	S-OIL TOTAL Lubricants Co., Ltd.	₩ 60,955	50% plus one share	₩ 30,478	₩ (161)	₩ 30,317

(In millions of Korean won)

		2018				
		Net assets at the end of the year	**Group's share in (%)**	**Group's share in KRW**	**Intergroup transactions and etc.**	**Book amount**
Joint venture	S-OIL TOTAL Lubricants Co., Ltd.	₩ 63,608	50% plus one share	₩ 31,804	₩ (267)	₩ 31,537
Associate	Korea Oil Terminal Co., Ltd.	(1,040)	18%	(187)	202	15

The tables below provide summarized financial information for those associate and joint venture for the years ended December 31, 2019 and 2018.

(In millions of Korean won)

	S-OIL TOTAL Lubricants Co., Ltd.		**Korea Energy Terminal Co., Ltd.** (Formerly Korea Oil Terminal Co., Ltd.)	
	2019	**2018**	**2019**	**2018**
Current assets	₩ 87,164	₩ 74,810	₩ -	₩ 261
Non-current assets	36,083	26,764	-	3,228
Total assets	₩ 123,247	₩ 101,574	₩ -	₩ 3,489
Current liabilities	54,309	37,966	-	4,529
Non-current liabilities	7,983	-	-	-
Total liabilities	₩ 62,292	₩ 37,966	₩ -	₩ 4,529
Total equity	₩ 60,955	₩ 63,608	₩ -	₩ (1,040)
Sales	₩ 272,667	₩ 268,339	₩ -	₩ -
Operating income (loss)	7,309	11,280	-	(226)
Profit (loss) before income tax	6,360	10,817	-	(226)
Profit (loss) for the year	4,918	8,317	-	(226)
Total comprehensive income (loss) for the year	4,847	8,274	-	(226)

Details of valuation of investments in associate and joint venture that are accounted for using the equity method for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019		
	S-OIL TOTAL Lubricants Co., Ltd.	**Korea Energy Terminal Co., Ltd.** (Formerly Korea Oil Terminal Co., Ltd.)	**Total**
Beginning balance	31,537	15	31,552
Acquisition	-	-	-
Share of profit (loss)	2,459	(15)	2,444
Unrealized gains	106	-	106
Dividend received	(3,750)	-	(3,750)
Other equity changes	(35)	-	(35)
Ending balance	30,317	-	30,317

(In millions of Korean won)	2018		
	S-OIL TOTAL Lubricants Co., Ltd.	**Korea Energy Terminal Co., Ltd.** (Formerly Korea Oil Terminal Co., Ltd.)	**Total**
Beginning balance	₩ 32,298	₩ 55	₩ 32,353
Acquisition	-	-	-
Share of profit (loss)	4,182	(40)	4,142
Unrealized losses	(22)	-	(22)
Dividend received	(4,900)	-	(4,900)
Other equity changes	(21)	-	(21)
Ending balance	₩ 31,537	₩ 15	₩ 31,552

14. Property, Plant and Equipment

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

(In millions of Korean won)	2019								
	Land	**Buildings**	**Structures**	**Machinery and equipment**	**Vehicles**	**Others**	**Catalysts**	**Construction-in-progress**	**Total**
At January 1, 2019									
Acquisition cost	₩ 1,774,635	₩ 522,818	₩ 1,786,536	₩ 7,947,627	₩ 14,800	₩ 713,691	₩ 1,188,372	₩ 780,116	₩ 14,728,595
Accumulated depreciation	-	(96,077)	(593,900)	(2,800,659)	(13,128)	(518,529)	(965,575)	-	(4,987,868)
Net book amount	₩ 1,774,635	₩ 426,741	₩ 1,192,636	₩ 5,146,968	₩ 1,672	₩ 195,162	₩ 222,797	₩ 780,116	₩ 9,740,727
Changes during 2019									
Beginning net book amount	₩ 1,774,635	₩ 426,741	₩ 1,192,636	₩ 5,146,968	₩ 1,672	₩ 195,162	₩ 222,797	₩ 780,116	₩ 9,740,727
Additions	-	56	50	314	195	27,397	172,770	643,805	844,587
Transfers	49,356	14,754	19,628	183,142	89	296,050	54,515	(490,834)	126,700
Disposals	(3,074)	(5,187)	(344)	-	-	(231)	-	(199)	(9,035)
Depreciation	-	(13,411)	(69,298)	(213,076)	(729)	(92,462)	(174,864)	-	(563,840)
Ending net book amount	₩ 1,820,917	₩ 422,953	₩ 1,142,672	₩ 5,117,348	₩ 1,227	₩ 425,916	₩ 275,218	₩ 932,888	₩ 10,139,139
At December 31, 2019									
Acquisition cost	₩ 1,820,917	₩ 531,792	₩ 1,805,274	₩ 8,131,084	₩ 14,827	₩ 1,027,921	₩ 870,361	₩ 932,888	₩ 15,135,064
Accumulated depreciation	-	(108,839)	(662,602)	(3,013,736)	(13,600)	(602,005)	(595,143)	-	(4,995,925)
Net book amount	₩ 1,820,917	₩ 422,953	₩ 1,142,672	₩ 5,117,348	₩ 1,227	₩ 425,916	₩ 275,218	₩ 932,888	₩ 10,139,139

(In millions of Korean won)	2018								
	Land	**Buildings**	**Structures**	**Machinery and equipment**	**Vehicles**	**Others**	**Catalysts**	**Construction-in-progress**	**Total**
At January 1, 2018									
Acquisition cost	₩ 1,330,201	₩ 339,503	₩ 1,067,523	₩ 4,017,714	₩ 14,177	₩ 607,402	₩ 1,016,437	₩ 4,223,403	₩ 12,616,360
Accumulated depreciation	-	(84,596)	(545,844)	(2,699,455)	(12,361)	(433,344)	(872,067)	-	(4,647,667)
Net book amount	₩ 1,330,201	₩ 254,907	₩ 521,679	₩ 1,318,259	₩ 1,816	₩ 174,058	₩ 144,370	₩ 4,223,403	₩ 7,968,693
Changes during 2018									
Beginning net book amount	₩ 1,330,201	₩ 254,907	₩ 521,679	₩ 1,318,259	₩ 1,816	₩ 174,058	₩ 144,370	₩ 4,223,403	₩ 7,968,693
Additions	-	266	4,813	1,390	593	24,421	124,113	1,973,420	2,129,016
Transfers	444,434	182,987	708,841	3,929,506	74	93,010	47,822	(5,416,707)	(10,033)
Disposals	-	(6)	(223)	(561)	-	(220)	-	-	(1,010)
Depreciation	-	(11,413)	(42,474)	(101,626)	(811)	(96,107)	(93,508)	-	(345,939)
Ending net book amount	₩ 1,774,635	₩ 426,741	₩ 1,192,636	₩ 5,146,968	₩ 1,672	₩ 195,162	₩ 222,797	₩ 780,116	₩ 9,740,727
At December 31, 2018									
Acquisition cost	₩ 1,774,635	₩ 522,818	₩ 1,786,536	₩ 7,947,627	₩ 14,800	₩ 713,691	₩ 1,188,372	₩ 780,116	₩ 14,728,595
Accumulated depreciation	-	(96,077)	(593,900)	(2,800,659)	(13,128)	(518,529)	(965,575)	-	(4,987,868)
Net book amount	₩ 1,774,635	₩ 426,741	₩ 1,192,636	₩ 5,146,968	₩ 1,672	₩ 195,162	₩ 222,797	₩ 780,116	₩ 9,740,727

Depreciation expense of ₩ 528,398 million (2018: ₩ 316,509 million) was charged to cost of sales, ₩ 24,298 million (2018: ₩ 22,851 million) to selling expenses and ₩ 11,144 million (2018: ₩ 6,579 million) to administrative expense.

