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Solutions for Our Climate

° Issue Brief

Diplomatic and Economic Strategies for "Plastic-Free Society":

Advocating for a Global Target to Reduce Plastic Production and Industrial Transition

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Solutions for Our Climate (SFOC) is an independent nonprofit organization that works to accelerate global greenhouse gas emissions reduction and energy transition. SFOC leverages research, litigation, community organizing, and strategic communications to deliver practical climate solutions and build movements for change.

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Key Summary

Reducing plastic pollution and Green House Gas (GHG) emissions from plastic production is a global challenge that cannot be avoided any longer. In the face of sluggish industry due to global overproduction from China, the new government is now assigned with double challenges of securing the sustainable survival of its petrochemical industry while reducing pollution and GHG emissions from the primary plastic production. The Issue Brief explores strategic approaches for the Korean government to accomplish the above-mentioned tasks, as the second part of the 5th session of the Intergovernmental Negotiating Committee (INC-5.2) is scheduled in Geneva, Switzerland, in August 2025 to finalize the draft of a global plastics treaty.

In short, internationally, the Korean government needs to endorse setting global targets to reduce primary plastic production to sustainable levels and push as many countries as possible to join this initiative. In particular, it needs to strengthen its regional leadership in the Asia-Pacific discussions. Domestically, the government should actively support the green transition of the petrochemical companies. Overproduction of general-purpose petrochemical products which are mostly either primary plastic polymers or their raw materials, is not desirable for the sustainable growth of the industry. While supporting industrial restructuring, the Korean government should increase its support for investment in decarbonization efforts at the upstream plastic production stage such as transition into eco-friendly portfolios and demonstration of GHGs reduction technologies in the production process. As such, with this two-track covering diplomatic relations and support for domestic industries, the Korean government can help its petrochemical industry to promote the sustainable survival, and at the same time, contribute to mitigating climate crisis and reducing plastic pollution by cutting unnecessary plastic production and carbon footprint of the petrochemical industry.

Global overproduction of plastics is both a threat to the industry and a climate catastrophe. Until now, the international agenda to reduce plastic production has been generally understood as being against the interests of the petrochemical industry. However, this Issue Brief emphasizes that the Korean government's active efforts to make global targets for reducing plastic production an international norm can rather a strategic approach to a sustainable transition of its petrochemical industry amid intensifying climate crisis.

I Introduction: Impacts of Plastic Production on Climate and Economy

Climate Impacts of Plastic Overproduction

Overproduction and overconsumption of plastics are emerging as one of the major contributors to driving climate change beyond environmental pollution.

Global plastic production nearly doubled from 234 million tons in 2000 to 460 million tons in 2019,[1] and it is expected to increase further to 736 million tons in 2040.[2] Plastic production, however, is structurally carbon-intensive because it not only uses fossil fuels directly as raw materials, but also consumes them as a major energy source in the production process, producing substantial Green House Gas (GHG) emissions. According to a study, as of 2019, GHGs emitting from the global production of primary plastics[3] reached 2.24GtCO2e, almost 5.3% of total global emissions. If plastic production keeps increasing, the figure may more than double to 4.75GtCO2e (a 2.5% annual growth scenario) or nearly triple to 6.78GtCO2e (a 4% annual growth scenario) by 2050.[4] Against this backdrop, there is a growing call among many countries to reduce overproduction and overconsumption of plastics globally, mainly led by the Intergovernmental Negotiating Committee to Develop an International Legally Binding Instrument on Plastic Pollution, Including in the Marine Environment (INC). Furthermore, Petrochemical Decarbonization is emerging as one of the key actions to fight climate change.

South Korea also produces significant GHG emissions from plastic production. Its economic structure is mainly based on manufacturing industry, and is a global petrochemical powerhouse with ranking 4th in ethylene production capacity and 5th in the international chemical industry market share[5] as of 2022. Therefore, refining and petrochemical sectors are responsible for a considerable amount of the nation's total GHG emissions. As of 2022, GHG emissions from the refining and petrochemical sectors

1 OECD. (2022). Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options. OECD Publishing, Paris

2 OECD (2024), Policy Scenarios for Eliminating Plastic Pollution by 2040, OECD Publishing, Paris

3 Primary plastic generally refers to plastic polymers produced newly from fossil fuels (crude oil, natural gas, etc.), that is, plastics not recycled and primarily produced.

4 Karali, N., Khanna, N., & Shah, N. (2024). Climate Impact of Primary Plastic Production. Lawrence Berkeley National Laboratory.

5 Korea Chemical Industry Association (2024), 『2024 Petrochemical Minibook』, Korea Chemical Industry Association.

of South Korea reached approximately 68.2 million tons, accounting for about 10% of its total emissions. Among them, emissions from the petrochemical industry amounted to 52 million tons, taking up 21% of total emissions within the industrial sector.[6] In particular, as the domestic petrochemical industry mostly uses Naphtha, derived from petroleum, as a raw material for petrochemical products. Between 2021 and 2023, annual production volumes of ethylene (more than 9 million tons) and synthetic resins (over 15 million tons) were higher than other categories (synthetic fiber raw materials, synthetic rubber) while synthetic resins represented half of the petrochemical exports[7], suggesting that the industry heavily depends on the production of petroleum-based primary plastics or their raw materials. In this context, reducing GHG emissions from the production of primary plastics is also a crucial challenge for South Korea to respond to climate crisis.

Economic Impacts of Plastic Overproduction

On the other hand, the global overproduction of primary plastics and their raw materials is serving as a contributor to an extended downturn in the domestic petrochemical industry. Since 2020, large scaling up, mainly led by China, has led to increases in global ethylene production capacity by about 45 million tons for five years (2020-2024)[8] and at the same time, production facilities for other primary plastic polymers such as PE and PP have continued to be expanded which took up the large production share within domestic companies.[9] Throughout 2023 and 2024, such an oversupply has dragged down the prices of ethylene and general-purpose petrochemical products[10] to the levels close to or below the manufacturing costs, leading to operating losses of Korean petrochemical companies.[11] Overall, global petrochemical capacity utilization has also decreased. In particular, the domestic top 4 petrochemical companies (LG Chem, LOTTE Chemical, Kumho Petrochemical, and Hanwha Solutions) witnessed the average utilization rate of petrochemical plants dropped to 79.8%[12] as of the first half of 2023. As such, it was evident that the global oversupply declined the domestic petrochemical capacity utilization.

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6 Greenhouse Gas Inventory and Research Center of Korea, Ministry of Environment. (2023), "Provisional GHG Emissions in 2022 Are Expected to Decrease by 3.5% from the Previous Year to 654.5 Million Tons." Ministry of Environment, 2023. 7. 31.

7 Korea Chemical Industry Association (2024), Same Book.

8 Overseas Economic Research Institute, Korea Export-Import Bank. (2024). Examining the Possibility of a Prolonged Crisis in the Petrochemical Industry. Issue Report Vol. 2024-Issue (2024.07.10).

