

■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category		Affiliate	Indicator	Equation	Baseline			Monetization Proxy		
						Content	Value	Reference	Content	Value	Reference
1	Environment	Process	All	Used water	Used water in the measurement year x Monetization Proxy	N/A			The unit cost by water is calculated as the average value of the purchase unit cost by water in the measurement year x processing water cost rate* * Processing water cost rate = (1 - Value-added rate of water supplier) If the company itself uses the water after intake and treatment, the amount of water intake is measured.	N/A	
2	Environment	Process	All	Greenhouse gas emissions	GHG emissions in the measurement year x Monetization Proxy (Eco-cost of GHG)	N/A			SCC(Social Cost of Carbon)	81.8702654 USD	PwC Methodology Report
3	Environment	Process	All	NOx emissions(Air pollutant)	NOx emissions in the measurement year x Monetization Proxy (Eco-cost of NOx)	N/A			unit cost of Nox	5.57 USD	TU Delft, Ecocosts emissions 2022 V1.1(2021.10.01)
4	Environment	Process	All	SOx emissions(Air pollutant)	SOx emissions in the measurement year x Monetization Proxy (Eco-cost of SOx)	N/A			unit cost of Sox	9.12 USD	TU Delft, Ecocosts emissions 2022 V1.1(2021.10.01)
5	Environment	Process	All	PM10 emissions(Air pollutant)	PM10 emissions in the measurement year x Monetization Proxy (Eco-cost of PM10)	N/A			unit cost of PM10	8.31 USD	TU Delft, Ecocosts emissions 2022 V1.1(2021.10.01)
6	Environment	Process	All	PM2.5 emissions(Air pollutant)	PM2.5 emissions in the measurement year x Monetization Proxy (Eco-cost of PM2.5)	N/A			unit cost of PM2.5	36.46 USD	TU Delft, Ecocosts emissions 2022 V1.1(2021.10.01)
7	Environment	Process	All	VOC emissions(Air pollutant)	VOC emissions in the measurement year x Monetization Proxy (Eco-cost of VOC)	N/A			unit cost of VOC	4.97 USD	Modified data based on TU Delft Eco-cost
8	Environment	Process	All	COD(Chemical Oxygen Demand)(Water pollutant)	COD in the measurement year x Monetization Proxy (Eco-cost of COD)	N/A			unit cost of COD	0.0955608 USD	TU Delft, Ecocosts emissions 2017 V1-6
9	Environment	Process	All	T-P emissions(Water pollutant)	T-P emissions in the measurement year x Monetization Proxy (Eco-cost of T-P)	N/A			unit cost of T-P	14.98 USD	TU Delft, Ecocosts emissions 2022 V1.1(2021.10.01)
10	Environment	Process	All	T-N emissions(Water pollutant)	T-N emissions in the measurement year x Monetization Proxy (Eco-cost of T-N)	N/A			unit cost of T-N	21.74 USD	TU Delft, Ecocosts emissions 2022 V1.1(2021.10.01)
11	Environment	Process	All	General waste (incineration)	The amount of general waste incinerated in the measurement year x Monetization Proxy (The eco-cost of general waste incinerated)	N/A			unit cost of general waste (incineration)	89.56 USD	TU Delft, 2012
13	Environment	Process	All	Designated waste (incineration)	The amount of designated waste incinerated in the measurement year x Monetization Proxy (The eco-cost of designated waste incinerated)	N/A			unit cost of designated waste (incineration)	590.004 USD	TU Delft, 2012
14	Environment	Process	All	Waste (landfill)	The amount of waste sent to landfill in the measurement year x Monetization Proxy (The eco-cost of waste sent to landfill)	N/A			unit cost of waste(landfill)	128.1227409 USD	idemar 2021
15	Environment	Product/Service	SK E&S	Reduction in particulate matter through fuel cell (PM 10)	(Inhaled amount of PM 2.5 by fuel cell-Inhaled amount of PM 2.5 without fuel cell)/monetization proxy of PM2.5* (Inhaled amount of PM 2.5 by fuel cell in a single month)	Reduced amount of PM 2.5	0	Korean institute of science and technology	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs
16	Environment	Product/Service	SK E&S	Reduction in resource consumption by running renewable power plant	(Average unit price of resources in electricity generation market- unit price of resources in renewable power plants run by SK E&S)*Amount of generated energy by renewable power plant x heat coefficient/(Amount of generated energy by renewable power plant * heat coefficient * 1000.00)	Average unit price of resources in electricity generation market	0.00011385741906 USD/MJ	Yearbook of energy statistics, Korea Coal Association, Korea Petroleum Association	1	0.00077 USD	-
17	Environment	Product/Service	SK E&S	Reduction in greenhouse gas emission by running renewable power plant	(Average GHG emission factor in electricity generation market- GHG emission factor of renewable power plants run by SK E&S)/SCC(Social Cost of Carbon)*Amount of generated energy by renewable power plant * heat coefficient/(Amount of generated energy by renewable power plant * heat coefficient * 1000.00)	Average GHG emission factor in electricity generation market	49.752808989g/MJ	Korea Power Exchange, GHG emission factor in energy generation sector	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
18	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by running renewable power plant (Nox)	(Average NOx emission factor in electricity generation market- NOx emission factor of renewable power plants run by SK E&S)/monetization proxy of NOx*Amount of generated energy by renewable power plant * heat coefficient/(Amount of generated energy by renewable power plant * heat coefficient)	Average NOx emission factor in electricity generation market	0.032929338g/MJ	Korea Power Exchange; National Institute Of Environmental Research, Statistics on the amount of air pollutant	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
19	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by renewable energy generation (Sox)	(Average SOx emission factor in electricity generation market- SOx emission factor of renewable power plants run by SK E&S)/monetization proxy of SOx*Amount of generated energy by renewable power plant * heat coefficient/(Amount of generated energy by renewable power plant * heat coefficient)	Average SOx emission factor in electricity generation market	0.017916984g/MJ	Korea Power Exchange; National Institute Of Environmental Research, Statistics on the amount of air pollutant	Unit cost of Sox	9.115256 USD/kg	Delft University of Technology, Eco-costs
20	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by renewable energy generation (Particular matter)	(Average particular matter emission factor in electricity generation market- particular matter emission factor of renewable power plants run by SK E&S)/monetization proxy of particular matter*Amount of generated energy by renewable power plant * heat coefficient/(Amount of generated energy by renewable power plant * heat coefficient)	Average particular matter emission factor in electricity generation market	0.000984854g/MJ	Korea Power Exchange; National Institute Of Environmental Research, Statistics on the amount of air pollutant	Unit cost of particular matter	12.06669 USD/Kg	Delft University of Technology, Eco-costs
21	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by fuel cell energy generation (Nox)	(Average NOx emission factor in electricity generation market- NOx emission factor of fuel cells run by SK E&S)/monetization proxy of NOx*Amount of generated energy by fuel cell * heat coefficient/(Amount of generated energy by fuel cell * heat coefficient)	Average NOx emission factor in electricity generation market	0.032929338g/MJ	Korea Power Exchange; National Institute Of Environmental Research, Statistics on the amount of air pollutant	Unit cost of Nox	5.57281 USD/kg	Delft University of Technology, Eco-costs
22	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by fuel cell energy generation (Sox)	(Average SOx emission factor in electricity generation market- SOx emission factor of fuel cells run by SK E&S)/monetization proxy of SOx*Amount of generated energy by fuel cell * heat coefficient/(Amount of generated energy by fuel cell * heat coefficient)	Average SOx emission factor in electricity generation market	0.017916984g/MJ	Korea Power Exchange; National Institute Of Environmental Research, Statistics on the amount of air pollutant	Unit cost of Sox	9.11525 USD/kg	Delft University of Technology, Eco-costs
23	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by fuel cell energy generation (Particular matter)	(Average particular matter emission factor in electricity generation market- particular matter emission factor of fuel cells run by SK E&S)/monetization proxy of particular matter*Amount of generated energy by fuel cell * heat coefficient/(Amount of generated energy by fuel cell * heat coefficient)	Average particular matter emission factor in electricity generation market	0.000984854g/MJ	Korea Power Exchange; National Institute Of Environmental Research, Statistics on the amount of air pollutant	Unit cost of particular matter	12.0667 USD/Kg	Delft University of Technology, Eco-costs
24	Environment	Product/Service	SK E&S	Reduction in greenhouse gas emission by transferring fuel of public buses from fossil fuel to CNG	(Average GHG emission factor of public bus-GHG emission factor of public CNG bus)/SCC(Social Cost of Carbon)*driving distance(km)/1000[CNG sales * fuel efficiency of CNG bus / 1000.00]	Average GHG emission factor of public bus	721.462g/Km	Ministry of Environment, Study on the validity of the policy on the spread-out of CNG bus by analysis on the environmental & economical efficiency of diesel bus and CNG bus (2012, Korean article)	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report

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25	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by transferring fuel of public buses from fossil fuel to CNG (Nox)	(Average NOx emission factor of public bus-NOx emission factor of public CNG bus)*monetization proxy of NOx*driving distance(km)[CNG sales * fuel efficiency of CNG bus]	Average NOx emission factor of public bus	5.1614199g/Km	Ministry of Environment, Study on the validity of the policy on the spread-out of CNG bus by analysis on the environmental & economical efficiency of diesel bus and CNG bus (2012, Korean article)	Unit cost of Nox	5.5728 USD/kg	Delft University of Technology, Eco-costs