As at December 31, 2019, a certain portion of property, plant and equipment is pledged as collateral for various borrowings and guarantees (Note 16).

During the year, the Group has capitalized borrowing costs amounting to ₩ 3,595 million (2018: ₩ 94,659 million) on property, plant and equipment that are qualifying assets. The capitalization rate of borrowings used to determine the amount of borrowing costs to be capitalized is 2.41% (2018: 2.46%) for general borrowings and 2.44% (2018: 2.52%) for specific borrowings.

As at December 31, 2019, construction in-progress consists of expenses related to facilities installation and land.

As at December 31, 2019, the Group entered into agreements with Samsung Fire & Marine Insurance Co., Ltd. and three other insurance companies in relation to plant construction. The insurance amount covered up to ₩ 2,520,000 million and USD 360 million is pledged as collateral from the Korea Development Bank and eight financial institutions.

15. Intangible Assets

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

(In millions of Korean won)	2019									
	Facility usage Rights		Others		Membership rights		Goodwill		Total	
At January 1, 2019										
Acquisition cost	₩	9,501	₩	90,646	₩	22,948	₩	57,080	₩	180,175
Accumulated amortization		(5,637)		(67,620)		(2,471)		-		(75,728)
Net book amount	₩	3,864	₩	23,026	₩	20,477	₩	57,080	₩	104,447
Changes during 2019										
Beginning net book amount	₩	3,864	₩	23,026	₩	20,477	₩	57,080	₩	104,447
Additions		-		32		230		-		262
Transfers		1,293		3,865		-		-		5,158
Decreases		-		-		(432)		-		(432)
Amortization		(571)		(7,535)		-		-		(8,106)
Ending net book amount	₩	4,586	₩	19,388	₩	20,275	₩	57,080	₩	101,329
At December 31, 2019										
Acquisition cost	₩	10,794	₩	94,543	₩	22,746	₩	57,080	₩	185,163
Accumulated amortization[1]		(6,208)		(75,155)		(2,471)		-		(83,834)
Net book amount	₩	4,586	₩	19,388	₩	20,275	₩	57,080	₩	101,329

[1] The amounts include accumulated impairment losses.

(In millions of Korean won)	2018				
	Facility usage Rights	**Others**	**Membership rights**	**Goodwill**	**Total**
At January 1, 2018					
Acquisition cost	₩ 9,501	₩ 80,400	₩ 23,209	₩ 57,080	₩ 170,190
Accumulated amortization	(5,149)	(59,886)	-	-	(65,035)
Net book amount	₩ 4,352	₩ 20,514	₩ 23,209	₩ 57,080	₩ 105,155
Changes during 2018					
Beginning net book amount	₩ 4,352	₩ 20,514	₩ 23,209	₩ 57,080	₩ 105,155
Additions	-	213	126	-	339
Transfers	-	10,033	-	-	10,033
Decreases	-	-	(387)	-	(387)
Amortization	(488)	(7,734)	-	-	(8,222)
Impairment losses	-	-	(2,471)	-	(2,471)
Ending net book amount	₩ 3,864	₩ 23,026	₩ 20,477	₩ 57,080	₩ 104,447
At December 31, 2018					
Acquisition cost	₩ 9,501	₩ 90,646	₩ 22,948	₩ 57,080	₩ 180,175
Accumulated amortization[1]	(5,637)	(67,620)	(2,471)	-	(75,728)
Net book amount	₩ 3,864	₩ 23,026	₩ 20,477	₩ 57,080	₩ 104,447

[1] The amounts include accumulated impairment losses.

Amortization expense of ₩ 2,926 million (2018: ₩ 2,222 million) is included in cost of sales, ₩ 701 million (2018: ₩ 538 million) in selling expenses and ₩ 4,479 million (2018: ₩ 5,462 million) in administrative expense.

Membership impairment reviews are undertaken annually. As a result of the impairment test, the Group recognized ₩ 2,471 million of impairment losses on the memberships that carrying amount exceeds the recoverable amount for the year ended December 31, 2018.

The Group recognized total research and development costs of ₩ 17,597 million (2018: ₩ 21,011 million) as expenses.

16. Assets Pledged as Collateral

As at December 31, 2019, assets pledged as collateral are as follows:

(In millions of Korean won and millions of other foreign currencies)

Pledged Assets as Collateral	**Secured Amount**	**Creditors**	**Related Borrowings/ Guarantees**	**Balance of Borrowings**
Land, Buildings, BTX and others	₩ 19,350 USD 144 FRF 155 JPY 11,781	The Korea Development Bank	Usance Borrowings and others	₩ 503,704 (USD 435)
Construction-in-progress (Land)	₩ 75,168	The Korea Development Bank	Loans for facility	₩ 50,893
Land, Buildings, Facilities, Construction-in-Progress and others[1]	₩ 2,520,000	The Korea Development Bank and others	Loans for facility	₩ 813,699

Time deposits[2]	₩ 27,000	Defense Acquisition Program Administration	Contractual Guarantee	-
Time deposits[2]	₩ 5,000	Korea Industrial Complex Corporation	Contractual Guarantee	-
		Total (Including USD 435)		₩ 1,368,296

[1] The land, buildings, facilities and construction-in-progress have been pledged as collateral for agreements with the Korea Development Bank and eight other financial institutions in relation to industry facilities fund and the outstanding amount is ₩ 813,699 million as at December 31, 2019.

[2] Short-term financial instruments include ₩ 31,226 million which are subject to restricted use in relation to contractual guarantee.

17. Trade Payables, Other Payables and Other Liabilities

Trade payables and other payables as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019		2018	
	Current	**Non-current**	**Current**	**Non-current**
Trade payables	₩ 1,655,203	₩ -	₩ 1,437,254	₩ -
Other payables				
Non-trade payables	517,172	-	727,542	470
Accrued expenses	22,487	-	25,285	-
Dividend payables	66	-	102	-
Lease liabilities (Note 35)	68,235	244,538	3,680	63,992
Leasehold deposit received	-	36,241	-	34,577
	607,960	280,779	756,609	99,039
Total	₩ 2,263,163	₩ 280,779	₩ 2,193,863	₩ 99,039

Other liabilities as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019		2018	
	Current	**Non-current**	**Current**	**Non-current**
Advances from customers	₩ 88,084	₩ -	₩ 101,605	₩ -
Withholdings	4,466	-	16,392	-
Non-trade payables and tax	533,651	-	493,677	-
Total	₩ 626,201	₩ -	₩ 611,674	₩ -

18. Borrowings

Details of borrowings as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019	2018
Current		
Short-term borrowings in Korean won	₩ 120,000	₩ -
Short-term borrowings in foreign currencies	-	122,991
Banker's usance	2,199,738	2,236,217
Current maturities of debentures	359,813	434,861
Current maturities of long-term borrowings	145,561	140,701
	2,825,112	2,934,770
Non-current		
Debentures	2,835,495	2,535,816
Long-term borrowings	719,310	864,811
	3,554,805	3,400,627
Total	₩ 6,379,917	₩ 6,335,397

Details of carrying amount of borrowings as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Creditor	Maturity date	Interest rates (%) Dec. 31, 2019	2019	2018
Short-term borrowings					
Short-term borrowings in Korean won	The Korea Development Bank	Mar. 27, 2020	1.77	₩ 120,000	₩ -
Short-term borrowings in foreign currencies	KEB Hana Bank	-	-	-	122,991
Banker's usance	The Korea Development Bank and others	Jan. 6, 2020 and others	2.22 – 2.37	2,199,738	2,236,217
				2,319,738	2,359,208
Current maturities of long-term borrowings					
Loans for facilities from energy usage rationalization fund	KEB Hana Bank	Mar. 15, 2020 and others	1.75	280	1,649
Loans for environment improvement supporting fund	KEB Hana Bank	-	-	-	161
Loans for industry facilities fund	The Korea Development Bank	Jan. 31, 2020 and others	1.87 – 2.44	10,714	10,714
Loans for industry facilities fund	The Korea Development Bank and others	Mar. 31, 2020 and others	2.755	134,567	128,177
				145,561	140,701
Long-term borrowings					
Loans for facilities from energy usage rationalization fund	KEB Hana Bank	-	-	-	280
Loans for industry facilities fund	The Korea Development Bank	Jul. 31, 2024	1.87 – 2.44	40,178	50,893
Loans for industry facilities fund	The Korea Development Bank and others	Dec. 30, 2025	2.755	679,132	813,638
				719,310	864,811
Total				₩ 3,184,609	₩ 3,364,720