9 Corporate Rating Headquarters, Korea Investors Service. (2024), Petrochemical Industry Stuck in a Tunnel of Long-term Recession – Checking the Risk and Future Credit Ratings of Each Company. Korea Investors Service.

10 General-purpose products refer to basic synthetic resins widely used for a variety of purposes, such as PE (used in plastic bags, packaging materials, films, etc.) and PP (used in food containers, etc.).

11 "Petrochemical Companies with High Proportion of General-Purpose Products, Expectations for Rebound in the Second Half Are Fading". Global Economic. 2024. 8. 12.

12 ""Economic Slump Persists in the Second Half Too"... Capacity Utilization of Petrochemical Plants Have Lowered". Financial News. 2023. 8. 23.

Especially, as the exports to China, a major export market for the Korean petrochemical companies, have declined from 51.5% in 2009 to 37.3% in 2023[13], total export volumes and profitability of domestic petrochemical companies have also fallen. As seen in the table below, the exports of Korean petrochemical industry in 2023 recorded all decreases in total value, volume, and unit price compared to the previous year.

[Table 1] Decreasing Trend in Petrochemical Exports Amount/ Volume/ Unit Price (Unit: USD 1 mil., 1000 tons, %)

Year	Amount		Volume		Unit Price ($/ton)	
	Value	YoY	Value	YoY	Value	YoY
2021	55,092	54.8	38,450	3.9	1,433	49.0
2022	54,316	△1.4	36,883	△4.1	1,473	2.8
2023	45,704	△15.9	36,770	△0.3	1,243	△15.6

Source: Korea Chemical Industry Association (KCIA) (2024)

As a result, since the whole industry experienced decreases in sales and operating profits, the operating profit margin of the domestic petrochemical companies plummeted from 13.4% in 2021 to 0.6% in 2023.[14] Moreover, this global oversupply is expected to intensify down the road. In other words, the overproduction of primary plastics throughout the world is serving as a factor to cause both climate crisis and hardship for the domestic petrochemical industry.

With International Negotiations on Global Plastics Treaty Being Imminent, Where Should the New Government's Plastic Policies Be Headed?

Against this backdrop, public interests are growing toward the policy direction of the newly inaugurated Lee Jae Myung administration, since the president Lee had pledged to present a "Plastic-Free Roadmap" during his campaign. In the face of reality where overproduction of primary plastics is prevalent through the world, the new government is now assigned with double challenges of securing the sustainable survival of Korea's petrochemical industry while reducing pollution and GHG emissions from the primary plastic production.

The Issue Brief suggests strategic approaches for the new administration to accomplish the above-mentioned tasks at hand, as the second part of the 5th session of the

13 Overseas Economic Research Institute, Korea Export-Import Bank. (2024). Same Report.
14 Overseas Economic Research Institute, Korea Export-Import Bank. (2024). Same Report.

Intergovernmental Negotiating Committee (INC-5.2) is scheduled in August to finalize the draft of a global plastics treaty.

In conclusion, the Korean government should take a two-track strategy to tackle the climate and economic challenges caused by the overproduction of primary plastics. Internationally, Korea needs to endorse setting targets to reduce global production of primary plastics through a global plastics treaty and push as many countries as possible including China and Middle Eastern countries to join this initiative. Domestically, the government should encourage Korean companies to gradually reduce general-purpose petrochemical products and undertake restructuring while, at the same time, significantly increasing support for the green transition of the petrochemical industry including demonstration of GHG emission reduction technologies in production processes. Korea may refer to the cases of Germany and Japan for such efforts, widely recognized countries as their high dependence on petrochemical exports like Korea. Through such a two-track strategy, Korea can help its petrochemical industry to transition to an eco-friendly portfolio for promoting sustainable survival, and at the same time, contribute to mitigating climate crisis and reducing plastic pollution by cutting unnecessary plastic production and carbon footprint of the petrochemical industry.

II

Advocating for a Global Target to Reduce Plastic Production as a Diplomatic Strategy

1 What is Global Initiative to Reduce Plastic Production?

Plastic production reduction refers to approaches to cap or reduce the total plastic production to a sustainable level, which targets primary plastics newly made from fossil fuels.

This approach is based on the discussion in the international community to shift from traditional plastic waste management to a full lifecycle management of plastics. In addition, reducing production is gaining global attention as one of the key solutions to plastic pollution and the GHGs emitted from plastic production.

Since the UNEA adopted a resolution in 2022 to launch negotiations for a global plastics treaty, five sessions of the INC have been held until 2024. In the course of negotiations, many countries have emphasized the need for a global goal of reducing production and consumption of plastics to sustainable levels. Countries supporting this initiative have requested to include global or national reduction targets for primary plastic production in the global plastics treaty. They have also advocated for measures to prioritize the phase-out of avoidable and problematic plastics which are used for non-essential purposes for a short time, are highly carbon-intensive, or are difficult to be recycled.

2 Progresses in International Discussions

The United Nations Environment Assembly (UNEA) held in March 2022 unanimously adopted a resolution to develop “an international legally binding instrument on plastic pollution” (UNEP/EA.5/Res.14). The resolution contained a joint decision to include a comprehensive approach in a new global treaty that addresses the full life cycle of plastic, beyond plastic waste management, from product design to sustainable production and consumption. In addition, the resolution specified convening an Intergovernmental Negotiating Committee

(hereinafter referred to as 'INC') with the ambition of completing developing an international legally binding instrument by the end of 2024, which would encompass the full life cycle of plastic.

Since the INC was formed, total five rounds of negotiations have been held on the global plastics treaty starting from the second half of 2022. The INC meetings have discussed a wide range of issues including sustainable design of plastic products, regulations on hazardous chemicals, and reuse of plastics, among which plastic production reduction has become one of the particularly hotly debated issue among countries.

The negotiations have witnessed countries being split into two major groups. One group is represented by the High Ambition Coalition (HAC), which maintains that the treaty should include legally binding obligations to reduce plastic production to sustainable levels.

The HAC, launched in 2022 jointly led by Norway and Rwanda, is participated by over 60 countries such as the member states of the European Union (EU), Canada, Australia, and Kenya. The HAC has called for "binding provisions to restrain and reduce the production and consumption of primary plastic polymers to sustainable levels," as well as "measurable and time-bound targets" to end plastic pollution.[15] In particular, countries directly affected by plastic pollution, such as Kenya and Rwanda, in support of strong production control, have strongly expressed that without introducing a cap on plastic production, an ambition to end plastic pollution will end up an empty slogan.[16] However, the HAC is a loose coalition of diverse countries with different stances. Especially, Korea has not actively spoken out on the global reduction targets even though it is a member of the HAC.