26	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by transferring fuel of public buses from fossil fuel to CNG (Particular matter)	(Average particular matter emission factor of public bus- particular matter emission factor of public CNG bus)*monetization proxy of NOx*driving distance(km)[CNG sales * fuel efficiency of CNG bus]	Average particular matter emission factor of public bus	0.0093324g/Km	Ministry of Environment, Study on the validity of the policy on the spread-out of CNG bus by analysis on the environmental & economical efficiency of diesel bus and CNG bus (2012, Korean article)	Unit cost of PM10	8.3124 USD/kg	Delft University of Technology, Eco-costs
27	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by transferring fuel of public buses from fossil fuel to CNG (VOCs)	(Average VOCs emission factor of public bus-VOCs emission factor of public CNG bus)*monetization proxy of NOx*driving distance(km)[CNG sales * fuel efficiency of CNG bus]	Average VOCs emission factor of public bus	4.06115g/Km	Ministry of Environment, Study on the validity of the policy on the spread-out of CNG bus by analysis on the environmental & economical efficiency of diesel bus and CNG bus (2012, Korean article)	Unit cost of VOC(Volatile Organic Compounds)	4.971957 USD/kg	Delft University of Technology, Eco-costs
28	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by transferring fuel of public buses from fossil fuel to CNG (CO)	(Average CO emission factor of public bus-CO emission factor of public CNG bus)*monetization proxy of NOx*driving distance(km)[CNG sales * fuel efficiency of CNG bus]	Average CO emission factor of public bus	0.4654448g/Km	Ministry of Environment, Study on the validity of the policy on the spread-out of CNG bus by analysis on the environmental & economical efficiency of diesel bus and CNG bus (2012, Korean article)	Unit cost of CO	0.2541205 USD/kg	Delft University of Technology, Eco-costs
29	Environment	Product/Service	SK E&S	Reduction in air pollutant emission by supplying city gas mixed with biogas	(Market average damage cost of CH4 - damage cost of CH4 in biogas)*1*biogas sales/biogas sales]	Market average damage cost of CH4	3.53734861476458 USD/kg	-	1	0.00077 USD	-
30	Environment	Product/Service	SK E&S	Reduction in particular matter through fuel cell (PM 10)	(Inhaled amount of PM 10 by fuel cell-Inhaled amount of PM 10 without fuel cell)*monetization proxy of PM10* (Inhaled amount of PM 10 by fuel cell in a single month)	Inhaled amount of PM 10 without fuel cell	0	Korean institute of science and technology	Unit cost of PM10	8.3124 USD/kg	Delft University of Technology, Eco-costs
31	Environment	Product/Service	SK Broadband	Reduction in resources consumption by recycling set-top box(STB)	(Cost reduction due to replacement of new equipment-The company's SV reference value prior to initiation of the service)*Terminal lifespan*Number of STB(set-top box) Repair/Number of STB(set-top box) Repair]	The company's SV reference value prior to initiation of the service	0 USD	The company's own data	Life expectancy of set-top box	0.00033	The company's own data
32	Environment	Product/Service	SK Broadband	Reduction in resources consumption by recycling Access Point(AP)	(Cost reduction due to replacement of new equipment-The company's SV reference value prior to initiation of the service)*Terminal lifespan*Number of AP(device) Repair/Number of AP(device) Repair]	The company's SV reference value prior to initiation of the service	0 USD	The company's own data	Life expectancy of Access Point	0.00033	The company's own data
33	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Smart STB 3(BFX-AT200))	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD	Korea Electric Power Corporation(KEPCO)
34	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Smart 3 Mini BIP-UW200)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD	Korea Electric Power Corporation(KEPCO)
35	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(UHD 4(BFX-UH200))	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD	Korea Electric Power Corporation(KEPCO)
36	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Legacy KAON)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD/kWh	Korea Electric Power Corporation(KEPCO)
37	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(HDR STB KAON)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD/kWh	Korea Electric Power Corporation(KEPCO)
38	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(HDR STB HUMAX)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD/kWh	Korea Electric Power Corporation(KEPCO)
39	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Smart STB 아리츠)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD/kWh	Korea Electric Power Corporation(KEPCO)
40	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Smart STB KAON)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD/kWh	Korea Electric Power Corporation(KEPCO)
41	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Smart STB 3)	(Power consumption of set-top box-Power consumption of the company's set-top box)*Electric Charges*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes/1000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	Electric Charges	0.092 USD/kWh	Korea Electric Power Corporation(KEPCO)
42	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(Smart 3 Mini BIP-UW200)	(Power consumption of set-top box-Power consumption of the company's set-top box)*SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
43	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(Smart 3 Mini BIP-UW200)	(Power consumption of set-top box-Power consumption of the company's set-top box)*SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report

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44	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(UHD4 (BFX-UH200))	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
45	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(Legacy KAON)	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
46	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(HDR STB KAON)	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
47	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box( HDR STB HUMAX)	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
48	Environment	Product/Service	SK Broadband	Reduction in energy consumption by supplying low-power set-top box(Smart STB 허리스)	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
49	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(Smart STB KAON)	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
50	Environment	Product/Service	SK Broadband	Reduction in GHG emissions by supplying low-power set-top box(Smart STB 3)	(Power consumption of set-top box*Power consumption of the company's set-top box)/SCC(Social Cost of Carbon)*The company's cumulative number of product installations[The company's cumulative number of product installations as of the end of the month*Average monthly time in active standby mode for low power set-top boxes*GHG emission factor/1000000]	Power consumption of set-top box	0.003477 USD	Korea Energy Agency, Ministry of Science and ICT	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
51	Environment	Product/Service	SKC	Reduction in energy consumption through OLED Black Bank	(weighted average of OLED power consumption(per unit)-Smartphone power consumption with Black Bank (per unit) * unit-cost of electricity * Millbase sales for Black Bank * area conversion factor with OLED * Smartphone usage time / 1000.00)]	weighted average of OLED power consumption(per unit)	152.257525W/㎡	-	Unit-cost of electricity(KEPCO, Korea Electric Power Corporation)	0.0815 USD/KWh	-
52	Environment	Product/Service	SKC	Reduction in GHG emissions through OLED Black Bank	(Weighted average OLED power consumption(per unit)-Smartphone power consumption with Black Bank (per unit) * SCC * Millbase sales for Black Bank * area conversion factor with OLED * Smartphone usage time * GHG emission factor when using electricity/ 1000000.00)]	weighted average of OLED power consumption(per unit)	152.257525W/㎡	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
53	Environment	Product/Service	SKC	Reduction in GHG emissions through PLA film	(GHG emissions when incinerating packaging materials - GHG emissions when incinerating PLA films) * SCC * amount of incineration among PLA film sales [PLA film sales * 0.67]	GHG emissions when incinerating packaging materials	0.003136tCO2eq/kg	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
54	Environment	Product/Service	SKC	Reduction in GHG emissions through PLA film	(GHG emissions when incinerating packaging materials - GHG emissions of PLA films landfill) * SCC * amount of landfill among PLA film sales [PLA film sales * 0.67]	GHG emissions when incinerating packaging materials	0.003131tCO2eq/kg	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
55	Environment	Product/Service	SKC	Reduction in environmental pollution through PLA film	(Eco-cost of packaging materials landfill - Eco-cost of PLA landfill) * conversion factor * amount of landfill among PLA film sales [PLA film sales * 0.33]	Eco-cost of packaging materials landfill	0.04998euro/m2	-	conversion factor of eco-cost	165.83 USD	-
56	Environment	Product/Service	SKC	Reduction in energy consumption through Window Film	(Energy saving factor of SKC Window Film - Energy saving factor in building insulation market) * unit-cost of electricity * monthly installation area [Architectural Window Film sales]	Energy saving factor in building insulation market	19.055801922kwh/㎡	-	Unit-cost of electricity(KEPCO, Korea Electric Power Corporation)	0.0815 USD/KWh	-
57	Environment	Product/Service	SKC	Reduction in GHG emissions through Window Film	(Energy saving factor of SKC Window Film - Energy saving factor in building insulation market) * SCC * monthly installation area [Architectural Window Film sales * GHG emission factor / 1000]	Energy saving factor in building insulation market	19.055801922kwh/㎡	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