Details of carrying amount of debentures as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Issuance date	Maturity Date	Interest Rates (%) Dec. 31, 2019	2019	2018
Public bonds (45-2)	Aug. 28, 2012	Aug. 28, 2019	3.330	₩ -	₩ 100,000
Public bonds (45-3)	Aug. 28, 2012	Aug. 28, 2022	3.530	50,000	50,000
Public bonds (46-1)	Jun. 26, 2014	Jun. 26, 2019	3.092	-	180,000
Public bonds (46-2)	Jun. 26, 2014	Jun. 26, 2021	3.234	110,000	110,000
Public bonds (46-3)	Jun. 26, 2014	Jun. 26, 2024	3.468	70,000	70,000
Public bonds (47-1)	Nov. 27, 2014	Nov. 27, 2019	2.471	-	155,000
Public bonds (47-2)	Nov. 27, 2014	Nov. 27, 2021	2.706	80,000	80,000
Public bonds (47-3)	Nov. 27, 2014	Nov. 27, 2024	2.990	130,000	130,000
Public bonds (48-1)	Oct. 29, 2015	Oct. 29, 2020	2.297	230,000	230,000
Public bonds (48-2)	Oct. 29, 2015	Oct. 29, 2022	2.391	70,000	70,000
Public bonds (48-3)	Oct. 29, 2015	Oct. 29, 2025	2.657	100,000	100,000
Public bonds (49-1)	Apr. 18, 2016	Apr. 18, 2021	1.930	230,000	230,000
Public bonds (49-2)	Apr. 18, 2016	Apr. 18, 2023	2.101	60,000	60,000
Public bonds (49-3)	Apr. 18, 2016	Apr. 18, 2026	2.225	60,000	60,000
Public bonds (50-1)	Sep. 2, 2016	Sep. 2, 2021	1.646	210,000	210,000
Public bonds (50-2)	Sep. 2, 2016	Sep. 2, 2023	1.722	80,000	80,000
Public bonds (50-3)	Sep. 2, 2016	Sep. 2, 2026	1.932	60,000	60,000
Public bonds (51-1)	Feb. 22, 2017	Feb. 22, 2022	2.197	230,000	230,000
Public bonds (51-2)	Feb. 22, 2017	Feb. 22, 2024	2.438	110,000	110,000
Public bonds (51-3)	Feb. 22, 2017	Feb. 22, 2027	2.559	60,000	60,000
Public bonds (52-1)	Sep. 19, 2017	Sep. 19, 2020	2.046	130,000	130,000
Public bonds (52-2)	Sep. 19, 2017	Sep. 19, 2022	2.317	110,000	110,000
Public bonds (52-3)	Sep. 19, 2017	Sep. 19, 2024	2.531	60,000	60,000
Public bonds (53-1)	Jul. 3, 2018	Jul. 3, 2021	2.442	110,000	110,000
Public bonds (53-2)	Jul. 3, 2018	Jul. 3, 2023	2.617	110,000	110,000
Public bonds (53-3)	Jul. 3, 2018	Jul. 3, 2025	2.708	80,000	80,000
Public bonds (54-1)	Jun. 7, 2019	Jun, 7, 2024	1.762	110,000	-
Public bonds (54-2)	Jun. 7, 2019	Jun, 7, 2026	1.769	100,000	-
Public bonds (54-3)	Jun. 7, 2019	Jun, 7, 2029	1.860	190,000	-
Public bonds (55-1)	Nov. 4, 2019	Nov. 4, 2024	1.904	160,000	-
Public bonds (55-2)	Nov. 4, 2019	Nov. 4, 2026	1.926	40,000	-
Public bonds (55-3)	Nov. 4, 2019	Nov. 4, 2029	2.102	60,000	-
Less: Present value discount				(4,692)	(4,323)
Sub total				3,195,308	2,970,677
Less: Current maturities				(359,813)	(434,861)
Total				₩ 2,835,495	₩ 2,535,816

As at December 31, 2019 and 2018, a certain portion of property, plant and equipment and etc. is pledged as collateral for various borrowings (Note 16).

19. Provisions and Contract Liabilities

Details and changes in provisions for other liabilities and charges for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Environmental Restoration	
	2019	**2018**
Beginning balance	₩ 2,768	₩ 1,797
Additional provision	829	3,000
Used during year	(3)	(2,029)
Ending balance	₩ 3,594	₩ 2,768

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

(In millions of Korean won)	**2019**	**2018**
Beginning balance	₩ 23,080	₩ 24,937
Additions	9,198	9,359
Used during year	(10,677)	(11,216)
Ending balance	₩ 21,601	₩ 23,080

Contract liabilities arise from customer loyalty program, and are adjusted from revenue.

20. Net Defined Benefit Assets/Liabilities

The majority of the plans are final salary pension plans, which provide benefit to employees in the form of a guaranteed level of pension payable for life. The level of benefits provided depends on employees' length of severance and their salary in the final years leading up to retirement. The majority of benefit payments are from trustee administered funds; however, there are also a number of unfunded plans. Plan assets held in trusts are governed by local regulations and practice in each country.

Details of net defined benefit liabilities recognized in the consolidated statements of financial position as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	**2019**	**2018**
Present value of funded defined benefit obligations	₩ 409,063	₩ 356,830
Fair value of plan assets[1]	(397,506)	(393,224)
Net defined benefit liabilities (assets)	₩ 11,557	₩ (36,394)

[1] The contributions to the National Pension Fund of ₩ 408 million are included in the fair value of plan assets as at December 31, 2019 (2018: ₩ 436 million).

Movements in the defined benefit obligations for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)		**2019**		**2018**
Beginning balance	₩	356,830	₩	312,834
Current service cost		43,030		38,502
Interest expense		11,321		11,704
Remeasurements :				
Actuarial losses arising from change in financial assumptions		15,835		14,643
Actuarial losses arising from change in demographic assumptions		79		2,211
Actuarial gains from experience adjustments		(5,854)		(3,092)
Benefits payments		(12,178)		(19,972)
Ending Balance	₩	409,063	₩	356,830

Movements in the fair value of plan assets for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)		**2019**		**2018**
Beginning balance	₩	393,224	₩	378,631
Interest income		11,823		13,560
Remeasurements :				
Return on plan assets		(5,271)		(8,260)
Contributions		10,138		28,742
Benefits payments		(12,408)		(19,449)
Ending balance	₩	397,506	₩	393,224

Plan assets as at December 31, 2019 and 2018, consist of financial assets including deposits.

The significant actuarial assumptions as at December 31, 2019 and 2018, are as follows:

	2019	**2018**
Discount rate	2.17% - 2.80%	2.55 - 3.20%
Salary growth rate	4.40% - 5.32%	5.00 - 5.32%

The sensitivity of the defined benefit obligation to changes in the principal assumptions is:

	Changes in assumption	**Impact on defined benefit obligations**	
		December 31, 2019	**December, 31 2018**
Salary growth rate	One percent increase	10.78% increase	10.97% increase
	One percent decrease	9.35% decrease	9.52% decrease
Discount rate	One percent increase	9.28% decrease	9.43% decrease
	One percent decrease	10.93% increase	11.07% increase

The above sensitivity analyses are based on a change in an assumption while holding all other assumptions constant. The sensitivity of the defined benefit obligation to changes in principal actuarial assumptions is calculated using the projected unit credit method, the same method applied when calculating the defined benefit obligations recognized on the consolidated statement of financial position. The methods and types of assumptions used in preparing the sensitivity analysis did not change compared to the prior period.