At INC-5, the most recent negotiations, the European Union (EU), the Pacific Small Island Developing States (PSIDS), and Panama acted proactively to advocate for a strong treaty that mandates plastic production reduction. Notably, the PSIDS group suggested a specific target to reduce the plastic polymer production by 40% until 2040, compared to 2025 levels.[17] The proposal led by Panama read the Conference of the Parties (CoP) should, at its first session, adopt in an annex a global target to reduce the production of

15 HAC Member States Ministerial Joint Statement for INC-5.
https://hactoendplasticpollution.org/hac-member-states-ministerial-joint-statement-for-inc-5/

16 African Countries Submission on Sustainable Production and Consumption.
https://resolutions.unep.org/incres/uploads/text_submission_-_african_countries_-_sustainable_production_and_consumption_final_r.pdf

17 Submission by PSIDS on Sustainable Production (Article 6: Supply).
https://resolutions.unep.org/incres/uploads/submission_by_psids_26.11.24_0_0.pdf

primary plastic polymers, receiving supports from 91 countries including 27 EU member states.[18]

On the other hand, major oil and petrochemical producing countries have remained opposed to including a provision on production reduction in the treaty at its source. So-called Like-reminded group, including China, Saudi Arabia, Russia, Iran, etc. is against including measures to limit plastic production or reduction targets in the treaty, on the ground that any production control on plastics might undermine economic developments of developing countries and infringe on the industrial sovereignty. The group also argues that the plastic issues should focus on improving waste management and promoting recycling.

Due to such definite differences between the two sides, the INC-5, held in Busan in November 2024, remained deadlocked over production reduction provisions and concluded with no clear agreement reached over the text of a global plastics treaty as in the previous INC-4 meeting in Ottawa.

Meanwhile, the United States was reportedly going to support limiting plastic production under the Biden administration in August 2024.[19] However, it is expected that the new Trump administration will not maintain the same position.

In another vein, on December 1, the final day of INC-5, the Chair presented the Chair's Text as the latest draft text based on the discussions up to that point. This Chair's text will guide further negotiations at INC-5.2 to be held in Geneva, Switzerland, from August 5 to 14, 2025.

18 Panama and a Group of Countries' Text Proposal on Sustainable Production. https://resolutions.unep.org/incres/uploads/text_proposal_-_article_6_-_panama_on_behalf_of_a_group_of_countries_1.pdf

19 "In shift, US backs global target to reduce plastic production, source says". Reuters. 2024. 8. 15.

Provisions on Plastic Production Reduction in the Chair's Text of the Global Plastics Treaty

The Chair's Text, released on December 1, 2024, consists of a preamble followed by 34 articles. Provisions related to plastic production reduction are included in Article 6. While presenting a framework for the treaty, the Chair's Text contains a large number of brackets indicating unresolved issues that require further negotiations for agreement.

Original text

ARTICLE 6
[SUPPLY][SUSTAINABLE PRODUCTION]

● **OPTION 1**
No Article

● **OPTION 2**

[1] The Conference of the Parties shall, at its first meeting, adopt [as an annex to this Convention] a[n] [aspirational] global target to [reduce] [maintain] [manage] the [consumption and] production [and consumption] [and use] of [primary] plastic[s] [polymers] [to reduce plastic pollution through consumption] [to sustainable levels].

[2] Each Party shall [, as appropriate] take measures across the full lifecycle of plastics to [achieve] [contribute to] the global target referred to in paragraph 1.

[3] Each Party shall report [available] statistical data on [its] [efforts to manage the consumption and its] production, [imports and exports] [of primary plastic polymers] [and consumption of plastics] and the measures taken [to achieve the global target referred to in] [under] paragraph **[1] [2]**.

[4] The Conference of the Parties shall, at its first meeting, adopt the reporting format, timing, methodologies and guidance for the implementation of this Article.

[5] The Conference of the Parties shall, every five years, [based on] [taking into account] a scientific, technical [social, cultural] and economic assessment by the subsidiary body referred to in Article 20bis, review progress [in the implementation of this Article] and, as appropriate, update the global target referred to in paragraph 1.

As shown in the above draft, Article 6 (Option 2) of the Chair's Text is structured into setting a global reduction target and mandating each Party to take national measures to attain the reduction target and report the results.

This Text does not include measures that directly regulate production, such as national reduction targets or production caps for each country, which were among the strict production regulations proposed during negotiations. Such proposals included setting national reduction targets and imposing legally binding obligations on Parties not to produce and supply primary plastic polymer that exceeds those targets. Furthermore, a discussion was held regarding the inclusion of legally binding provisions in the annex, which sets a global reduction target and mandates Parties to reduce their production of primary plastic polymers to attain the target.

However, the Chair's Text appears to compromise different views of participating countries. As a result, the Text includes the establishment of a global reduction target for the production of primary plastic polymers while narrowing the scope of obligations of Parties to take national measures that contribute to the global target, and with such measures, report statistics on plastic production, exports, and imports.

3 South Korea's Past Stance on a Global Target to Reduce Plastic Production

Though Korea joined the HAC upon its launch, it has received criticism for displaying an ambiguous and passive stance on the specific issue of plastic production reduction compared to other HAC member countries.

Initial position of the Korean government at the INC negotiation table was to focus on downstream measures such as expanding recycling, and it avoided publicly mentioning upstream measures including plastic production reduction. Until mid-2024, its statements in international negotiation tables remained relatively general.

However, as the 5th session of the Intergovernmental Negotiating Committee (INC-5) was held in Korea in 2024, international expectations and pressure on Korea as the host country increased accordingly. In response, during a press briefing in November 2024, former Minister of Environment Kim Wansup officially stated, "In order to solve the plastic

pollution problem, we must move toward reduction rather than recycling", acknowledging the need for production reduction.[20]

Despite this statement, the Korean government has remained cautious about the key word of production reduction when it comes to specific actions, showing contrasting moves to EU and other HAC member states. As a result, criticism has been continuously raised at both home and abroad that Korea is maintaining a lukewarm stance in discussions on plastic production reduction.

During the INC-5 meetings in November 2024, the Korean delegation fulfilled its role as the host country by helping to facilitate the proceedings. However, it did not make any clear suggestions or play a lead role in coordinating on the issue of plastic production reduction. Korea also didn't join the "Bridge to Busan: Declaration on Primary Plastic Polymers"[21], a joint declaration on the global plastics treaty presented in the run up to the INC-5 and signed by 33 countries including France, the Netherlands, Denmark, Peru, and Fiji. Furthermore, the government of Panama proposed Article 6 during the INC-5 negotiations, which included the adoption of an annex containing plastic production reduction targets. Again, though this proposal was welcome by 91 countries, the Korean government did not express any support for the proposal.[22] In response, 153 domestic and international civil society organizations issued a joint statement to urge the Korean government to speak out on plastic production reduction as the host country.[23]

At the United Nations Ocean Conference (UNOC) held in Nice, France, in June 2025, 95 UN member states endorsed a joint declaration titled 'The Nice Wake Up Call for an Ambitious Plastics Treaty' which called for international targets to reduce production and consumption of plastics, and to phase out hazardous substances. However, Korea did not sign on this joint declaration.[24] The Nice Declaration basically supports the establishment of a global production reduction target as proposed in Option 2 of Article 6 from the Chair's Text. The Declaration calls for setting global targets to reduce the production and consumption of primary plastic polymers to sustainable levels, urges Parties to take full-lifecycle actions to attain the global target, and requires the treaty to impose obligations on each country to report on their production, import, and export of primary plastic

20 "'Minister of Environment Kim Wansup, 100 Days in Office..."We Need to Focus on Reducing Production than Recycling Plastics"", Buddhist Broadcasting System, 2024. 11. 4.