58	Environment	Product/Service	SK Gas	Reduction in GHG emissions through fuel conversion from B-C oil to LPG in industrial boilers	(Average GHG emission factor in industrial sector-LPG GHG emission factor)/SCC(Social Cost of Carbon)*Amount of LPG converted from B-C oil to LPG fuel[(Amount of LPG converted from B-C oil to LPG fuel * 1.11)]	Average GHG emission factor in industrial sector	4.533tCO2eq/ton	Korea Energy Agency, Statistics on energy use and greenhouse gas emissions in the industrial sector, Ministry of Environment, Guidelines on Emission Reporting and Certification of Greenhouse Gas Emission Trading Scheme	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
59	Environment	Product/Service	SK Gas	Reduction in NOx emissions through LPG for passenger cars	(Average NOx emission factor for passenger car sector-NOx emission factor for LPG passenger car sector)/Unit cost of NOx *The company share of total mileage for passenger cars[Number of LPG passenger cars * Average mileage for passenger cars(km) * The company's transportation fuel(LPG) market share / 1000]	Average NOx emission factor for passenger car sector	0.529822772g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
60	Environment	Product/Service	SK Gas	Reduction in SOx emissions through LPG for passenger cars	(Average SOx emission factor for passenger car sector-SOx emission factor for LPG passenger car sector)/Unit cost of SOx *The company share of total mileage for passenger cars[Number of LPG passenger cars * Average mileage for passenger cars(km) * The company's transportation fuel(LPG) market share / 1000]	Average SOx emission factor for passenger car sector	0.000485014g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs

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No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
61	Environment	Product/Service	SK Gas	Reduction in PM2.5 emissions through LPG for passenger cars	(Average PM2.5 emission factor for passenger car sector-PM2.5 emission factor for LPG passenger car sector)*Unit cost of PM2.5*The company share of total mileage for passenger cars[(Number of LPG passenger cars * Average mileage for passenger cars(km) * The company's transportation fuel(LPG) market share / 1000]	Average PM2.5 emission factor for passenger car sector	0.006291054g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs
62	Environment	Product/Service	SK Gas	Reduction in NOx emissions through LPG for vans	(Average NOx emission factor for van sector-NOx emission factor for LPG van sector)*Unit cost of NOx *The company share of total mileage for vans[(Number of LPG vans * Average mileage for vans(km) * The company's transportation fuel(LPG) market share / 1000]	Average NOx emission factor for van sector	0.829377204g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
63	Environment	Product/Service	SK Gas	Reduction in SOx emissions through LPG for vans	(Average SOx emission factor for van sector-SOx emission factor for LPG van sector)*Unit cost of SOx *The company share of total mileage for vans[(Number of LPG vans * Average mileage for vans(km) * The company's transportation fuel(LPG) market share / 1000]	Average SOx emission factor for van sector	0.00025987g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs
64	Environment	Product/Service	SK Gas	Reduction in PM2.5 emissions through LPG for vans	(Average PM2.5 emission factor for van sector-PM2.5 emission factor for LPG van sector)*Unit cost of PM2.5*The company share of total mileage for vans[(Number of LPG vans * Average mileage for vans(km) * The company's transportation fuel(LPG) market share / 1000]	Average PM2.5 emission factor for van sector	0.019881169g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs
65	Environment	Product/Service	SK Gas	Reduction in NOx emissions through LPG for trucks	(Average NOx emission factor for truck sector-NOx emission factor for LPG truck sector)*Unit cost of NOx *The company share of total mileage for trucks[(Number of LPG trucks * Average mileage for trucks(km) * The company's transportation fuel(LPG) market share / 1000]	Average NOx emission factor for truck sector	3.107714687g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
66	Environment	Product/Service	SK Gas	Reduction in SOx emissions through LPG for trucks	(Average SOx emission factor for truck sector-SOx emission factor for LPG truck sector)*Unit cost of SOx *The company share of total mileage for trucks[(Number of LPG trucks * Average mileage for trucks(km) * The company's transportation fuel(LPG) market share / 1000]	Average SOx emission factor for truck sector	0.001121048g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs
67	Environment	Product/Service	SK Gas	Reduction in PM2.5 emissions through LPG for trucks	(Average PM2.5 emission factor for truck sector-PM2.5 emission factor for LPG truck sector)*Unit cost of PM2.5*The company share of total mileage for trucks[(Number of LPG trucks * Average mileage for trucks(km) * The company's transportation fuel(LPG) market share / 1000]	Average PM2.5 emission factor for truck sector	0.083838969g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs
68	Environment	Product/Service	SK Gas	Reduction in NOx emissions through LPG for special vehicles	(Average NOx emission factor for special vehicle sector-NOx emission factor for LPG special vehicle sector)*Unit cost of NOx *The company share of total mileage for special vehicles [(Number of LPG special vehicles * Average mileage for special vehicles(km) * The company's transportation fuel(LPG) market share / 1000]	Average NOx emission factor for special vehicle sector	0.618438566g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
69	Environment	Product/Service	SK Gas	Reduction in SOx emissions through LPG for special vehicles	(Average SOx emission factor for special vehicle sector-SOx emission factor for LPG special vehicle sector)*Unit cost of SOx *The company share of total mileage for special vehicle [(Number of LPG special vehicles * Average mileage for special vehicles(km) * The company's transportation fuel(LPG) market share / 1000]	Average SOx emission factor for special vehicle sector	0.000389436g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs
70	Environment	Product/Service	SK Gas	Reduction in PM2.5 emissions through LPG for special vehicles	(Average PM2.5 emission factor for special vehicle sector-PM2.5 emission factor for LPG special vehicle sector)*Unit cost of PM2.5*The company share of total mileage for special vehicle [(Number of LPG special vehicles * Average mileage for special vehicles(km) * The company's transportation fuel(LPG) market share / 1000]	Average PM2.5 emission factor for special vehicle sector	0.01377719g/km	Ministry of Land, Infrastructure and Transport, Vehicle registration status; Korea Transportation Safety Authority, Car mileage statistics; National Air Emission Inventory and Research Center, Air pollutant emission statistics	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs

■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
71	Environment	Product/Service	SK Networks	Delaying additional usage of resources by reusing personal computers (PC)	(Weighted average of PC resource consumption - SK networks' resource consumption of reusing PC) * 1 * amount of reusing PC [Reusing PC monthly sales * Reusing PC persisting period ratio]	Weighted average of resource consumption when producing PC	170.6011239 USD	- Average New PC Price: Minimum Specification for AJ Desktop/Laptop Rental Product Models - Computer manufacturing, semiconductor/electronic components, sales relative to primary metal material costs, chemicals and chemicals, rubber and plastic products: Bank of Korea statistics	1	0.00077 USD	-
72	Environment	Product/Service	SK Networks	Delaying additional usage of resources by reusing smartphone	(Weighted average of smartphone resource consumption - SKN's Resource consumption of used smartphone) * 1 * amount of used smartphone [used smartphone monthly sales * Used smartphone persisting period ratio]	Weighted average of resource consumption when producing smartphone	47.8275 USD	- Average price of new smartphones: Estimate average price including 256GB Wi-Fi + Cellular and Wi-Fi-only models from Apple and Samsung - Computer manufacturing, semiconductor/electronic components, sales relative to primary metal material costs, chemicals and chemicals, rubber and plastic products: Bank of Korea statistics	1	0.00077 USD	-
73	Environment	Product/Service	SK Networks	Delaying GHG emissions by reusing smartphone	(Weighted average of GHG emissions of smartphone - SKN's GHG emissions(in the process of recycling) of used smartphone) * SCC(Social Cost of Carbon) * amount of used smartphone [used smartphone monthly sales * Used smartphone persisting period ratio / 1000]	Weighted average of GHG emissions when producing smartphone	32.98008kg	Total GHG emissions in LCA of the new smartphone, new smartphone use phase, and disposal phase GHG emissions ; Carbon Footprint data of Apple product	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
74	Environment	Product/Service	SK Networks	Delaying waste by reusing smartphones	(Weighted average of smartphone minus the weight extracted when disposing of used phones - SKN's waste from used smartphone) * Eco-cost of electronics disposal * Used smartphones provided [Used smartphone sales * Used smartphone persisting period ratio]	Weighted average of smartphone minus the weight extracted when disposing of used phones	142.03g	- Average weight of smartphone: Average weight of Apple iPhone and Samsung Galaxy models - Weight of materials extracted during smartphone recycling: The Economics of Cell Phone Reuse and Recycling, International Journal of Advanced Manufacturing Technology 47(5):515-525 - March 2009	eco-cost of electronics disposal	0.000014 USD/g	Delft University of Technology, Eco-costs
75	Environment	Product/Service	SK Networks	Delaying GHG emissions by reusing personal computers (PC)	(Weighted average of GHG emissions of PC - SKN's GHG emissions of reusing PC) * SCC(Social Cost of Carbon) * amount of reusing PC [reusing PC monthly sales * Reusing PC persisting period ratio / 1000]	Weighted average of GHG emissions when producing PC	232.33896kg	- Total GHG emissions in LCA of new PCs, new PC use phase, and disposal phase: Carbon Footprint data of Dell product - GHG emissions from replacement parts: cited Carbon Footprint data of Dell product	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