The Group reviews the funding level on an annual basis and has a policy of eliminating deficit from the fund.

The weighted average duration of the defined benefit obligation is 10.10 years and expected contributions to post-employment benefit plans for the year ending December 31, 2019 are ₩ 58,877 million.

The expense and others recognized in the current period in relation to defined contribution plan was ₩ 8,282 million (2018: ₩ 7,901 million).

21. Contingencies and Commitments

As at December 31, 2019, the Group has overdraft agreements of up to ₩ 23,000 million with Shinhan Bank and one other bank, short-term loan agreements of up to ₩ 120,000 million with the Korea Development Bank and general loan agreements of up to ₩ 14,750 million and USD 532 million with Shinhan Bank and three other banks.

As at December 31, 2019, the Group has banker's usance agreements and imported credit agreements of up to a maximum of USD 4,570 million with the Korea Development Bank and 17 other banks.

As at December 31, 2019, Shinhan Bank has provided guarantees up to ₩ 30,000 million for the Group's obligation for repayment of remaining bonus points.

As at December 31, 2019, KEB Hana Bank has provided guarantees up to ₩ 1,600 million for the restoration responsibilities of Onsan National Industrial Complex.

As at December 31, 2019, the Group offered one blank check to Korea National Oil Corporation ("KNOC") as payment guarantee.

As at December 31, 2019, the balance of trade receivables that are not past due amounts to USD 280 million (2018: USD 149 million). As at December 31, 2019, the Group transferred the trade receivables to Mizuho Corporate Bank and two other financial institutions and derecognized the transferred receivables as all the risks and rewards are substantially transferred (Note 8).

As at December 31, 2019, the Group has Stand-by credit line agreements, etc. with the Korea Development Bank and five other financial institutions for up to ₩ 300,000 million and USD 290 million.

As at December 31, 2019, the Group has agreements with the Korea Development Bank and eight other financial institutions in relation to industry facilities fund and the outstanding amount is ₩ 813,699 million.

As at December 31, 2019, the Group entered into agreements with Samsung Fire & Marine Insurance Co., Ltd. and three other insurance companies in relation to plant construction. The insurance amount covered up to ₩ 2,520,000 million and USD 360 million is pledged as collateral from the Korea Development Bank and eight financial institutions.

As at December 31, 2019, the Group has been provided performance guarantee and others amounting to ₩ 5,466 million by Seoul Guarantee Insurance.

As at December 31, 2019, there is no significant pending litigation.

As at December 31, 2019, the amount of commitment in relation to the Group’s purchase of lands is ₩ 3,101 million.

22. Share Capital and Share Premium

Share capital and share premium as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won, except number of shares)	**Number of shares (Ordinary share)**	**Number of shares (Preferred share)**	**Share capital (Ordinary share)**	**Share capital (Preferred share)**	**Share premium**	**Total**
December 31, 2018	112,582,792	4,021,927	₩281,457	₩ 10,055	₩ 379,190	₩ 670,702
December 31, 2019	112,582,792	4,021,927	₩281,457	₩ 10,055	₩ 379,190	₩ 670,702

Under its Articles of Incorporation, the Company is authorized to issue 60 million cumulative, participating preferred shares that are non-voting and entitled to a minimum cash dividend at 9% of par value. As all of the preferred share as at December 31, 2019, was issued before March 27, 1998, it receives 1% more dividends over ordinary share under the Articles of Incorporation.

The Company is authorized to issue non-voting convertible share up to 4 million shares. Each share of this non-voting convertible share was converted to one ordinary share. As at December 31, 2019, there is no outstanding convertible share issued by the Company.

The Company may grant options to purchase the Company’s ordinary share to key employees or directors. The grant limit of the options is 15% of outstanding shares and the options may be granted with the special resolution of the shareholders. As at December 31, 2019, no option has been granted.

The Company is authorized to issue 180,000,000 ordinary shares with a par value of ₩ 2,500 per share and 112,582,792 ordinary shares are issued. The Company is authorized to issue 60,000,000 preferred shares with par value of ₩ 2,500 per share and 4,021,927 preferred shares are issued.

23. Treasury Share

As at December 31, 2019, the Company holds 184,080 treasury share of preferred shares amounting to ₩ 1,876 million and is deducted from shareholders' equity. The Company intends to dispose of the treasury share depending on the market conditions.

24. Retained Earnings

Retained earnings as at December 31, 2019 and 2018, consist of:

(In millions of Korean won)		2019		2018
Legal reserve				
Earned surplus reserve[1]	₩	145,756	₩	145,756
Discretionary reserve				
Reserve for improvement of financial structure		55,700		55,700
Reserve for business rationalization		103,145		103,145
Reserve for market development		3,508,498		3,357,898
		3,667,343		3,516,743
Revaluation reserve		984,648		984,648
Retained earnings before appropriation		50,424		175,910
	₩	4,848,171	₩	4,823,057

[1] The Commercial Code of the Republic of Korea requires the Company to appropriate, as a legal reserve, an amount equal to a minimum of 10% of annual cash dividends paid, until such reserve equals 50% of its issued share capital. As the Company's reserve exceeds 50% of its issued share capital, additional reserve is unnecessary. The reserve is not available for cash dividends payment, but may be transferred to share capital or used to reduce accumulated deficit.

Year-end cash dividends for 2018 amounting to ₩ 16,887 million for ordinary share and ₩ 672 million for preferred share were paid out in April 2019 (Dividends paid in 2018: ₩ 529,139 million for ordinary share and ₩ 18,134 million for preferred share).

In accordance with the Articles of Incorporation on August 1, 2019, the Board of Directors declared interim cash dividends of ₩ 100 per share with dividend date on June 30, 2019.

(In millions of Korean won, except number of shares)	**Number of shares**		**Amount**	**Dividend rate**		**Cash Dividends**
Ordinary share	112,582,792	₩	281,457	4%	₩	11,258
Preferred share[1]	3,837,847		9,595	4%		384
	116,420,639	₩	291,052		₩	11,642

[1] Treasury shares are excluded from the number of shares issued.

A dividend in respect of the year ended December 31, 2019, of ₩ 100 per ordinary share and ₩ 125 per preferred share, amounting to total dividend of ₩ 11,258 million for ordinary share and ₩ 480 million for preferred share, is to be proposed to shareholders at the annual general meeting on March 26, 2020. These consolidated financial statements do not reflect this dividend payable.

25. Reserves

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

(In millions of Korean won)	Gains on disposal of treasury share	Gains on valuation of financial assets at fair value through other comprehensive income	Share of other comprehensive loss of joint venture and associate	Unrealized translation gains on foreign operation	Cash flow hedge	Total
Balance at January 1, 2019	₩ 952,311	₩ 16,917	₩ (49)	₩ 8,172	₩ -	₩ 977,351
Gains on valuation of financial assets at fair value through other comprehensive income	-	2,271	-	-	-	2,271
Currency translation difference	-	-	-	32	-	32
Share of other comprehensive income in joint venture and associate	-	-	(25)	-	-	(25)
Balance at December 31, 2019	₩ 952,311	₩ 19,188	₩ (74)	₩ 8,204	₩ -	₩ 979,629
Balance at January 1, 2018	₩ 952,311	₩ 16,485	₩ (34)	₩ 8,134	₩ (1,234)	₩ 975,662
Gains on valuation of financial assets at fair value through other comprehensive income	-	432	-	-	-	432
Currency translation difference	-	-	-	38	-	38
Share of other comprehensive income in joint venture and associate	-	-	(15)	-	-	(15)
Cash flow hedge	-	-	-	-	1,234	1,234
Balance at December 31, 2018	₩ 952,311	₩ 16,917	₩ (49)	₩ 8,172	₩ -	₩ 977,351