21 "Oil Producing Countries Close Door for Negotiations, Host Country Korea to Stand Aside... 'Busan Agreement' Failed to Reach Consensus", Kyunghyang Daily News, 2024. 12. 2.

22 ""Just Do This" Negotiations Ended up Empty-Handed Despite Applause... What Should We Do About Plastic Negotiations?" Herald Biz U.S. Edition, 2024. 12. 2.

23 "153 Civic Groups from 36 Countries Urge the Korean Government to Speak up Actively for Plastic Production Reduction", Korea Daily, 2024. 10. 14.

24 "Nearly 100 countries call for ambitious global treaty to end plastic pollution at UN ocean summit". Euronews. 2025. 6. 11.

polymers. Total 238 international civil society organizations, including Greenpeace, issued a joint statement endorsing this Declaration.[25] However, the South Korean government did not participate in such a widespread support either.

Against this backdrop, the second part of the fifth session of (INC-5.2) is set to resume after the inauguration of the Lee Jae Myung administration, which has pledged to pursue a "plastic-free" initiative. In this context, attention is now being placed on whether the new Korean government will take leading and proactive actions toward setting global targets for plastic reduction.

25 Break Free From Plastics. (2025). "More than 230 CSOs support more than 90 countries' renewed commitment to a strong Plastics Treaty." Press Release (2025. 6. 11.).

4 A New Strategy for the Plastic-Free Era: Advocating for a Global Target to Reduce Plastic Production

A. Practical Rationale for Korea to Support a Global Target to Reduce Plastic Production

It is certain that reducing global plastic production is an essential measure to combat the climate crisis and eliminate plastic pollution. In its 2024 report, the OECD analyzed that only a policy scenario implementing the following four key policy instruments together could keep plastic-related GHG emissions at 2020 levels and curb plastic accumulation in rivers and oceans. These four policy instruments include curbing plastic production and demand, designing for circularity, enhancing recycling, and closing plastic leakage pathways into the environment. The report found that partial policy scenarios focusing solely on downstream measures, such as improvement of waste collection and recycling would require much higher investment in waste management, and pollution from plastic environmental leakage would continue with being somewhat reduced.[26] That is, only when upstream measures such as global reduction targets for plastic production are introduced together with downstream measures, pollution and climate crisis driven by plastic production can be restrained at sustainable levels.

Korea's support for global targets to reduce plastic production at the negotiating table for the global plastics treaty is not only justifiable in terms of tackling plastic pollution, but also effective as a diplomatic strategy for the sake of economic and national interests. As previously discussed, the market for general-purpose petrochemical products, which are key raw materials for plastic production, is currently facing oversupply, posing a major threat to the domestic petrochemical industry. Therefore, Korea needs to join efforts to establish a global reduction target for the production of primary plastic polymers as an international norm, campaign for international pressure for countries to participate in this initiative, and create international diplomatic environment to curb excessive expansion of manufacturing facilities abroad. It may be a more strategic choice that will help mitigate oversupply and stabilize the market.

Some may argue that if a global plastics treaty restricts the production of primary plastics, it could also serve as a trade regulation that limits the growth of domestic petrochemical industry. However, experts analyze that as China and Middle Eastern countries keep scaling up their production facilities for primary plastic polymers and their raw materials,

26 OECD (2024), Policy Scenarios for Eliminating Plastic Pollution by 2040, OECD Publishing, Paris

the competitiveness of Korean petrochemical companies is expected to decline and demand is not likely to rebound enough to keep up with this growing production capacity. In other words, it will be difficult for Korean petrochemical companies to make a breakthrough for future growth if they stick to conventional strategy of increasing production with maintaining portfolios centering on general-purpose petrochemical products, raw materials for fossil fuel-based plastic products.

For example, the report published by the U.S. Institute for Energy Economics and Financial Analysis (IEEFA) in September 2024 projected that global annual GDP growth from 2022 to 2050 will be lower than in the past, and therefore, for the next two decades, plastic demand is unlikely to grow at the same rate as it did over the past two decades. Based on this, the report concluded that global production cap on plastics makes financial sense as well.[27]

Similarly, the Export-Import Bank of Korea projected that economic maturity in advanced economies and a slowdown in China's growth rate would lower the GDP elasticity of demand for petrochemical products. It also expected that the momentum for normalizing petrochemical demand would remain weak in the mid-term.[28] Energy consultancy Wood Mackenzie analyzed that due to global oversupply, approximately 24% of global petrochemical production capacity could be in danger of a permanent closure by 2028.[29] Additionally, global data service provider ICIS projected that Korea may shut down up to 48% of its polypropylene (PP) production capacity by 2030.[30]

Given these circumstances, it would be a practical approach to set a clear global reduction target for primary plastics and actively advocate for such global efforts, thus making the maximum diplomatic efforts to contribute to restraining the excessive expansion of production facilities for primary plastics and their raw materials such as basic petrochemicals as well as synthetic resins.

The petrochemical industry, once a flagship industry in Korea, now stands at a structural turning point. With the rise of overseas producing countries like China and global oversupply, the industry can no longer expect the same growth as in the past. Facing a double crisis where changes in the industry are inevitable driven by carbon neutrality

27 Sanzillo, T., Mattei, S., & Sinha, A. (2024). Why a Production Cap on Plastics Makes Financial Sense. Institute for Energy Economics and Financial Analysis.

28 Overseas Economic Research Institute, Korea Export-Import Bank. (2024). Same Report.

29 Wood Mackenzie. (2024). Global Steam Cracker Closure Threat 2024.

30 ICIS. (2024). "South Korea may have to shut 48% of its PP capacity in 2024-2030 to return to healthy operating rates". https://www.icis.com/asian-chemical-connections/2024/01/south-korea-may-have-to-shut-48-of-its-pp-capacity-in-2024-2030-to-return-to-healthy-operating-rates/

regulations, maintaining the current status may mean a decline. If the government sends a clear and consistent signal in support of a global target to reduce plastic production while developing support measures for a green transition, it can brace for the future with minimized disruption. Domestically, this must be paired with the efforts to back the industrial competitiveness in the era of carbon neutrality through active support for petrochemical companies in the green transition of their product portfolios and production process.

Furthermore, it is also hard to say that the industry would shoulder excessive burden due to the obligations imposed on the Parties according to global reduction targets. Assuming that Article 6 (Option 2) of the Chair's Text is reflected in the final global plastics treaty, the obligation on the Parties is to introduce full life-cycle measures for plastics, including production, distribution, and consumption to contribute to the global reduction targets. However, Korea already completed the revision of the Framework Act on Resources Circulation on December 31, 2022 and introduced the Act on Promotion of Transition to Circular Economy and Society to legislate the principle of taking actions 'in the entire process of production, distribution, consumption, etc. of products' to realize a sustainable circular economy and society (Article 1 of the said Act). In addition, the Lee Jae Myung administration already pledged to establish a 'Roadmap for a Plastic-Free Society (Plastic-free Roadmap)' during the 21st presidential election, increasing the expectations on strengthening policies across the full plastic lifecycle. Therefore, it can be said that the introduction of lifecycle measures aligns with Korea's current policy direction and does not impose an excessive burden on the industry.