76	Environment	Product/Service	SK Networks	Delaying waste by reusing personal computers (PC)	(Average weight of PCs - SKN's Weight of waste of reusing PCs) * eco-cost of PC disposal * amount of reusing PCs [reusing PCs monthly sales * Reusing PCs persisting period ratio]	Average weight of PCs	4.29kg	Average weight of AJ Desktop/Laptop Rental Product Models( <a href="http://itajnetworks.co.kr/product/pc/%EB%85%B8%ED%8A%B8%EB%B6%81/">http://itajnetworks.co.kr/product/pc/%EB%85%B8%ED%8A%B8%EB%B6%81/</a> )	eco-cost of PC disposal	0.082499 USD/kg	Delft University of Technology, Eco-costs
77	Environment	Product/Service	SK Networks	Delaying additional usage of resources by reusing tablet computers	(Weighted average of tablet computers resource consumption - SKN's Resource consumption of used tablet computers) * 1 * amount of used tablet PCs [used tablet computers monthly sales * Used tablet computers persisting period ratio]	Weighted average of resource consumption when producing tablet computers	117.2897 USD	-	Proxy	0.00077 USD/kg	-
78	Environment	Product/Service	SK Networks	Delaying waste by reusing tablet computers	(Average weight of tablet computers - SKN's Weight of waste of reusing tablet computers) * eco-cost of PC disposal * amount of reusing tablet computers [reusing tablet computers monthly sales * Reusing tablet computers persisting period ratio]	Average weight of tablet computers	0.5kg	-	eco-cost of PC disposal	0.082499 USD/kg	-
79	Environment	Product/Service	SK Networks	Delaying GHG emissions by reusing tablet computers	(Weighted average of GHG emissions of tablet computers - SKN's GHG emissions of reusing tablet computers) * SCC(Social Cost of Carbon) * amount of reusing tablet computers [reusing tablet computers monthly sales * Reusing tablet computers persisting period ratio / 1000]	Weighted average of GHG emissions when producing tablet computers	65.55616kg	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
80	Environment	Product/Service	SK Networks	Delaying additional usage of resources by reusing personal computers(PC)	(Weighted average of PC resource consumption - SK networks' resource consumption of reusing PC) * 1 * amount of reusing PC [Reusing PC monthly sales * Reusing PC persisting period ratio]	Weighted average of resource consumption when producing PCs	170.60 USD	- Average New PC Price: Minimum Specification for AJ Desktop/Laptop Rental Product Models - Computer manufacturing, semiconductor/electronic components, sales relative to primary metal material costs, chemicals and chemicals, rubber and plastic products: Bank of Korea statistics	1	0.00077 USD	-



■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
96	Environment	Product/Service	SK Ecoplant	Reduction in resource consumption by building railroad infrastructure (Korea_Railroad)	(Benefits in resource consumption reduction before project execution - Benefits in resource consumption reduction after project execution)*1*Number of passing trains	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
97	Environment	Product/Service	SK Ecoplant	Reduction in greenhouse gas emission by building railroad infrastructure (Singapore_Railroad)	(Benefits in greenhouse gas emission reduction before project execution - Benefits in greenhouse gas emission reduction after project execution)*1*Number of passing trains	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
98	Environment	Product/Service	SK Ecoplant	Reduction in resource consumption by building railroad infrastructure (Singapore_Railroad)	(Benefits in resource consumption reduction before project execution - Benefits in resource consumption reduction after project execution)*1*Number of passing trains	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
99	Environment	Product/Service	SK Ecoplant	Reduction in greenhouse gas emission by building environment-friendly residential building (Korea)	(Average GHG emissions of residential buildings with Building Energy Efficiency Ratings-GHG emissions of residential buildings with Building Energy Efficiency Ratings built by SK Ecoplant*SCC(Social Cost of Carbon)*Period of use of building	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
100	Environment	Product/Service	SK Ecoplant	Reduction in energy consumption by building environment-friendly residential building (Korea)	(Average amount of energy use of residential buildings with Building Energy Efficiency Ratings-amount of energy use of residential buildings with Building Energy Efficiency Ratings built by SK Ecoplant*Average energy cost of residential building*Period of use of building	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
101	Environment	Product/Service	SK Ecoplant	Reduction in greenhouse gas emission by building environment-friendly non-residential building (Korea)	(Average GHG emissions of non-residential buildings with Building Energy Efficiency Ratings-GHG emissions of non-residential buildings with Building Energy Efficiency Ratings built by SK Ecoplant*SCC(Social Cost of Carbon)*Period of use of building	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
102	Environment	Product/Service	SK Ecoplant	Reduction in energy consumption by building environment-friendly non-residential building (Korea)	(Average amount of energy use of non-residential buildings with Building Energy Efficiency Ratings- amount of energy use of non-residential buildings with Building Energy Efficiency Ratings built by SK Ecoplant*Average energy cost of non-residential building*Period of use of building	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
103	Environment	Product/Service	SK Ecoplant	Reduction in greenhouse gas emission by renewable-energy power plant (Korea)	(Average GHG emission factor in electricity generation market- GHG emission factor of renewable-energy power plants)*SCC(Social Cost of Carbon)*Amount of generated energy*(Capacity of power plant * running time)	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
104	Environment	Product/Service	SK Ecoplant	Reduction in air pollutant emission by building renewable-energy power plant (Korea)(NOx)	(Average NOx emission factor in electricity generation market- NOx emission factor of renewable-energy power plants)*monetization proxy of NOx*Amount of generated energy*(Capacity of power plant * running time)	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
105	Environment	Product/Service	SK Ecoplant	Reduction in air pollutant emission by building renewable-energy power plant (Korea)(SOx)	(Average SOx emission factor in electricity generation market- SOx emission factor of renewable energy power plants)*monetization proxy of SOx*Amount of generated energy*(Capacity of power plant * running time)	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
106	Environment	Product/Service	SK Ecoplant	Reduction in air pollutant emission by building renewable-energy power plant (Korea)(Particular matter)	(Average particular matter emission factor in electricity generation market- particular matter emission factor of renewable-energy power plants)*monetization proxy of particular matter*Amount of generated energy*(Capacity of power plant * running time)	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
107	Environment	Product/Service	SK Innovation	Reduction in SOx through Eco-ship charter service	(The company's ratio of high-efficiency vessel-Market average's ratio of high-efficiency vessel)*Unit cost of SOx *Reduced SOx emissions[Total number of chartered vessels in the company * Daily fuel savings per high-efficiency vessel * The number of sailing days * 0.01 * SOx conversion factor for petroleum products * 1000]	Market average's ratio of high-efficiency vessel	0.0001696904 USD	Clarkson Engine Type	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs
108	Environment	Product/Service	SK Innovation	Reduction in NOx through Eco-ship charter service	(The company's ratio of high-efficiency vessel-Market average's ratio of high-efficiency vessel)*Unit cost of NOx *Reduced SOx emissions[Total number of chartered vessels in the company * Daily fuel savings per high-efficiency vessel * The number of sailing days * 84.70]	Market average's ratio of high-efficiency vessel	0.0001696904 USD	Clarkson Engine Type	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
109	Environment	Product/Service	SK Innovation	Reduction in PM2.5 through Eco-ship charter service	(The company's ratio of high-efficiency vessel-Market average's ratio of high-efficiency vessel)*Unit cost of PM2.5*Reduced PM2.5 emissions[Total number of chartered vessels in the company * Daily fuel savings per high-efficiency vessel * The number of sailing days * 0.01 * 1000]	Market average's ratio of high-efficiency vessel	0.0001696904 USD	Clarkson Engine Type	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs
110	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through Eco-ship charter service	(The company's ratio of high-efficiency vessel-Market average's ratio of high-efficiency vessel)*SCC(Social Cost of Carbon)*Reduced GHG emissions[Total number of chartered vessels in the company * Daily fuel savings per high-efficiency vessel * The number of sailing days * GHG emission factor]	Market average's ratio of high-efficiency vessel	0.0001696904 USD	Clarkson Engine Type	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
111	Environment	Product/Service	SK Innovation	Reduction in fuel consumption through Eco-ship charter service	(The company's ratio of high-efficiency vessel-Market average's ratio of high-efficiency vessel)*LSFO 380 fuel cost*Fuel consumption savings[Total number of chartered vessels in the company * Daily fuel savings per high-efficiency vessel * The number of sailing days]	Market average's ratio of high-efficiency vessel	0.0001696904 USD	Clarkson Engine Type	LSFO 380 fuel cost	318.439 USD	S&P Global, Platts Bunkerwire (2019).