26. Cost of Sales

Cost of sales for the years ended December 31, 2019 and 2018, consists of:

(In millions of Korean won)		2019		2018
Beginning balance of merchandise and finished goods	₩	769,842	₩	558,279
Purchases of merchandise		2,043,007		2,500,951
Manufacturing cost for the year		23,565,688		24,043,603
Transfer from other accounts		26,146		48,864
Transfer to other accounts		(1,597,495)		(1,401,371)
Ending balance of merchandise and finished goods		(684,362)		(769,842)
Adjustments		(776,020)		(780,238)
Total	₩	23,346,806	₩	24,200,246

27. Selling and Administrative Expenses

Selling and administrative expenses for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Selling expenses		Administrative expenses	
	2019	2018	2019	2018
Salaries	₩ 64,817	₩ 64,525	₩ 32,476	₩ 31,006
Post-employment benefits	10,670	9,481	5,832	4,775
Employee benefits	29,562	37,483	17,603	20,502
Training expenses	91	58	1,749	2,842
Travel expenses	3,405	3,323	990	1,122
Miscellaneous administrative expenses	176	851	580	496
Communication expenses	2,199	1,771	1,311	1,516
Vehicles maintenance expenses	442	442	366	360
Utility expenses	2,273	1,809	1,100	1,301
Rental expenses	3,610	11,976	1,277	2,013
Service expenses for oil storages	27,293	27,161	-	-
Service fees	11,583	12,923	5,340	6,646
Entertainment expenses	1,360	1,389	1,347	969
Export expenses	110,790	114,541	-	-
Repairs and maintenance expenses	6,266	6,490	7,176	3,472
Supplies expenses	242	253	83	106
Chemicals expenses	622	438	-	-
Outsourcing fees	12,653	14,212	7,910	9,525
Promotional and advertising expenses	20,490	24,445	7,495	8,006
Freight expenses	155,884	145,010	-	-
Insurance premium	1,290	3,109	180	65
Taxes and dues	5,329	5,445	6,685	5,557
Depreciation expenses	24,298	22,851	11,144	6,580
Amortization expenses	701	538	4,480	5,462
Depreciation of right-of-use assets	11,159	-	3,715	-
Impairment losses (Reversal of provision for impairment)	(47)	(242)	-	1
Others	304	275	989	710
Total	₩ 507,462	₩ 510,557	₩ 119,828	₩ 113,032

28. Other Income and Expenses

Other income and expenses for the years ended December 31, 2019 and 2018, are as follows:

Other income

(In millions of Korean won)		**2019**		**2018**
Gains on disposal of property, plant and equipment	₩	2,710	₩	69
Dividend income		947		1,037
Others		47,914		24,259
Gains on foreign currency transactions		264,404		198,708
Gains on foreign currency translation		23,583		9,120
Gains on derivative transactions		29,902		23,994
Gains on valuation of derivatives		566		4,590
Gains on disposal of investments in associate		397		-
Total	₩	370,423	₩	261,777

Other expenses

(In millions of Korean won)		**2019**		**2018**
Losses on disposal of property, plant and equipment	₩	5,527	₩	617
Impairment losses on intangible assets		-		2,471
Donations		19,346		19,456
Others		24,614		75,647
Losses on foreign currency transactions		309,829		256,272
Losses on foreign currency translation		15,862		9,408
Losses on derivative transactions		57,233		79,260
Losses on valuation of derivatives		8,160		9,768
Total	₩	440,571	₩	452,899

29. Finance Income and Costs

Finance income and costs for the years ended December 31, 2019 and 2018, consist of:

Finance income

(In millions of Korean won)		**2019**		**2018**
Interest income	₩	13,960	₩	24,295
Gains on foreign currency transactions		99,092		73,998
Gains on foreign currency translation		50,356		18,374
Total	₩	163,408	₩	116,667

Finance costs

(In millions of Korean won)		**2019**		**2018**
Interest expenses[1]	₩	182,816	₩	72,309
Losses on foreign currency transactions		222,720		164,166
Losses on foreign currency translation		-		861
Total	₩	405,536	₩	237,336

[1] Interest expenses exclude capitalized borrowing costs on qualifying assets (Note 14).

30. Tax Expense and Deferred Tax

Income tax expense for the years ended December 31, 2019 and 2018, consists of:

(In millions Korean won)	2019	2018
Current tax		
Current tax on profit for the year	₩ 793	₩ 60,165
Adjustments in respect of prior years	(3,186)	4,791
Total current tax	(2,393)	64,956
Deferred tax		
Origination and reversal of temporary differences	47,315	8,798
Income tax expense	₩ 44,922	₩ 73,754

The tax on the Group's profit before tax differs from the theoretical amount that would arise using the weighted average tax rate applicable to profits of the consolidated entities as follows:

(In millions of Korean won)	2019	2018
Profit before income tax	₩ 110,351	₩ 331,789
Tax at domestic tax rates applicable to profits in the respective countries	₩ 30,007	₩ 80,880
Income not subject to tax	(4,984)	(6,982)
Expenses not deductible for tax purposes	23,296	3,913
Adjustments in respect of prior years	(3,186)	4,791
Tax credit and others	(752)	(11,751)
Effects of changes on tax brackets	541	2,903
Income tax expense	₩ 44,922	₩ 73,754

The weighted average applicable tax rate of the Group was 27.19% (2018: 24.38%).

The tax effect relating to components of other comprehensive income (expenses) for the years ended December 31, 2019 and 2018, is as follows:

(In millions Korean won)	2019		
	Before Tax	Tax effect	After tax
Gains on valuation of financial assets at fair value through other comprehensive income	₩ 3,133	₩ (862)	₩ 2,271
Share of other comprehensive income of joint venture and associate	(34)	9	(25)
Remeasurements of net defined benefit liabilities	(15,332)	4,218	(11,114)
Currency translation differences	44	(12)	32
Cash flow hedge	-	-	-
Total	₩ (12,189)	₩ 3,353	₩ (8,836)

(In millions Korean won)	2018		
	Before Tax	Tax effect	After tax
Gains on valuation of financial assets at fair value through other comprehensive income	₩ 596	₩ (164)	₩ 432
Share of other comprehensive income of joint venture and associate	(21)	6	(15)
Remeasurements of net defined benefit liabilities	(22,022)	6,045	(15,977)
Currency translation differences	53	(15)	38
Cash flow hedge	1,702	(468)	1,234

Total	₩ (19,692)	₩ 5,404	₩ (14,288)

The analysis of deferred tax assets and liabilities as at December 31, 2019 and 2018, is as follows:

(In millions of Korean won)	**2019**	**2018**
Deferred tax assets		
Deferred tax asset to be recovered after more than 12 months	₩ 50,536	₩ 47,222
Deferred tax asset to be recovered within 12 months	52,757	47,981
	103,293	95,203
Deferred tax liabilities		
Deferred tax liability to be recovered after more than 12 months	(236,472)	(235,775)
Deferred tax liability to be recovered within 12 months	(107,711)	(56,356)
	(344,183)	(292,131)
Deferred tax liabilities, net	₩ (240,890)	₩ (196,928)

The movements on the deferred income tax for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	**2019**	**2018**
Beginning balance	₩ (196,928)	₩ (193,534)
Deferred income tax charged to income	(47,315)	(8,798)
Deferred income tax charged to equity	3,353	5,404
Ending balance	₩ (240,890)	₩ (196,928)

The movements in deferred tax assets and liabilities for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)