Secondly, reporting statistics would place a relatively low burden on Korea. As further details will be addressed below, there is a wide consensus in the domestic petrochemical industry that restructuring involving production reduction, including the consolidation of production facilities, is inevitable in response to global oversupply. In this situation where resolving oversupply has become a top priority for Korea's petrochemical policy, it is an overstated prediction that the obligation to report statistics on the production and export of primary plastics would act as an indirect trade restriction and cause economic losses. On the contrary, it is more reasonable to think that such a reporting obligation may serve as a diplomatic means to exert pressure on the alleviation of global oversupply, doing more good than harm.

In conclusion, supporting global targets to reduce plastic production is an advantageous strategy for Korea. From an environmental diplomacy perspective, Korea can strengthen its international standing by contributing to responding to climate crisis and addressing plastic pollution, and lead discussions in the process of shaping international norms. From an economic perspective, it can contribute to resolving market imbalances by exerting diplomatic influence to mitigate the global race to expand petrochemical capacity. Recognizing these strategic benefits, Korea needs to play a leading role in international negotiations by supporting the establishment of a global reduction target for primary plastic production.

B. Specific Recommendations

In the discussions based on the Chair's Text for the global plastics treaty, Korea should express its clear support for setting a global reduction target for the primary plastic polymer production, introducing an obligation for countries to take measures across the full plastic lifecycle to contribute to the global reduction target, and introducing an obligation for countries to report statistics on production, consumption, export, and import, along with the measures they have taken to contribute to achieving the target. In addition, Korea should persuade as many countries as possible to join these efforts.

More specifically, first, it is essential for Korea to express a clear and proactive stance on the global target for reducing plastic production. As one of the world's major producers of plastic polymers, if Korea maintains a lukewarm or ambiguous position, it may receive criticism from the international community for avoiding responsibility.

As previously discussed, the INC negotiations to date have also proposed regulatory measures that could immediately and directly impact the trade of petrochemical producers, including setting specific production reduction targets for each country and imposing legally binding obligations on each country to comply with them.

However, Article 6 (Option 2) of the Chair's Text does not require to set such immediate and quantitative targets and impose legally binding obligations. Instead, it is structured to further specify the global reduction target at the Conference of the Parties, and to require countries to report on the measures they have taken to contribute to that goal. This can be understood as a compromise that reflects the progress of the INC negotiations to some extent.

However, if Korea maintains a lukewarm and passive stance even toward the setting of a global reduction target, it will be difficult to regard the country as a responsible member of the international community, and it risks losing its leadership itself.

Second, Korea needs to take the lead in Asia-Pacific discussions and strengthen its leadership in this region. The Asia-Pacific region is characterized by a highly dynamic negotiating landscape where Southeast Asian countries on the frontlines of marine plastic pollution, Pacific island nations directly impacted by plastic pollution, China and India representing developing countries, and developed countries like Japan, Australia, and South Korea coexist. As both a plastic-producing and waste-exporting nation, Korea should consider such a regional context and its diplomatic responsibility, to coordinate opinions between countries and advance meaningful progress in negotiations on full lifecycle plastic management, including production reduction. The Asia-Pacific regional group met in Bangkok, Thailand from June 9 to 11, and will reconvene on August 4, a day before the opening of INC-5.2.

Third, since plastic production reduction is one of the key agenda items of this treaty, Korea should develop a sophisticated strategy through close cooperation among relevant ministries, including the Ministry of Foreign Affairs and the Ministry of Environment, and deploy strong negotiating capacity on the ground. Prior to the negotiations, inter-ministerial disagreements on plastic production reduction should be reconciled, and a unified national position should be clearly communicated to the international community. In particular, discussions on Article 6 (Production) will take place in the Contact Group, where differences between countries are most pronounced and negotiation progress has been slower than in other groups. Given this, the Korean government should prioritize developing a strategy and concentrate resources for this article in preparation for INC-5.2.

Fourth, the government should recognize the connection between the existing UN Framework Convention on Climate Change (UNFCCC) and the newly negotiated plastics treaty and respond with an integrated approach. The Nationally Determined Contributions (NDCs) submitted under the Paris Agreement include targets for emission reductions in the industrial sector, which are closely linked to the agenda of plastic production reduction. This is because setting plastic production reduction targets mean that GHG emissions from the petrochemical sector are likely to decrease accordingly. Thus, the Korean government should review the reduction pathway in the industrial sector with an integrated approach and strive to establish more ambitious NDC targets.

5 Myths and Facts: Fact-checking Criticisms of Reducing Plastic Production

A. Will Setting a Global Target to Reduce Plastic Production Impact the Domestic Economy and Eliminate Jobs?

As of 2023, the petrochemical industry ranked as the fourth largest export industry in Korea, accounting for 7.2% of the country's total exports with KRW 45.7 billion in total export volume. The industry is strongly perceived as a 'core industry', since it is closely tied to the local economies where industrial complexes are located. In this sense, there is a widespread recognition that adopting a strategy to reduce primary plastic polymer production could have impacts on the national and regional economies.

However, as previously discussed, the global scaling up of petrochemical production facilities is expected to continue at least by 2030, while demand for general-purpose petrochemical products, which are either primary plastic polymers themselves or their raw materials, is difficult to grow in a response to supply expansion. Therefore, low profitability in general-purpose petrochemical products is projected to persist in the mid- to long term.

In response to the global oversupply crisis, there is growing consensus in Korea that restructuring involving the production reduction such as the consolidation of domestic production facilities is inevitable. For example, the Federation of Korean Industries (FKI) proposed an 'Urgent Tasks to Overcome Crisis of the Petrochemical Industry' in March 2025, urging the government to take measures such as permitting corporate mergers to facilitate rapid restructuring of the petrochemical sector.[31] Similarly, in December 2024, the government announced a "Plan to Enhance the Competitiveness of the Petrochemical Industry" through the Ministerial Meeting on Strengthening Industrial Competitiveness, which included scaling down NCC (Naphtha Cracking Center) facilities as a key strategy to address oversupply.[32] As such recognition has also been spreading within the industry itself, companies are already discussing reducing production capacities of NCCs in major petrochemical complexes. A notable example is the Daesan Petrochemical Complex, where HD Hyundai Oilbank is exploring a physical integration by acquiring LOTTE Chemical's NCC facilities.[33]

31 Federation of Korean Industries. (2025). "Urgent Tasks to Overcome Crisis of the Petrochemical Industry", Press Release by the Federation of Korean Industries, 2025. 3. 24.

32 Government of the Republic of Korea. (2024). "Measures to Enhance Competitiveness of Petrochemical Industry". Joint Press Release. 2024. 12. 23.