112	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III US 5W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*US 5W-20's sale[US 5W-20 lube base oil's sale * conversion factor / 0.88 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	PCMO fuel cost	0.0286 USD/km	Platt's MOGAS 92R
113	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III US 0W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*US 0W-20's sale[US 0W-20 lube base oil's sale * conversion factor / 0.85 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	PCMO fuel cost	0.0286 USD/km	Platt's MOGAS 92R
114	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III EU 5W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*EU 5W-30's sale[EU 5W-30 lube base oil's sale * conversion factor / 0.81 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	PCMO fuel cost	0.0286 USD/km	Platt's MOGAS 92R
115	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III EU 0W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*EU 0W-20's sale[EU 0W-20 lube base oil's sale * conversion factor / 0.80 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	PCMO fuel cost	0.0286 USD/km	Platt's MOGAS 92R
116	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III ASIA 5W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*ASIA 5W-30's sale[ASIA 5W-30 lube base oil's sale * conversion factor / 0.83 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	PCMO fuel cost	0.0286 USD/km	Platt's MOGAS 92R
117	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III ASIA 0W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*ASIA 0W-20's sale[ASIA 0W-20 lube base oil's sale * conversion factor / 0.83 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	PCMO fuel cost	0.0286 USD/km	Platt's MOGAS 92R
118	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III US 10W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*HDDO fuel cost*US 10W-30's sale[US 10W-30 lube base oil's sale * conversion factor / 0.10 / 60 * HDDO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	HDDO fuel cost	0.151 USD/km	Platt's MOGAS 92R
119	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III EU 10W-40)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*HDDO fuel cost*EU 10W-40's sale[EU 10W-40 lube base oil's sale * conversion factor / 0.67 / 60 * HDDO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	HDDO fuel cost	0.151 USD/km	Platt's MOGAS 92R
120	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III EU 5W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*HDDO fuel cost*EU 5W-30's sale[EU 5W-30 lube base oil's sale * conversion factor / 0.68 / 60 * HDDO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	HDDO fuel cost	0.151 USD/km	Platt's MOGAS 92R
121	Environment	Product/Service	SK Innovation	Reduction in energy consumption through premium lube base oil(Gr-III ASIA 10W-40)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*HDDO fuel cost*ASIA 10W-40's sale[ASIA 10W-40 lube base oil's sale * conversion factor / 0.71 / 60 * HDDO average mileage]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	HDDO fuel cost	0.151 USD/km	Platt's MOGAS 92R
122	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III US 5W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*US 5W-20's sale[US 5W-20 lube base oil's sale * conversion factor / 0.88 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report

■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
123	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_US 0W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*US 0W-20's sale[EU 0W-20 lube base oil's sale * conversion factor / 0.85 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
124	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_EU 5W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*EU 5W-30's sale[EU 5W-30 lube base oil's sale * conversion factor / 0.81 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
125	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_EU 0W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*EU 0W-20's sale[EU 0W-20 lube base oil's sale * conversion factor / 0.80 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
126	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_ASIA 5W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*ASIA 5W-30's sale[ASIA 5W-30 lube base oil's sale * conversion factor / 0.83 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
127	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_ASIA 0W-20)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*ASIA 0W-20's sale[ASIA 0W-20 lube base oil's sale * conversion factor / 0.88 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
128	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_US 10W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*US 10W-30's sale[US 10W-30 lube base oil's sale * conversion factor / 0.10 / 60 * HDDO average mileage * HDDO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
129	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_EU 10W-40)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*EU 10W-40's sale[EU 10W-40 lube base oil's sale * conversion factor / 0.67 / 60 * HDDO average mileage * HDDO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
130	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_EU 5W-30)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*EU 5W-30's sale[EU 5W-30 lube base oil's sale * conversion factor / 0.68 / 60 * HDDO average mileage * HDDO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
131	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through premium lube base oil(Gr-III_ASIA 10W-40)	(Premium lube base oil's fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*ASIA 10W-40's sale[ASIA 10W-40 lube base oil's sale * conversion factor / 0.71 / 60 * HDDO average mileage * HDDO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Korea Transportation Safety Authority	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
132	Environment	Product/Service	SK Innovation	Reduction in PM2.5 through investment in scrubber installation in the shared growth program	(Average PM2.5 emission per unit fuel consumption of vessel-PM2.5 emissions per unit fuel consumption of vessels with scrubbers)*Unit cost of PM2.5*PM2.5 emissions from ships with scrubber[Total annual fuel consumption * Participation rate in the company's the shared growth program * 1000]	Average PM2.5 emission per unit fuel consumption of vessel	0.0063609ton/MT	The company's data(Market VLCC database)	Unit cost of PM2.5	36.46 USD/kg	Delft University of Technology, Eco-costs
133	Environment	Product/Service	SK Innovation	Reduction in energy consumption through ESS linked to renewable energy in the United States	(Basic power fuel cost-Fuel cost for Curtailment ESS storage in PV power generation)*1*ESS discharge[exchange rate (KRW/USD) * ESS's sale * 365]	Basic power fuel cost	10.9USD/MWh	Ministry of Trade, Industry and Energy	1	0.00077 USD	-
134	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through ESS linked to renewable energy in the United States	(GHG emissions for Base power(electricity import or NG power generation)-GHG emissions for Curtailment ESS storage in PV power generation)*SCC(Social Cost of Carbon)*ESS discharge[ESS's sale * 365]	GHG emissions for base power(electricity import or NG power generation)	0.483tonCO2/MWh	Ministry of Trade, Industry and Energy	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
135	Environment	Product/Service	SK Innovation	Reduction in energy consumption through ESS linked to renewable energy in South Korea	(Resource saving effect through PV power generation with ESS-Resource saving effect through PV power generation without ESS)*1*ESS discharge[ESS's sale * 365]	Resource saving effect through PV power generation without ESS	104.80 USD/MWh	Data from Yeongheung Solar Power Plant; Korea Energy Economics Institute, Economic Study of Solar Wind Power Generation Considering Grid Stability(2014)	1	0.00077 USD	-
136	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through ESS linked to renewable energy in South Korea	(CO2 reduction through PV power generation with ESS-CO2 reduction through PV power generation without ESS)*SCC(Social Cost of Carbon)*ESS discharge[ESS's sale * 365]	CO2 reduction through PV power generation without ESS	0.554tonCO2/MWh	Data from Yeongheung Solar Power Plant; Korea Energy Economics Institute, Economic Study of Solar Wind Power Generation Considering Grid Stability(2014)	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
137	Environment	Product/Service	SK Innovation	Reduction in water pollution by developing and selling non-toxic Clean 7	(Average legal content of toluene-Clean7's content of toluene)*Unit cost of Toluene/Clean 7's sale[Clean7's sale * 1000]	Average legal content of toluene	0.85	Ministry of Environment, Air pollutant emission standards	Unit cost of Toluene	5.01 USD/kg	Delft University of Technology, Eco-costs
138	Environment	Product/Service	SK Innovation	Reduction in energy consumption through low viscosity passenger car motor oil	(low viscosity motor oil fuel efficiency improvement rate-Average fuel efficiency improvement rate)*PCMO fuel cost*PCMO energy savings[PCMO's sale * 158.98 / 5.00 * PCMO average mileage]	Average fuel efficiency improvement rate	0	Ministry of Trade, Industry and Energy	PCMO fuel cost	0.029 USD/km	The company's internal data
139	Environment	Product/Service	SK Innovation	Reduction in energy consumption through low viscosity heavy-duty motor oil	(low viscosity motor oil fuel efficiency improvement rate-Average fuel efficiency improvement rate)*HDDO fuel cost*HDDO energy savings[HDDO's sale * 158.98 / 60 * HDDO average mileage]	Average fuel efficiency improvement rate	0	Ministry of Trade, Industry and Energy	HDDO fuel cost	0.151 USD/km	The company's internal data
140	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through low viscosity passenger car motor oil	(low viscosity motor oil fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*PCMO GHG emissions[PCMO's sale * 158.98 / 5.00 * PCMO average mileage * PCMO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Ministry of Trade, Industry and Energy	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
141	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through low viscosity heavy-duty motor oil	(low viscosity motor oil fuel efficiency improvement rate-Average fuel efficiency improvement rate)*SCC(Social Cost of Carbon)*HDDO GHG emissions[HDDO's sale * 158.98 / 60 * HDDO average mileage * HDDO GHG emissions/ 1000000]	Average fuel efficiency improvement rate	0	Ministry of Trade, Industry and Energy	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