	2019			
	Beginning Balance	**Statement of Profit or Loss**	**Other comprehensive income**	**Ending Balance**
Depreciation	₩ 5,324	₩ (757)	₩ -	₩ 4,567
Losses on impairment of investments	1,186	(40)	-	1,146
Salaries and wages payable	11,273	(3,268)	-	8,005
Bonus card point and etc.	7,470	(89)	-	7,381
Subsidiary and joint ventures	(1,226)	(136)	-	(1,362)
Gains (losses) on valuation of derivative instruments	1,649	(905)	-	744
Losses on impairment of property, plant and equipment	1,518	(27)	-	1,491
Customs duties receivable	(18,908)	(15,891)	-	(34,799)
Accrued interest income	(160)	(213)	-	(373)
Net defined benefit liabilities	(11,432)	7,131	-	(4,301)
Employee benefits	7,840	389	-	8,229
Revaluation of lands	(215,184)	545	-	(214,639)
Annual leave compensation and others	(6,761)	(58,818)	-	(65,579)
Tax loss carryforwards and tax credits	-	24,764	-	24,764
Gains (losses) on valuation of financial assets at fair value through other comprehensive income	(6,418)		(862)	(7,280)
Currency translation differences and share of other comprehensive income of associate and joint venture	(2,518)	-	(3)	(2,521)
Cash flow hedge	-	-	-	-
Remeasurements of net defined benefit liabilities	29,419	-	4,218	33,637
Total	₩ (196,928)	₩ (47,315)	₩ 3,353	₩ (240,890)

(In millions of Korean won)

	2018			
	Beginning Balance	**Statement of Profit or Loss**	**Other comprehensive income**	**Ending Balance**
Depreciation	₩ 6,021	₩ (697)	₩ -	₩ 5,324
Losses on impairment of investments	507	679	-	1,186
Salaries and wages payable	24,544	(13,271)	-	11,273
Bonus card point and etc.	7,697	(227)	-	7,470
Subsidiary and joint ventures	(5,023)	3,797	-	(1,226)
Gains (losses) on valuation of derivative instruments	1,547	102	-	1,649
Losses on impairment of property, plant and equipment	1,518	-	-	1,518
Customs duties receivable	(12,319)	(6,589)	-	(18,908)
Accrued interest income	(1,911)	1,751	-	(160)
Net defined benefit liabilities	(14,735)	3,303	-	(11,432)
Employee benefits	7,997	(157)	-	7,840
Revaluation of lands	(215,184)	-	-	(215,184)
Annual leave compensation and others	(9,272)	2,511	-	(6,761)
Tax loss carryforwards and tax credits	-	-	-	-
Gains (losses) on valuation of financial assets at fair value through other comprehensive income	(6,254)	-	(164)	(6,418)
Currency translation differences and share of other comprehensive income of associate and joint venture	(2,509)	-	(9)	(2,518)
Cash flow hedge	468	-	(468)	-
Remeasurements of net defined benefit liabilities	23,374	-	6,045	29,419

Total	₩ (193,534)	₩ (8,798)	₩ 5,404	₩ (196,928)

31. Breakdown of Expenses by Nature

Expenses by nature for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019	2018
Raw materials and merchandises used	₩ 20,769,173	₩ 22,286,125
Changes in inventories of finished goods, work in-progress and merchandise	40,973	(311,804)
Employee benefit expense	365,606	353,785
Utility expenses	1,456,582	1,375,126
Depreciation and amortization	571,947	354,161
Depreciation of right-of-use assets	40,503	1,143
Freight expenses	232,528	226,403
Advertising costs	15,951	18,532
Other expenses	480,833	520,364
Total cost of sales, selling and administrative expenses	₩ 23,974,096	₩ 24,823,835

32. Earnings per Share

Basic earnings per ordinary share is calculated by dividing the profit attributable to ordinary shareholders of the Group by the weighted average number of ordinary shares during the financial year. As the Group's preferred shares are participating shares with right to participate in distribution of earnings, earnings per share on preferred share is also calculated.

Basic earnings per ordinary share for the years ended December 31, 2019 and 2018, is calculated as follows:

(In millions of Korean won, except per share data and number of shares)	2019	2018
Profit for the year	₩ 65,429	₩ 258,035
Adjustments:		
Dividends for preferred share	(96)	(96)
Additional dividends for preferred share	(2,154)	(8,503)
Profit attributable to ordinary share shareholders	63,179	249,436
Weighted average number of shares of ordinary share	112,582,792	112,582,792
Basic earnings per ordinary share	₩ 561	₩ 2,216

Basic earnings per preferred share for the years ended December 31, 2019 and 2018, is calculated as follows:

(In millions of Korean won, except per share data and number of shares)	2019	2018
Profit attributable to preferred share shareholders	₩ 2,250	₩ 8,599
Weighted average number of shares of preferred share[1]	3,837,847	3,837,847
Basic earnings per preferred share	₩ 586	₩ 2,241

[1] The 184,080 treasury shares are excluded in calculating weighted average number of shares of preferred share.

As there are no dilutive items outstanding, diluted earnings per share is identical to basic earnings per share.

33. Related Party Transactions

Details of related parties as at December 31, 2019 and 2018, are as follows:

	2019	2018
Ultimate parent company	Saudi Arabian Oil Company[3]	Saudi Arabian Oil Company[3]
Parent company	Aramco Overseas Co., B.V.	Aramco Overseas Co., B.V.
Joint venture	S-OIL TOTAL Lubricants Co., Ltd.	S-OIL TOTAL Lubricants Co., Ltd.
Associate[1]	-	Korea Oil Terminal Co., Ltd. [1]
Other related parties who have transactions with the Company	Aramco Trading Company (Formerly Saudi Aramco Products Trading Company)[4]	Aramco Trading Company (Formerly Saudi Aramco Products Trading Company)[4]
	Aramco Trading Singapore Pte. Ltd. [4]	Aramco Trading Singapore Pte. Ltd.[4]
	Saudi Aramco Base Oil Company – Luberef Saudi Arabia[4]	-
	Aramco Chemicals Company[4]	-
	Aramco Trading Limited[4]	-
	Aramco Trading Fujairah FZE[4]	-
	The National Shipping Company of Saudi Arabia[5]	The National Shipping Company of Saudi Arabia[5]
	Hyundai Oilbank Co., Ltd.[2, 5]	-

[1] The Company's entire ownership interest in Korea Oil Terminal was disposed of during the year ended December 31, 2019.
[2] Hyundai Oilbank Co., Ltd. is presented as a related party of the Company as it is transferred to an associate of Aramco Overseas Co., B.V., the Parent Company of the Company, during the year ended December 31, 2019.
[3] The ultimate parent of Aramco Overseas Co., B.V.
[4] Subsidiaries of Saudi Arabian Oil Company
[5] Associates of Saudi Arabian Oil Company

Significant transactions with related parties for the years ended December 31, 2019 and 2018, and the related receivables and payables as at December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Sales		Purchases	
	2019	2018	2019	2018
Ultimate parent company				
Saudi Arabian Oil Company[1]	₩ -	₩ -	₩ 14,040,070	₩ 17,428,059
Joint venture				
S-OIL TOTAL Lubricants Co., Ltd.	84,141	93,248	33,649	33,086
Other related parties				
Aramco Trading Company (Formerly Saudi Aramco Products Trading Company)	27,368	2,302,769	2,214,744	956,019
Aramco Trading Singapore PTE. LTD.	3,943,462	614,837	1,004,206	343,733
Hyundai Oilbank Co., Ltd. [2]	11,035	-	11,571	-
Others	27,511	-	342,459	114,910
Total	₩ 4,093,517	₩ 3,010,854	₩ 17,646,699	₩ 18,875,807

(In millions of Korean won)	Receivables		Payables	
	2019	2018	2019	2018
Ultimate parent company				
Saudi Arabian Oil Company[1]	₩ -	₩ -	₩ 980,684	₩ 1,027,835
Joint venture				
S-OIL TOTAL Lubricants Co., Ltd.	3,596	955	3,657	1,456
Other related parties				
Aramco Trading Company (Formerly Saudi Aramco Products Trading Company)	-	41,727	387,357	140,036
Aramco Trading Singapore PTE. LTD.	42,673	219,620	25,207	64,459
Hyundai Oilbank Co., Ltd. [2]	2,100	-	14,459	-
Others	23,931	-	49,623	4,462
Total	₩ 72,300	₩ 262,302	₩ 1,460,987	₩ 1,238,248

[1] The Group is under a long-term purchasing agreement with Saudi Arabian Oil Company in relation with crude oil purchase as at December 31, 2018.