33 "Restructuring Bomb Is Set to Explode…Petrochemical Companies on the Brink, Even Consolidation Is Not Easy", Maeil Business News Korea, 2025. 6. 23.

Given this context, it is inevitable that the production of general-purpose petrochemical products including primary plastic polymers will be reduced to a certain level, considering the global oversupply. Rather, the government should send preemptive signals and restructure the unsustainable production structure in order to protect regional economies and the industry in the mid- to long-term. As will be elaborated further below, considering international regulatory trends around carbon neutrality, the future competitiveness of Korea's petrochemical industry will not hinge on increasing production of primary plastic polymers, but rather on transitioning to a green, high value-added product portfolio and introducing decarbonization technologies. Therefore, the government should support for the green transition of the industry with a clear reduction signal.

Furthermore, we should not overlook the fact that the environmental and climate damages caused by plastic also incur enormous economic costs. According to the UN Environment Programme (UNEP), if plastic production continues on its current path, the global cost of addressing pollution and climate change caused by plastics could reach USD 3.2 trillion (approximately KRW 4,000 trillion) worldwide.[34] Considering all socioeconomic losses, including health and environmental damage from marine microplastics, plastic waste disposal costs, and disaster response expenses due to climate change, reducing problems through a proactive reduction in plastic production and a green transition in the industry would rather be the measures to protect the national economy from global risks.

B. Should We Focus on Recycling and New Technologies Instead of Reducing Production?

This is the argument that the Like-Minded Group mainly presents at the negotiation table. Until former Environment Minister Kim Wansup's remarks in November 2024, the Korean government had also taken a stance that placed relatively greater emphasis on issues such as recycling and waste management. It is based on the assumption that improved plastic waste management and recycling, and the development of new technologies can resolve the plastic issues.

Of course, recycling and the development of carbon-neutral technologies are critical solutions to plastic pollution and should be continuously strengthened. However, only when production reduction is implemented together with recycling and technology innovation, GHG emissions and pollution from plastics can be curbed to sustainable levels.

34 United Nations Environment Programme (2023). Turning off the Tap. How the world can end plastic pollution and create a circular economy. Nairobi.

Recycling has some limitations. In the short term, it is difficult to sharply increase the recycling rate. In addition, even if the recycling rate soars, total volume of plastic waste will inevitably increase too as long as overall production and consumption continue to rise. Currently, only 9% of collected plastic waste is recycled globally while 19% of the rest is incinerated, 50% is landfilled, and 22% is discarded without any control.[35] Although it is definitely important to improve recycling rates, such efforts also face limitations because about 80% of short-lived plastics are difficult to recycle due to design issues (additives, combination of materials, etc.).[36] UNEP analyzes that vitalizing recycling can reduce plastic pollution by 20% by 2040 and accelerating reuse can cut the pollution by 30%.[37] This indicates that recycling and reuse is clearly an important policy vehicle, but not a standalone solution to the plastic issues.

Furthermore, it is pointed out as a limitation that as long as the plastic production and consumption continue to increase, the absolute amount of waste will inevitably grow even with improved recycling rate. The abovementioned OECD report analyzed that in a limited scenario where only downstream measures are introduced without upstream measures such as reduction and transition at the production stage, pollution resulting from plastic environmental leakage would with about 16 million tons of macroplastics being leaked into the environment annually by 2040.[38]

There is also a technological optimism that the introduction of low-carbon design and processes will drastically reduce carbon footprint of plastic production. According to this view, the followings might be the solutions: increasing the use of chemical recycling that utilizes plastic waste as raw material; expanding the use of bio-based plastics; and adopting technologies such as Carbon Capture and Storage (CCS) and electrification that does not emit carbon dioxide.

It is certain that technological innovation for carbon neutrality is highly important. Therefore, the latter part of this report will also address the need to support technological innovation in the domestic petrochemical industry. However, there are several pitfalls to the fantasy of technological omnipotence that takes no account of reducing plastic production.

35 OECD. (2022). Same Report.
36 United Nations Environment Programme (2023). Same Report.
37 United Nations Environment Programme (2023). Same Report.
38 OECD (2024), Same Report.

First, some technological solutions have yet to resolve key problems. For example, bioplastics require a full life-cycle assessment from raw material cultivation to product decomposition, and especially there are concerns that the process of securing raw materials may cause another environmental problems. Another example is chemical recycling. Considering its high energy consumption and incurring indirect emissions, it is difficult to regard it as a complete decarbonization solution. CCS also has limitations, aside from commonly raised economic feasibility, that the technology still cannot completely resolve the emissions generated out of processes where capture is not applied, as well as life-cycle emissions.

Furthermore, some technologies still require time to be commercialized. For instance, thermal cracking of naphtha with electricity is expected to significantly reduce the carbon footprint of the petrochemical industry. However, it is still at the pilot stage and is projected to take time before large-scale implementation.

Moreover, while it is crucial to reduce carbon emissions from the production stage, since plastics store carbon in material form and release it during disposal phases such as incineration and landfill, controlling total lifecycle emissions is difficult unless the level of production and consumption is reduced.

Taken together, technological innovation and production reduction are complementary. Emissions that can be reduced through technology should be minimized to the greatest extent possible. However, in light of scientific evidence, an effective response to plastic pollution and climate change requires not only technological innovation, but also a full life-cycle approach, including measures to limit the production and consumption of primary plastics to sustainable levels.

C. Is Reducing Production Difficult as Plastic Is Essential to Our Lives and Has No Substitute?

It is concern arising from the significant role plastics play in supporting modern life, including in medical and electronic devices, automobiles, etc. However, this argument stems from a misunderstanding that setting global targets for reducing primary plastic production means a complete ban on all plastic use. Reducing plastic production is not a claim that we should not use plastic at all. Rather, it is about managing the current excessive and wasteful amount of plastic use to an appropriate level so that plastics can be used at a sustainable level where truly necessary.

According to UNEP, an estimated 238 million metric tons (MMt), or 67%, of the 335 MMt of plastic waste generated in 2019 consisted of short-lived plastics.[39] In other words, plastic wastes from relatively replaceable items such as single-use products took up larger portion than those from more essential uses.

Therefore, if a global target is set to reduce the primary plastic production and countries are obliged to take lifecycle measures to contribute to this goal, national policies are expected to prioritize regulating the demand and supply of plastic product categories that are widely used despite being short-lived and replaceable.

Examining the overall framework of the Chair's Text of the global plastics treaty, even if a global target for reducing primary plastic production is established, as reflected in Article 3 of the Chair's Text, national efforts to reduce plastic production are expected to prioritize the reduction of avoidable and problematic plastics which cause risks to human health and environment through leakage, and are not reusable or recyclable. It is also expected that such efforts will be made in connection with overall management of demand and supply.

In other words, the claim that adopting a global target for reducing primary plastic production would immediately hinder the use of plastics for essential and irreplaceable purposes has a logical leap and does not square with the fact. Furthermore, for areas where plastic use is necessary, efforts should be made further to continuously expand alternatives to primary plastics directly made from fossil fuels, including enhancing repair and reuse through more sustainable product design, and expanding recycling.