142	Environment	Product/Service	SK Innovation	Reduction in energy consumption through electric vehicle motor oil	(Average fuel consumption per car-Fuel consumption per electric vehicle)*Combined fuel unit cost*Motor oil's sale for electric vehicles[Motor oil's sale for electric vehicles]	Average fuel consumption per car	1,006.919595076 L per unit car	Ministry of Trade, Industry and Energy	Combined fuel unit cost	0.423921 USD/L	Korea national oil corporation, Petronet
143	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through electric vehicle motor oil	(Market average GHG emissions-GHG emissions from the company's electric vehicle motor oil)*SCC(Social Cost of Carbon)*Motor oil's sale for electric vehicles[Motor oil's sale for electric vehicles * Mileage / 1000000]	Market average GHG emissions	202.107366146g/km	Ministry of Trade, Industry and Energy	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
144	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through vehicle lightweight materials	(Reduced GHG emissions from the company's vehicle lightweight materials -Reduced GHG emissions from average vehicle lightweight material)*SCC(Social Cost of Carbon)*The conversion of vehicle lightweight materials sales to the number of cars[vehicle lightweight materials' sale /Plastic usage per vehicle lightweight material * 1000]	Reduced GHG emissions from average vehicle lightweight material	0.04826409CO2e per unit car	Ministry of Trade, Industry and Energy	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
145	Environment	Product/Service	SK Innovation	Reduction in energy consumption through vehicle lightweight materials	(The company's vehicle lightweight materials energy saving-Average vehicle lightweight materials energy saving)*Combined fuel unit cost*GC vehicle lightweight materials energy saving[vehicle lightweight materials' sale /Plastic usage per vehicle lightweight material * 1000]	Average vehicle lightweight materials energy saving	24.472389932 L per unit car	Ministry of Trade, Industry and Energy	Combined fuel unit cost	0.423921 USD/L	Korea national oil corporation, Petronet



■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
146	Environment	Product/Service	SK Innovation	Reduction in air pollutant emissions Eco-friendly foaming agent	(Air pollution emission factor of foaming agent for building insulation-Cylopentance's air pollution emission factor)*Unit cost of HCFC-141b.'Eco-friendly foaming agent's sale[Eco-friendly foaming agent's sale * HCFC conversion factor * 1000]	Air pollution emission factor of foaming agent for building insulation	0.269997354	Hyunsuk-Kwon et al., A Study on the Combustion Characteristics of Synthetic Insulation Materials for Buildings (2018).	Unit cost of HCFC-141b	94.49 USD/kg	Delft University of Technology, Eco-costs
147	Environment	Product/Service	SK Innovation	Reduction in fossil fuel through Solar power generation	(Average fuel cost for power sources-Solar power generation fuel cost)*1*Annual power generation [Solar facility capacity * Solar power generation days * 3.60]	Average fuel cost for power sources	0.0336566 USD/KWh	IEA, 2006	1	0.00077 USD	-
148	Environment	Product/Service	SK Innovation	Reduction in GHG emissions through solar power generation	(Average GHG Emission factor from conventional power sources-GHG emission factor from solar power generation)*SCC(Social Cost of Carbon)*Annual power generation [Solar facility capacity * Solar power generation days * 3.60]	Average GHG Emission factor from conventional power sources	0.0000003634 USD/ton	World Nuclear Association	SCC(Social Cost of Carbon)	81.87 USD/CO2eq	PwC Methodology Report
149	Environment	Product/Service	SK Innovation	Reduction in NOx emissions through solar power generation	(Average NOx emissions from conventional power sources-NOx emissions from solar power generation)*Unit cost of NOx *Annual power generation [Solar facility capacity * Solar power generation days * 3.60]	Average NOx emissions from conventional power sources	0.001471878kg/kwh	National Institute Of Environmental Research, Estimated Air Pollutant Emissions from Latest Coal-fired Power Plants and Latest LNG Power Plants (2017)	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
150	Environment	Product/Service	SK Innovation	Reduction in SOx emissions through solar power generation	(Average SOx emissions from conventional power sources-SOx emissions from solar power generation)*Unit cost of SOx *Annual power generation [Solar facility capacity * Solar power generation days * 3.60]	Average SOx emissions from conventional power sources	0.001482694kg/kwh	National Institute Of Environmental Research, Estimated Air Pollutant Emissions from Latest Coal-fired Power Plants and Latest LNG Power Plants (2017)	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs
151	Environment	Product/Service	SK Innovation	Reduction in PM10 emissions through solar power generation	(Average PM10 emissions from conventional power sources-PM10 emissions from solar power generation)*Unit cost of PM10*Annual power generation [Solar facility capacity * Solar power generation days * 3.60]	Average PM10 emissions from conventional power sources	0.000755743kg/kwh	National Institute Of Environmental Research, Estimated Air Pollutant Emissions from Latest Coal-fired Power Plants and Latest LNG Power Plants (2017)	Unit cost of PM10	8.3124 USD/kg	Delft University of Technology, Eco-costs
152	Environment	Product/Service	SK Innovation	Reduction in GHG emissions by providing waste heat as a source of district heating energy	(The company's SV reference value after initiation of the service-The company's SV reference value prior to initiation of the service)*SCC(Social Cost of Carbon)*GHG reduction [(Incheon Total Energy's energy supply * Incheon Total Energy's GHG emission factor * 4.20)]	The company's SV reference value prior to initiation of the service	0	-	SCC(Social Cost of Carbon)	81.87 USD/CO2eq	PwC Methodology Report
153	Environment	Product/Service	SK Innovation	Reduction in SOx emissions by providing waste heat as a source of district heating energy	(The company's SV reference value after initiation of the service-The company's SV reference value prior to initiation of the service)*Unit cost of SOx *SOx reduction[SOx emissions from Incheon total energy company * 1000]	The company's SV reference value prior to initiation of the service	0	-	Unit cost of SOx	9.11526 USD/kg	Delft University of Technology, Eco-costs
154	Environment	Product/Service	SK Innovation	Reduction in NOx emissions by providing waste heat as a source of district heating energy	(The company's SV reference value after initiation of the service-The company's SV reference value prior to initiation of the service)*Unit cost of NOx *NOx reduction[NOx emissions from Incheon total energy company * 1000]	The company's SV reference value prior to initiation of the service	0	-	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
155	Environment	Product/Service	SK Innovation	Reduction in PM10 emissions by providing waste heat as a source of district heating energy	(The company's SV reference value after initiation of the service-The company's SV reference value prior to initiation of the service)*Unit cost of PM10*PM10 reduction[PM10emissions from Incheon total energy company * 1000]	The company's SV reference value prior to initiation of the service	0	-	Unit cost of PM10	8.31 USD/kg	Delft University of Technology, Eco-costs
156	Environment	Product/Service	SK Innovation	Reduction in waste through lightening of PE Film (mPE) for packaging materials	(Reduction factor of waste of Metalloocene C8 LLD-Reduction factor of waste of PE film for packaging material)*Unit cost of PE*PE Film (C8 LLD) for packaging materials' sale[PE Film (C8 LLD) for packaging materials' sale * 1000]	Reduction factor of waste of PE film for packaging material	0.0777	korea institute of science and technology information	Unit cost of PE	0.0521 USD/kg	Delft University of Technology, Eco-costs
157	Environment	Product/Service	SK Innovation	Reduction in waste through lightening of PE Film (ZN C8 LLD) for packaging materials	(Reduction factor of waste of C8 LLD-Reduction factor of waste of PE film for packaging material)*Unit cost of PE*PE Film(ZN LLD) for packaging materials' sale[PE Film(ZN LLD) for packaging materials' sale * 1000]	Reduction factor of waste of PE film for packaging material	0.0132	korea institute of science and technology information	Unit cost of PE	0.0521 USD/kg	Delft University of Technology, Eco-costs
158	Environment	Product/Service	SK Innovation	Reduction in waste through high-performance products (EAA) for packaging materials	(EAA's blocking contribution rate - Contribution rate of barrier properties of sealing resin for packaging material)*Unit cost of waste*Amount of food waste[EAA's sale / Ratio of Tie Layer in packaging / weight of packaging * rate of food waste after expiration date (beverages)]	Contribution rate of barrier properties of sealing resin for packaging material	0.15822	korea institute of science and technology information	Unit cost of waste (weighted average by food waste treatment method)	32.36332 USD/ton	Delft University of Technology, Eco-costs
159	Environment	Product/Service	SK Innovation	Reduction in waste through high-performance products (Ionomer) for packaging materials	(Ionomer's blocking contribution rate-Contribution rate of barrier properties of sealing resin for packaging material)*Unit cost of waste*Amount of food waste[Ionomer's sale / Ratio of Sealing Layer in packaging / weight of packaging * rate of food waste after expiration date (food average)]	Contribution rate of barrier properties of sealing resin for packaging material	0.15822	korea institute of science and technology information	Unit cost of waste (weighted average by food waste treatment method)	32.36332 USD/ton	Delft University of Technology, Eco-costs
160	Environment	Product/Service	SK Innovation	Reduction in waste through high-performance products (PVDC) for packaging materials	(PVDC's blocking contribution rate-Contribution rate of barrier properties of barrier resin)*Unit cost of waste*Amount of food waste[PVDC's sale / Ratio of Barrier layer in packaging / weight of packaging * rate of food waste after expiration date (fish meat products)]	Contribution rate of barrier properties of barrier resin	0.09008	korea institute of science and technology information	Unit cost of waste (weighted average by food waste treatment method)	32.36332 USD/ton	Delft University of Technology, Eco-costs
161	Environment	Product/Service	SK Innovation	Reduction in PM10 emissions by shortening the transport distance of Homepick service	(Average delivery distance of other companies-Delivery distance of Homepick service)*Unit cost of PM10*PM10 reduction[Number of business days per year * Required number of trunk vehicles * PM10 reduction rate when 1km driving is reduced /1000]	Average delivery distance of other companies	154km	Korea transport institute	Unit cost of PM10	8.31 USD/kg	Delft University of Technology, Eco-costs