[2] This is the exchange transaction with Hyundai Oilbank Co., Ltd.

Financial transactions with related parties for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	Dividends received		Dividends paid	
	2019	2018	2019	2018
Parent company				
Aramco Overseas Co., B.V.	₩ -	₩ -	₩ 17,944	₩ 380,226
Joint venture				
S-OIL TOTAL Lubricants Co., Ltd.	3,750	4,900	-	-
Total	₩ 3,750	₩ 4,900	₩ 17,944	₩ 380,226

The compensation to key management for employee services for the years ended December 31, 2019 and 2018, consists of:

(In millions of Korean won)	2019	2018
Short-term employee benefits	₩ 1,383	₩ 1,482
Post-employment benefits	207	183
Total	₩ 1,590	₩ 1,665

Key management consists of registered executive officers who have the authority and responsibility in the planning, directing and control over the Group's operations.

34. Cash Generated From Operations

Cash generated from operations for the years ended December 31, 2019 and 2018, is as follows:

(In millions of Korean won)	2019	2018
Profit for the year	₩ 65,429	₩ 258,035
Adjustments :		
Income tax expense	44,922	73,754
Depreciation expense of property, plant and equipment	563,840	345,939
Amortization expense	8,106	8,222
Depreciation of right-of-use assets	40,503	1,143
Post-employment benefits	42,527	36,645
Reversal of provision for impairment losses on receivables	(47)	(241)
Interest expense	182,816	72,309
Losses on foreign currency translation	15,862	10,269
Losses on derivative transactions	57,233	79,260
Losses on valuation of derivatives	8,160	9,768
Losses on disposal of property, plant and equipment	5,527	617
Impairment losses on intangible assets	-	2,471
Losses on valuation of inventories (reversal)	(210,430)	242,161
Share of profit of joint venture	(2,565)	(4,161)
Share of loss of associate	15	41
Interest income	(13,960)	(24,295)
Gains on foreign currency translation	(73,939)	(27,494)
Gains on disposal of property, plant and equipment	(2,710)	(69)
Gains on disposal of investments in associate	(397)	-
Gains on derivative transactions	(29,902)	(23,994)
Gains on valuation of derivatives	(566)	(4,590)
Dividend income	(947)	(1,037)
Others	5,615	1,856
Changes in net working capital :		
Trade receivables	312,663	(111,635)
Other receivables	(73,335)	(86,941)
Other current assets	(170,777)	(2,684)
Inventories	20,659	(590,501)
Trade payables	239,242	(289,591)
Other payables	(223,776)	228,742
Other liabilities	11,019	999
Net defined benefit liabilities	(9,908)	(29,405)
Provisions for other liabilities and charges	826	971
Contract liabilities	(1,480)	(1,857)
Cash generated from operations	₩ 810,225	₩ 174,707

Significant transactions not affecting cash flows for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)	2019	2018

Reclassification of construction in-progress to property, plant and equipment and intangible assets	₩ 490,834	₩ 5,416,707
Reclassification of inventories to property, plant and equipment	132,820	-
Current portion of long-term borrowings and debentures	505,768	561,379
Current portion of long-term loans receivable	9,573	19,832
Increase in other payables related to acquisition of property, plant and equipment	13,645	28,336
Reclassification of long-term advance payments to property, plant and equipment	-	19,731
Reclassification of long-term prepaid expenses to property, plant and equipment	3	1,593
Increase of right-of-use assets due to changes in accounting policy	133,027	-
Acquisition of right-of-use assets	135,388	68,576

Changes in liabilities arising from financing activities for the years ended December 31, 2019 and 2018, are as follows:

(In millions of Korean won)

	2019						
			Changes in non-cash transaction				
	Beginning balance	Cash flows from financing activities	Current portion	Transfer in	Changes in foreign exchange rates	Reclassification from retained earnings	Ending balance
Short-term borrowings in foreign currencies and banker's usance	₩ 2,359,208	₩ 10,882	₩ -	₩ -	₩ (50,352)	₩ -	₩ 2,319,738
Current maturities of debentures	434,861	(435,000)	359,813	139	-	-	359,813
Current maturities of long-term borrowings	140,701	(141,095)	145,955	-	-	-	145,561
Debentures	2,535,816	658,217	(359,813)	1,275	-	-	2,835,495
Long-term borrowings	864,811	-	(145,955)	454	-	-	719,310
Dividend payables	102	(29,237)	-	-	-	29,201	66
Current other payables	3,680	(47,310)	54,606	57,259	-	-	68,235
Other payables	63,992	-	(54,606)	234,489	663	-	244,538
	₩ 6,403,171	₩ 16,457	₩ -	₩ 293,616	₩ (49,689)	₩ 29,201	₩ 6,692,756

(In millions of Korean won)

	2018						
			Changes in non-cash transaction				
	Beginning balance	Cash flows from financing activities	Current portion	Transfer in	Changes in foreign exchange rates	Reclassification from retained earnings	Ending balance
Short-term borrowings in foreign currencies and banker's usance	₩ 1,355,350	₩ 1,021,371	₩ -	₩ -	₩ (17,513)	₩ -	₩ 2,359,208
Current maturities of debentures	-	-	434,861	-	-	-	434,861
Current maturities of long-term borrowings	14,183	-	126,518	-	-	-	140,701
Debentures	2,670,275	299,139	(434,861)	1,263	-	-	2,535,816
Long-term borrowings	804,402	185,817	(126,518)	1,110	-	-	864,811
Dividend payables	85	(617,109)	-	-	-	617,126	102
Current other payables	-	-	3,680	-	-	-	3,680
Other payables	-	(1,430)	(3,680)	69,102	-	-	63,992
	₩ 4,844,295	₩ 887,788	₩ -	₩ 71,475	₩ (17,513)	₩ 617,126	₩ 6,403,171

35. Leases

35.1 Amounts recognized in the consolidated statement of financial position

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

(In millions of Korean won)	December 31, 2019		January 1, 2019	
Right-of-use assets[1]				
Vessels	₩	169,343	₩	61,589
Gas station/Charging station		18,090		21,158
Storage and other facilities		107,912		117,713
	₩	295,345	₩	200,460

(In millions of Korean won)	December 31, 2019		January 1, 2019	
Lease liabilities[2]				
Current	₩	68,235	₩	38,845
Non-current		244,538		175,593
	₩	312,773	₩	214,438

(In millions of Korean won)	December 31, 2019		January 1, 2019	
Lease receivables[3]				
Current	₩	5,834	₩	4,818
Non-current		10,323		10,631
	₩	16,157	₩	15,449

[1] Included in ‘Other assets’ in the consolidated statement of financial position
[2] Included in ‘Other payables’ in the consolidated statement of financial position
[3] Included in ‘Other receivables’ in the consolidated statement of financial position

35.2 Amounts recognized in the consolidated statement of profit or loss

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

(In millions of Korean won)		2019
Depreciation of right-of-use assets		
Vessels	₩	15,105
Gas station/Charging station		4,355
Storage and other facilities		21,043
	₩	40,503
Interest expense relating to lease liabilities (included in finance cost)	₩	6,299
Interest income relating to lease receivables (included in finance income)		(380)
Expense relating to short-term leases[1]		65,021
Expense relating to leases of low-value assets that are not short-term leases[1]		748
Expense relating to variable lease payments not included in lease liabilities[1]		57,883
Foreign currency translation gains and losses for lease liabilities		663

[1] Included in 'Cost of sales' and 'Selling and administrative expenses' in the consolidated statement of profit or loss

Total cash outflow and inflow with respect to leases amount to ₩ 170,962 million and ₩ 5,685 million, respectively in 2019.