D. Even If We Agree to Reduce Production, Won't We Just Lose out If Other Countries Keep Producing?

Such criticism, on the contrary, points out the potential economic drawbacks from the current policies that Korea is solely pursuing scaling down production facilities, and underscores the need for international cooperation. Even if one country makes policy efforts to reduce primary plastic production, without global action, there is a high risk of carbon leakage where polluting industries shift to countries with weaker reduction commitments.

39 United Nations Environment Programme (2023). Same Report.

In this sense, a proposed global plastics treaty promotes multilateral and simultaneous action to solve such a problem. That is, by encouraging collective efforts of all countries to meet the reduction targets for primary plastic production, this treaty aims to address the challenge of managing a “global public good,” where the efforts of a single country alone are insufficient to achieve results.

Since Korea has already faced the urgent task of reducing production capacities due to global oversupply, it is necessary to build international pressure through coordinated action so that as many major trading partners as possible adopt global reduction targets. It’s also noteworthy that in terms of production volume and price, Korean companies may have difficulty in winning over those in countries with cost competitiveness like China. However, new opportunities may arise if a competitive market is formed that will add value through low-carbon innovation.

To bring about such outcomes, international cooperation through a global plastics treaty should be accompanied by policy efforts to support the green transition of the domestic petrochemical industry. This will be discussed in more detail below.

III

Supporting the Green Transition of the Petrochemical Industry as an Economic Strategy

1 Current Status and Challenges of Korean Petrochemical Industry

A. Current Status of Korean Petrochemical Industry

The petrochemical industry refers to an industry that produces basic petrochemicals from raw materials such as naphtha extracted through crude oil refining, and reprocesses them into intermediate materials and derivatives such as synthetic resins, synthetic fiber raw materials, and synthetic rubber. Petrochemicals is a key foundational materials industry that supplies various raw and subsidiary materials to a wide range of downstream industrial sectors such as automobiles, electronics, and construction. However, hidden behind the growth is an increase in the production of plastics used for short-term, non-essential purposes, such as single-use plastics.

The portfolios of domestic petrochemical companies vary depending on factors such as whether they own naphtha crackers (NCCs), and the level of portfolio diversification also differs by company. Nonetheless, experts point out two general characteristics of Korea's petrochemical firms that their price competitiveness are relatively weak in the global market and their portfolios are largely centered on general-purpose petrochemical products.

When it comes to total petrochemical production volume, Korea is a petrochemical powerhouse which ranks 4th in global ethylene production capacity and 5th in global chemical industry market share as of 2022.[40] However, its production capacity per company is relatively small compared to global major firms and therefore has a weakness in terms of cost competitiveness based on economies of scale. Additionally, since most domestic petrochemical processes are based on petroleum-derived NCCs, cost competitiveness is relatively lower compared to other production methods such as ethane crackers (ECCs) or crude oil-to-chemicals (COTC) processes[41].

40 Korea Chemical Industry Association. (2024). Same Book.

41 Overseas Economic Research Institute, Korea Export-Import Bank. (2019). Comparison of Competitiveness in the Petrochemical Industry by Raw Materials. 2019 Issue Report VOL 2019-Issue-23.

In terms of portfolio, most companies primarily focus on general-purpose petrochemical products, while also operating side businesses such as secondary batteries, solar energy, and other energy businesses. Some companies, such as LG Chem (advanced materials, secondary batteries) and Hanwha Solutions (solar energy), have enhanced the level of diversification to the extent that the share of commodity petrochemical products in their revenue fell below 50%. However, as of 2022, Korea's top 4 petrochemical firms (LG Chem, LOTTE Chemical, Hanwha Solutions, Kumho Petrochemical) saw the average share of general-purpose petrochemical products compared to the entire products still stood at 59%.[42] In the case of companies like YEOCHUN NCC and Korea Petrochemical Ind. Co., LTD (KPIC), nearly 100% of their product portfolios consisted of general-purpose petrochemical products.[43] This figure is significantly higher compared to 45% share of general-purpose products of Japan's major petrochemical companies (Mitsubishi, Sumitomo, Shin-Etsu), and 17% share of Germany's leading petrochemical company BASF.

Meanwhile, most general-purpose petrochemical products are either primary plastic polymers or basic petrochemicals used as raw materials. While they are utilized as foundational inputs for various industries such as automobiles, a considerable amount is used to produce short-lived disposable plastic products like packaging and food containers, posing great problems. Among plastic products, there are high-performance resins that are used as industrial materials for relatively more essential and longer-term purposes. However, in Korea's petrochemical industry, the production of functional resins accounted for only 2.5% of total output as of 2022.[44]

As a result, it is continuously pointed out that to enhance the competitiveness of domestic petrochemical companies, the share of general-purpose petrochemical products should be reduced. Instead, there should be a shift to increasing the share of eco-friendly products such as recycled plastics or those produced in low-carbon processes, as well as high value-added products that can be used for relatively long-term and essential industrial purposes. Such improvements would eventually contribute to the goal of reducing and managing the excessive production of primary plastic polymers.

42 KDB Future Strategy Research Institute. (2023). "Business Outlook and Strategy for Domestic Petrochemical Industry in Accordance with Slowed Exports to China"

43 Overseas Economic Research Institute, Korea Export-Import Bank. (2024). Examining the Possibility of a Prolonged Crisis in the Petrochemical Industry. Issue Report Vol. 2024-Issue (2024.07.10).

44 Hana Bank Hana Institute of Finance. (2023). Korean Petrochemical Industry with Little Golden Time Left: No Changes, No Survival! Hana Industry Ecosystem Analysis Series Vol. 6.

B. Dual Challenge: Global Oversupply and Expansion of Carbon Neutrality Regulations

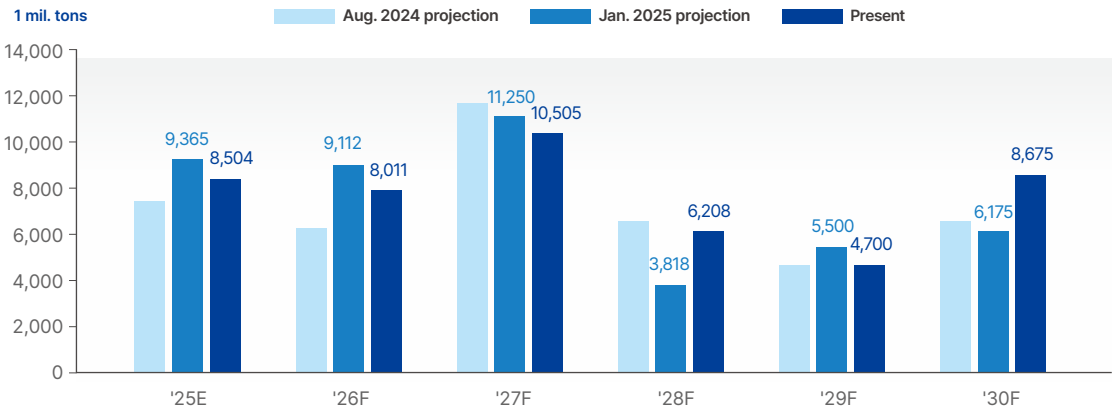
Korean petrochemical industry is currently facing a dual challenge. One is the expected prolonged slump in capacity utilization and operating profits due to oversupply amid the realized global overproduction of general-purpose petrochemical products. Another is the global expansion of carbon neutrality regulations.