162	Environment	Product/Service	SK Innovation	Reduction in NOx emissions by shortening the transport distance of Homepick service	(Average delivery distance of other companies-Delivery distance of Homepick service)*Unit cost of NOx *NOx reduction[Number of business days per year * Required number of trunk vehicles * NOx reduction rate when 1km driving is reduced /1000]	Average delivery distance of other companies	154km	Korea transport institute	Unit cost of NOx	5.5728 USD/kg	Delft University of Technology, Eco-costs
163	Environment	Product/Service	SK Innovation	Reduction in GHG emissions by shortening the transport distance of Homepick service	(Average delivery distance of other companies-Delivery distance of Homepick service)*SCC(Social Cost of Carbon)*GHG reduction[Number of business days per year * Required number of trunk vehicles *GHG reduction rate when 1L diesel is reduced / 11 ton truck fuel efficiency]	Average delivery distance of other companies	154km	Korea transport institute	SCC(Social Cost of Carbon)	81.8703 USD/CO2eq	PwC Methodology Report
164	Environment	Product/Service	SK Innovation	Reduction in waste landfill through the sale of asphalt for recycling	(SKEnergy's cost of disposing of asphalt for recycle-Disposal cost of general asphalt and asphalt for general recycle)*Unit cost of waste*Asphalt for recycling's sale[Asphalt for recycling's sale]	Disposal cost of general asphalt and asphalt for general recycle	0.001144195 USD/ton	-	Unit cost of waste(general, designated waste landfill)	128.123 USD/ton	-
165	Environment	Product/Service	SK Innovation	Reduction in production of new asphalt through the sale of asphalt for recycling	(Unit price of asphalt for SKEnergy's Recycle-Unit price of general asphalt and ordinary recycling asphalt)*Oil refiner's average asphalt price*Asphalt for recycling's sale[Asphalt for recycling's sale]	Unit price of general asphalt and ordinary recycling asphalt	0.000045197 USD/ton	-	Oil refiner's average asphalt price	470.016 USD/ton	-
166	Environment	Product/Service	SK Forest	Atmosphere purification by forest development(absorption of carbon dioxide)	(Forest condition - No forest) * CO2 unit cost * Amount of CO2 absorbed	Non-disclosure	Non-disclosure	Korea Forest Research Institute, A Study on the Quantification of Commonweal Functions in Forest(2010)	Non-disclosure	Non-disclosure	Non-disclosure
167	Environment	Product/Service	SK Forest	Atmosphere purification by forest development(production of oxygen)	(Forest condition - No forest) * O2 unit cost * Amount of oxygen produced	Non-disclosure	Non-disclosure	Korea Forest Research Institute, A Study on the Quantification of Commonweal Functions in Forest(2010)	Non-disclosure	Non-disclosure	Non-disclosure

■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
168	Environment	Product/Service	SK Forest	Water purification by forest development(reducing use of a coagulant)	(Necessary amount of coagulant for non-stocked land - Required amount of coagulant for stocked land) * Coagulant unit price * Forest area	Non-disclosure	Non-disclosure	Korea Forest Research Institute, A Study on the Quantification of Commonweal Functions in Forest(2010)	Non-disclosure	Non-disclosure	Non-disclosure
169	Environment	Product/Service	SK Forest	Water purification by forest development(reducing use of a sludge)	(Necessary amount of coagulant for non-stocked land - Required amount of coagulant for stocked land) * Sludge treatment unit price * Forest area	Non-disclosure	Non-disclosure	Korea Forest Research Institute, A Study on the Quantification of Commonweal Functions in Forest(2010)	Non-disclosure	Non-disclosure	Non-disclosure
170	Environment	Product/Service	SK Forest	Water purification by forest development(reducing cost of cleaning water)	(Rate of water purification costs of non-stocked land - Rate of water purification costs stocked land) * water purification cost * forest area	Non-disclosure	Non-disclosure	Korea Forest Research Institute, A Study on the Quantification of Commonweal Functions in Forest(2010)	Non-disclosure	Non-disclosure	Non-disclosure
171	Environment	Product/Service	SK C&C	Reduction in GHG emissions by providing online mobile application test	(Average moving distance-Moving distance from Mobile App Test)/SCC(Social Cost of Carbon)*GHG Emission reduction factor by access to the online services[Number of times of the online service * GHG emissions per distance / 1000000]	Average moving distance	40km	Distance from Seoul station to SK C&C head office based on Naver Map	SCC(Social Cost of Carbon)	81.87 USD/CO2eq	PwC Methodology Report
172	Environment	Product/Service	SK C&C	Reduction in resources consumption by reusing desktop	(Resource consumption of newly manufactured desktop-resource consumption of reused desktop)/Service life of reused PC / Service life of new PC*Number of reused desktop[Number of reused desktop]	Non-disclosure	Non-disclosure	Non-disclosure	Service life of reused PC / Service life of new PC	0.00039	Internal data of SK Networks, Comparison of Service life of reused PC and new PC of Samsung
173	Environment	Product/Service	SK C&C	Reduction in resources consumption by reusing computer monitor	(Resource consumption of newly manufactured monitor-resource consumption of reused monitor)/Service life of reused PC / Service life of new PC*Number of reused monitor[Number of reused monitor]	Non-disclosure	Non-disclosure	Non-disclosure	Service life of reused PC / Service life of new PC	0.00039	Internal data of SK Networks, Comparison of Service life of reused PC and new PC of Samsung
174	Environment	Product/Service	SK C&C	Reduction in resources consumption by reusing laptop computer	(Resource consumption of newly manufactured laptop computer-resource consumption of reused laptop computer)/Service life of reused PC / Service life of new PC*Number of reused monitor[Number of reused monitor]	Non-disclosure	Non-disclosure	Non-disclosure	Service life of reused PC / Service life of new PC	0.00039	Internal data of SK Networks, Comparison of Service life of reused PC and new PC of Samsung
175	Environment	Product/Service	SK C&C	Reduction in resources consumption by remanufacturing desktop	(Resource consumption of newly manufactured desktop - Resource consumption of remanufactured desktop)/Service life of remanufactured PC / Service life of new PC*Number of emanufactured desktop[Number of emanufactured desktop]	Non-disclosure	Non-disclosure	Non-disclosure	Service life of remanufactured PC / Service life of new PC	0.000578	Internal data of SK Networks, Comparison of Service life of reused PC and new PC of Samsung
176	Environment	Product/Service	SK C&C	Reduction in resources consumption by remanufacturing computer monitor	(Resource consumption of newly manufactured monitor - Resource consumption of remanufactured monitor)/Service life of remanufactured PC / Service life of new PC*Number of emanufactured monitor[Number of emanufactured monitor]	Non-disclosure	Non-disclosure	Non-disclosure	Service life of remanufactured PC / Service life of new PC	0.000578	Internal data of SK Networks, Comparison of Service life of reused PC and new PC of Samsung
177	Environment	Product/Service	SK C&C	Reduction in resources consumption by remanufacturing laptop computer	(Resource consumption of newly manufactured laptop computer - Resource consumption of remanufactured laptop computer)/Service life of remanufactured PC / Service life of new PC*Number of remanufactured laptop computer[Number of remanufactured laptop computer]	Non-disclosure	Non-disclosure	Non-disclosure	Service life of remanufactured PC / Service life of new PC	0.000578	Internal data of SK Networks, Comparison of Service life of reused PC and new PC of Samsung
178	Environment	Product/Service	SK C&C	Reduction in environmental pollution by reusing desktop	(Weight of desktops being discarded - Weight of desktops being discarded being reused)/Desktop disposal cost(Kg)*Extending the useful life of reused desktops[Number of reused desktops / 2.00]	Non-disclosure	Non-disclosure	Non-disclosure	Disposal cost of desktop(kg)	0.079 USD	Eco cost
179	Environment	Product/Service	SK C&C	Reduction in environmental pollution by reusing computer monitor	(Weight of monitors being discarded - Weight of monitors being discarded being reused)/Desktop disposal cost(Kg)*Extending the useful life of reused monitors[Number of reused monitors / 2.00]	Non-disclosure	Non-disclosure	Non-disclosure	Disposal cost of computer monitor(kg)	0.2079 USD	Eco cost
180	Environment	Product/Service	SK C&C	Reduction in environmental pollution by reusing laptop computer	(Weight of laptop computers being discarded - Weight of laptop computers being discarded being reused)/Desktop disposal cost(Kg)*Extending the useful life of reused laptop computers[Number of reused laptop computers / 2.00]	Non-disclosure	Non-disclosure	Non-disclosure	Disposal cost of laptop computer(kg)	0.143 USD	Eco cost
181	Environment	Product/Service	SK C&C	Reduction in resource consumption by Clause service called 'IaaS'	(Baseline of the market-The company's SV reference value)*Resource savings per unit of MRR revenue in Cloud services*Resource savings based on Cloud MRR revenue[MRR revenue]	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
182	Environment	Product/Service	SK C&C	Reduction in resource consumption by detecting abnormal vibration of rotating equipment	(Scale of raw material use-scale of raw material reduction)*Monthly resource saving efficiency of rotating equipment* Number of rotating equipment [number of rotating equipment]	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure	Non-disclosure
183	Environment	Product/Service	SK Chemical	Reduction in waste through environment-friendly plastic polymers (WPC)	(Ratio of biomass in plastic waste used as raw material of WPC made by SK chemical - Ratio of biomass in plastic waste used as raw material of WPC made by the others)/monetization proxy of incinerated-general waste*The amount of biomass in WPC not transferred as waste[WPC sales * ratio of biomass in WPC * weight of original biomass when it was waste before utilized as raw material of WPC]	Ratio of biomass in plastic waste used as raw material of WPC made by the others	8.64%	Result from in-house research	Unit cost of general waste (incineration)	89.5594 USD/ton	Delft University of Technology, Eco-costs
184	Environment	Product/Service	SK Chemical	Reduction in waste through transparent plastic (ECOTRIA)	(Ratio of recycled plastic in our company's product - market average of ratio of recycled plastic)/monetization proxy of incinerated-general waste*ECOTRIA sales[ECOTRIA sales in North America * Ratio of A-level R-PET in ECOTRIA / ratio of R-PET among total yield / weight lose ratio of PET waste turned into r-PET]	market average of ratio of recycled plastic	0.0003%	GMID Passport, 2018, Global beauty packaging: key trends and innovations	Unit cost of general waste (incineration)	89.5594 USD/ton	Delft University of Technology, Eco-costs