35.3 Changes in asset and liabilities related to lease

Changes in right-of-use assets during the year ended December 31, 2019, are as follows:

(In millions of Korean won)		2019
Beginning net book amount	₩	67,433
Adjustments due to changes in accounting policy (Note 36)		133,027
Additions		135,388
Depreciation		(40,503)
Ending net book amount	₩	295,345

Changes in lease liabilities during the year ended December 31, 2019, are as follows:

(In millions of Korean won)		2019
Beginning net book amount	₩	67,672
Adjustments due to changes in accounting policy (Note 36)		146,766
Increase		138,683

Interest expenses		6,299
Foreign currency rate changes		663
Repayments of lease liabilities		(47,310)
Ending net book amount	₩	312,773

Changes in lease receivables during the year ended December 31, 2019, are as follows:

(In millions of Korean won)		**2019**
Beginning net book amount	₩	-
Adjustments due to changes in accounting policy (Note 36)		15,449
Additions		6,013
Interest income		380
Received		(5,685)
Ending net book amount	₩	16,157

35.4 Finance lease – 2018

The Group leases machinery under non-cancellable finance lease agreements for the year ended December 31, 2018. The lease terms are 15 years.

Details of machinery classified as a finance lease as at December 31, 2018, are as follows:

(In millions of Korean won)		**2018**
		Machinery
Cost- capitalized finance leases	₩	68,576
Accumulated depreciation		(1,143)
Net book amount	₩	67,433

From the current period, leased assets are presented as a separate line item in the statement of financial position. See Note 36 for further details regarding the changes in accounting policy.

The lease agreements do not include terms of renewal or purchase options. Meanwhile, there are no other restrictions imposed under lease arrangements relating to dividends, additional debt and further leasing.

The total of future minimum lease payments to the lessor at the end of the 2018 reporting period are as follows:

(In millions of Korean won)		**2018**
		Machinery
Total minimum lease payments		
Within one year	₩	5,720
Later than one year but not later than five years		22,878
Later than five years		55,767
		84,365

Unearned finance income		(16,693)
Net minimum lease payments		
Within one year		5,625
Later than one year but not later than five years		20,841
Later than five years		41,206
	₩	67,672

35.5 Operating lease - 2018

The Group leases vessels, sites for gas station and charging station, other facilities and machinery under non-cancellable operating leases expiring within one to seventeen years for the year ended December 31, 2018. The leases have varying terms, escalation clauses and renewal rights. On renewal, the terms of the leases are renegotiated. Certain assets are sub-let to third parties also under non-cancellable operating leases.

From January 1, 2019, the Group has recognized right-of-use assets for these leases, except for short-term and low-value leases (Note 36).

Commitments for minimum lease payments in relation to non-cancellable operating leases are payable as follows:

(In millions of Korean won)		**2018**
Operating lease payments		
Within one year	₩	96,238
Later than one year but not later than five years		75,285
Later than five years		56,214
	₩	227,737
Sub-lease payments		
Future minimum lease payments expected to be received in relation to non-cancellable sub-leases of operating leases	₩	(16,451)

Lease payments relating to operating leases for the year ended December 31, 2018, are as follows:

(In millions of Korean won)		**2018**
Minimum lease payments	₩	87,135
Sub-lease payments		(5,143)
Total lease payments	₩	81,992

36. Changes in Accounting Policies

As explained in Note 2.1.1, the Group has adopted Korean IFRS 1116, retrospectively, from January 1, 2019, but has not restated comparatives for the 2018 reporting period, as permitted under the specific transitional provisions in the standard. The reclassifications and the adjustments arising from the new leasing rules are, therefore, recognized in the consolidated statement of financial position on January 1, 2019. Details of adjustments recognized on adoption of Korean IFRS 1116 *Lease* are as follows:

On adoption of Korean IFRS 1116, the Group recognized lease liabilities in relation to leases which had previously been classified as 'operating leases' under the principles of Korean IFRS 1017. These liabilities were measured at the present value of the remaining lease payments, discounted using the lessee's incremental borrowing rate as at January 1, 2019. The lessee's weighted average incremental borrowing rate applied to the lease liabilities on January 1, 2019 was 2.71%.

For leases previously classified as 'finance leases', the Group recognized the carrying amount of the lease asset and lease liability immediately before transition as the carrying amount of the right-of-use asset and the lease liability at the date of initial application. The measurement principles of Korean IFRS 1116 are only applied after that date.

36.1 Practical expedients applied

In applying Korean IFRS 1116 for the first time, the Group has used the following practical expedients permitted by the standard:

- the use of a single discount rate to a portfolio of leases with reasonably similar characteristics
- reliance on previous assessments on whether leases are onerous – there were no onerous contracts as at January 1, 2019
- the accounting for operating leases with a remaining lease term of less than 12 months as at January 1, 2019, as short-term leases
- the exclusion of initial direct costs for the measurement of the right-of-use asset at the date of initial application, and
- the use of hindsight in determining the lease term where the contract contains options to extend or terminate the lease

The Group has also elected not to reassess whether a contract is, or contains a lease at the date of initial application. Instead, for contracts entered into before the transition date, the Group relied on its assessment made applying Korean IFRS 1017 and Interpretation 2104 *Determining whether an Arrangement contains a Lease*.

36.2 Measurement of lease liabilities

(In millions of Korean won)		2019
Operating lease commitments disclosed as at December 31, 2018	₩	227,737
Discounted using the lessee's incremental borrowing rate of at the date of initial application		209,927
Add: finance lease liabilities recognized as at December 31, 2018		67,672
Less: short-term leases not recognized as a liability		(61,624)
Less: low-value leases not recognized as a liability		(1,537)
Lease liability recognized as at January 1, 2019		214,438
Of which are:		
Current lease liabilities		38,845
Non-current lease liabilities		175,593
	₩	214,438

36.3 Measurement of right-of-use assets

Right-of use assets were measured at the amount equal to the lease liability, adjusted by the amount of any prepaid or accrued lease payments relating to that lease recognized in the consolidated statement of financial position as at December 31, 2018. There were no onerous lease contracts that would have required an adjustment to the right-of-use assets at the date of initial application.

36.4 Adjustments recognized in the statement of financial position as at January 1, 2019

The change in accounting policy affected the following items in the consolidated statement of financial position on January 1, 2019:

- right-of-use assets: increase by ₩ 133,027 million
- lease receivables: increase by ₩ 15,449 million
- lease liabilities: increase by ₩ 146,766 million
- Others: decrease by ₩ 1,710 million

37. Greenhouse Gas Emission Permits and Obligations

Quantity of emission permits for the 2nd plan period (2018–2020) as at December 31, 2019, is as follows:

(In thousands of tCO2-eq)	**Emission Permits[1]**
2018	6,069
2019	5,310
2020	5,310
	16,689

[1] The quantity is estimated based on cancel of emission permits, additional allocation and others.

Changes in quantity of emission permits for the 2nd plan period (2018–2020) as at December 31, 2019, are as follows:

(In thousands of tCO2-eq)	**2018**	**2019**	**2020**
Beginning balance	8,441	7,363	5,633
Withdrawal by government [1]	(6,439)	(6,440)	Undefined
Others[2]	(112)	(600)	Undefined
Carry forward	(2,053)	(323)	Undefined
Ending balance	-	-	5,633

[1] Withdrawal by government for the year 2019 is the best estimate as at December 31, 2019 and subject to change with submission to government.

[2] Disposal of emission permits driven by the government's restriction on carry forward is included.

Greenhouse gas emissions obligations for the year ended December 31, 2019, is measured at zero and there are no emission permits pledged as collateral.