185	Environment	Product/Service	SK Chemical	Reduction in BPA emissions in consumer-level through non-BPA products (Ecozen)	(Market average of BPA detection rate from plastic products-BPA detection rate from ECOZEN)/Disposal cost of BPA*BPA reduction rate by ECOZEN [Replacement rate of ECOZEN on epoxy * ECOZEN sales]	Market average of BPA detection rate from plastic products	0.99	Result from in-house research	Disposal cost of BPA	17238.529 USD/ton	Toxic Impressions BPA in thermal paper Cost and Benefit assessments in the REACH restriction dossiers
186	Environment	Product/Service	SK Chemical	Reduction in BPA emissions in consumer-level through non-BPA products (can coating agent)	(Market average of BPA detection rate from can coating agent-BPA detection rate from SK chemical's can coating agent)/Disposal cost of BPA*BPA reduction rate by our company's product [Replacement rate of can coating agent on epoxy * can coating agent sales]	Market average of BPA detection rate from plastic products	0.99	Result from in-house research	Disposal cost of BPA	17238.529 USD/ton	Toxic Impressions BPA in thermal paper Cost and Benefit assessments in the REACH restriction dossiers
187	Environment	Product/Service	SK Chemical	Reduction in greenhouse gas emissions through bio-product (Ecozen)	(Market average GHG emission rate from plastic products -GHG emission rate from ECOZEN)/SCC(Social Cost of Carbon)*reduced amount of GHG by ECOZEN[ ( ratio of bio material in ECOZEN (low-thermal resistance type) * ECOZEN sales (low-thermal resistance ) + ( ratio of bio material in ECOZEN(high-thermal resistance type) * ECOZEN sales (high-thermal resistance ) ) * reduced amount of GHG by bio material / 1000.00]	Market average GHG emission rate from plastic products	0.99	Result from in-house research	SCC(Social Cost of Carbon)	81.87 USD/CO2eq	PwC Methodology Report
188	Environment	Product/Service	SK Chemical	Reduction in greenhouse gas emissions through bio-product (POG3)	(Market average of GHG emissions from POG3 product-GHG emissions from POG3 made up of bio material)/SCC(Social Cost of Carbon)*replaced amount of petroleum-based product[POG3 sales/ theoretical yield rate of POG3]	Market average of GHG emissions from POG3 product	4.9718kg CO2/kg	Result from research by DuPont	SCC(Social Cost of Carbon)	81.87 USD/CO2eq	PwC Methodology Report
189	Environment	Product/Service	SK Chemical	Reduction in waste charge by environment-friendly substance (PETG)	(Waste charge estimation score of PVC -Waste charge estimation score of PETG)*Waste charge of PVC/reduced waste charge by PETG[PETG sales * 1000.00]	Waste charge estimation score of PVC	1.164	<a href="https://www.budangum.or.kr/wcs/usr/system/info.do">https://www.budangum.or.kr/wcs/usr/system/info.do</a>	Waste charge of PVC	0.1155 USD/kg	Korea environment corporation, Product specific imposition rate and cost of waste charge

■ SK Monetization Measurement Formula and Necessary Data (Environmental)

No.	Category	Affiliate	Indicator	Equation	Baseline			Monetization Proxy			
					Content	Value	Reference	Content	Value	Reference	
190	Environment	Product/Service	SK Chemical	Improving fuel efficiency through PCT film used for reducing weight of cables in vehicles	(Average weight of cable used in car per single vehicle - weight of cable made up of PCT film used in car per single vehicle)/average energy cost of gasoline combustion vehicle/Improved fuel efficiency by reducing weight of vehicle(PCT film sales * yield rate of PCT film / total weight of PCT cable in a single car ) * improved fuel efficiency by weight reduction of car * average annual driving distance of a single car]	Average weight of cable used in car per single vehicle	34.999113369kg	-	average energy cost of gasoline combustion vehicle	0.415441 USD/l	-
191	Environment	Product/Service	SK Chemical	Reduction in greenhouse gas emissions through PCT film used for reducing weight of cables in vehicles	(Average weight of cable used in car per single vehicle - weight of cable made up of PCT film used in car per single vehicle)*SCC(Social Cost of Carbon)/Reduced amount of GHG emissions by reducing weight of vehicle(PCT film sales * yield rate of PCT film / total weight of PCT cable in a single car ) * reduced amount of GHG emissions by weight reduction of car * average annual driving distance of a single car]	Average weight of cable used in car per single vehicle	34.999113369kg	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
192	Environment	Product/Service	SK telecom	Reduction in resources consumption by providing Re-new Phone(refurbished phone)	Value of Re-new phone for resources saving * Re-new phone's sale	The company's SV reference value prior to initiation of the service	0	-	Value of Re-new phone for resources saving	0.99 USD/unit	Evaluation of Recycling Resources in Discarded Information and Communication Technology Devices (Smartphones, Laptop computers)(2018)
193	Environment	Product/Service	SK telecom	Reduction in GHG emissions by providing Re-new Phone(refurbished phone)	Value of Re-new phone for reducing carbon dioxide emissions * Re-new phone's sale	The company's SV reference value prior to initiation of the service	0	-	Value of Re-new phone for reducing carbon dioxide emissions	1.386 USD/unit	-A circular economy for smart devices (Green Alliance, 2015) - https://www.apple.com/environment/
194	Environment	Product/Service	SK telecom	Reduction in resources consumption by providing Eco Phone, Re-work Phone(used phone)	Value of Eco Phone, Re-work Phone for resources saving * Eco Phone, Re-work's sale	The company's SV reference value prior to initiation of the service	0	-	Value of Eco Phone, Re-work Phone for resources saving	1.98 USD/unit	Evaluation of Recycling Resources in Discarded Information and Communication Technology Devices (Smartphones, Laptop computers)(2018)
195	Environment	Product/Service	SK telecom	Reduction in GHG emissions by providing Eco Phone, Re-work Phone(used phone)	Value of Eco Phone, Re-work Phone for reducing GHG emissions * Eco Phone, Re-work's sale	The company's SV reference value prior to initiation of the service	0	-	Value of Eco Phone, Re-work Phone for reducing carbon dioxide emissions	4.47 USD/unit	-A circular economy for smart devices (Green Alliance, 2015) - https://www.apple.com/environment/
196	Environment	Product/Service	SK telecom	Reduction in resources consumption by Happy Habit Project* *Happy Habit Project: campaign for reducing use of disposable plastic cups	(Number of multi-use cups* Disposable plastic cup resource consumption * Unit cost of disposable plastic cups)-(Total production of multi-use cups * Resource consumption of 1 multi-use cup * Unit cost of reusable cups)	The company's SV reference value prior to initiation of the service	1	-	①Unit cost of disposable plastic cups ②Unit cost of reusable cups	① 0.0013 USD/g ② 0.00111706 USD/g	Ecoinvent data sets (2015), Delft University of Technology
197	Environment	Product/Service	SK telecom	Reduction in GHG emissions by Happy Habit Project* *Happy Habit Project: campaign for reducing use of disposable plastic cups	((Number of multi-use cups* GHG emissions per disposable plastic cup)-(Total production of multi-use cups* GHG emissions per disposable cup)) x SCC(Social Cost of Carbon)	The company's SV reference value prior to initiation of the service	1	-	SCC(Social Cost of Carbon)	0.00008187 USD/g	- plasticsaurope.org - SCC(Social Cost of Carbon): PwC Methodology Report
198	Environment	Product/Service	SK telecom	Reduction in resources consumption by electronic identification service called 'Initial'	Number of printing papers saved * Weight of printing papers * Unit cost of printing papers	The company's SV reference value prior to initiation of the service	0	-	Unit cost of printing papers	0.00033808040343 USD/g	Ecoinvent data sets (2015), Delft University of Technology
199	Environment	Product/Service	SK telecom	Reduction in energy consumption by Factory Energy Management System(FEMS)	Actual energy savings of FEMS - Contractual energy savings of FEMS	The company's SV reference value prior to initiation of the service	0	-	-	-	-
200	Environment	Product/Service	SK telecom	Reduction in GHG emissions by Factory Energy Management System(FEMS)	Amount of GHG emissions reduced of FEMS * SCC(Social Cost of Carbon)	The company's SV reference value prior to initiation of the service	0	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
201	Environment	Product/Service	SK telecom	Reduction in energy consumption by Building Energy Management System(BEMS)	Actual energy savings of BEMS - Contractual energy savings of BEMS	The company's SV reference value prior to initiation of the service	0	-	-	-	-
202	Environment	Product/Service	SK telecom	Reduction in GHG emissions by Building Energy Management System(BEMS)	Amount of GHG emissions reduced of BEMS * SCC(Social Cost of Carbon)	The company's SV reference value prior to initiation of the service	0	-	SCC(Social Cost of Carbon)	81.87 USD/tCO2eq	PwC Methodology Report
203	Environment	Product/Service	SK telecom	Reduction in wastes by cutting package of SIM cards(ABS plastic)	SIM card's sale * ABS Plastic savings * Eco-cost of ABS plastic	The company's SV reference value prior to initiation of the service	1	-	Unit cost of ABS plastic	0.00161728 USD/g	Ecoinvent data sets (2015), Delft University of Technology
204	Environment	Product/Service	SK telecom	Reduction in wastes by cutting package of SIM cards(printing paper)	SIM card's sale * amount of printing paper (wrapping paper) reduced * Unit cost of printing paper	The company's SV reference value prior to initiation of the service	1	-	Unit cost of printing paper	0.00033808 USD/g	Ecoinvent data sets (2015), Delft University of Technology
205	Environment	Product/Service	SK telecom	Reduction in wastes by cutting package of SIM cards(PP)	SIM card's sale * amount of vinyl (PP) reduced * Unit cost of PP	The company's SV reference value prior to initiation of the service	1	-	Unit cost of PP	0.001117059 USD/g	Ecoinvent data sets (2015), Delft University of Technology
206	Environment	Product/Service	SK telecom	Reduction in paper wastes by switching digitalized application form	Number of electronic applications used * amount of print paper saved (paper application) * Unit cost of printing paper	The company's SV reference value prior to initiation of the service	1	-	Unit cost of printing paper	0.00033808 USD/g	Ecoinvent data sets (2015), Delft University of Technology

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