First, the latest figures show the global overproduction of general-purpose products as follows:

Updated projections for new petrochemical product capacity additions released by S&P Global in May 2025 shows an even greater increase compared to previous projections. The combined projections for new capacity addition and increase/ decrease rate compared to the previous projections for the 2025–2030 period include 46.6 million tons of ethylene (+3.1%), 31.92 million tons of polyethylene (PE) (+5.5%), and 19.41 million tons of polypropylene (PP) (+9.3%).[45] These figures reinforce the forecasts that as the oversupply of general-purpose petrochemical products persists, the downturn of Korea's petrochemical industry will also be extended.

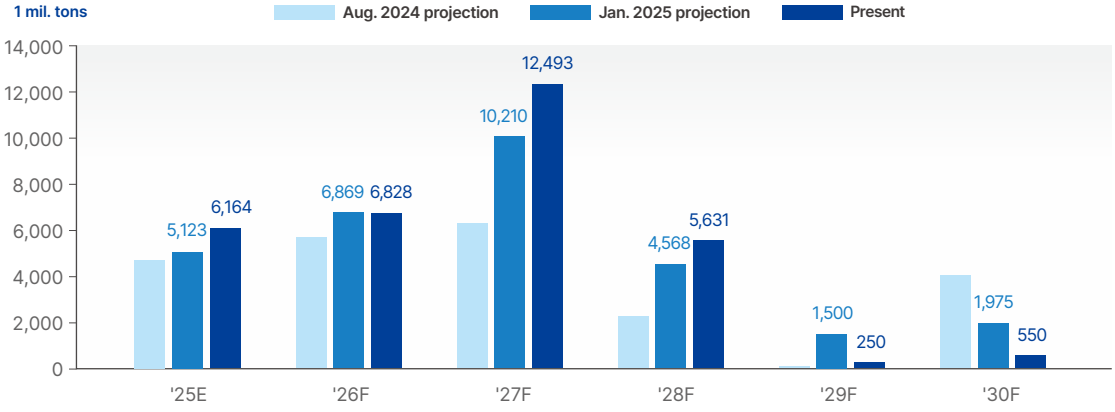
45 NH Investment & Securities Co., Ltd. (2025). "New Expansion Scale to Increase Again between 2025 and 2030". NH Investment & Securities Industry Comment. 2025. 6. 4.

[Figure 1] Global ethylene capacity addition projection: the cumulative addition projection for 2025–2030 has increased by 3.1% compared to previous projection.



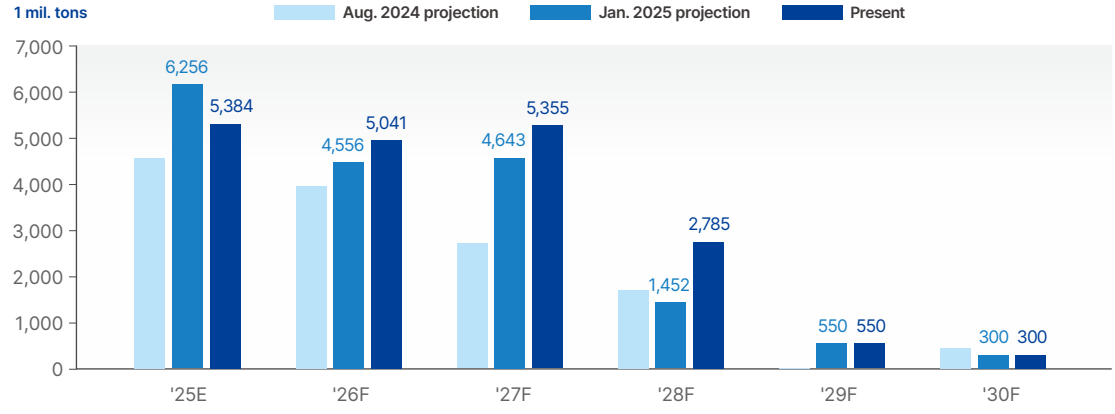
Source : S&P Global, Research Headquarters for NH Investment & Securities Co., Ltd.

[Figure 2] Global PE capacity addition projection: the cumulative addition projection for 2025–2030 has increased by 5.5% compared to previous projection.



Source : S&P Global, Research Headquarters for NH Investment & Securities Co., Ltd.

[Figure 3] Global PP capacity addition projection: the cumulative addition projection for 2025–2030 has increased by 9.3% compared to previous projection.



Source : S&P Global, Research Headquarters for NH Investment & Securities Co., Ltd.

In addition, since producing basic petrochemicals and synthetic resins is structurally carbon-intensive, changes in the global regulatory environment toward carbon neutrality also pose risks to Korean petrochemical companies.

Representative examples of expected carbon regulations include the EU's Carbon Border Adjustment Mechanism (CBAM) and the U.S. Clean Competition Act (CCA). If major export markets introduce policies that impose additional tariffs or charges based on the carbon emissions of products, the competitiveness of Korea's carbon-intensive general-purpose petrochemical products is likely to deteriorate.

Indeed, ahead of the full implementation of the CBAM in 2026, the EU has required reporting of the embedded emissions of imports for six categories including steel, aluminum, and fertilizers during the transitional phase that began in October 2023. From 2026, the EU is expected to implement the verification of emissions data and request to purchase CBAM certificates for these products. Although plastic products are excluded during the transitional phase, the European Commission (EC) is set to review expanding the system to other products with a high risk of carbon leakage like petrochemicals during this phase. The EC aims to expand the CBAM by 2030 to all items (including petrochemicals) which are subject to the EU Emissions Trading System (EU ETS).[46]

Similar legislative moves are witnessed in the United States. For example, the U.S. Clean Competition Act (CCA), which was reintroduced in December 2023, proposes a carbon tax on imported goods produced by energy-intensive industries by multiplying the difference in carbon intensity between the U.S. and the country of origin by a unit carbon price. As of 2020, Korea's carbon intensity was approximately 1.3 times that of the United States. The CCA would apply to goods produced by 26 energy-intensive industries, including the petrochemical industry. The list of products subject to this initiative includes petroleum products that are among Korea's top 10 exports to the U.S.[47]

As such, carbon neutrality regulations become integrated into the international trade framework. If the Korean petrochemical industry sticks to current petroleum-based high-carbon processes, the trade competitiveness of Korea's general-purpose petrochemical products will further decline.

46 Korea Energy Economics Institute. (2023). EU Commission Announces Transition Rules for the Transition Period Before Full-pledged Implementation of CBAM in 2026. World Energy Market Insights No. 23-17 (2023. 9. 4.)

47 Federation of Korean Industries. (2024). Impacts and Implications of U.S. Clean Competition Act (CCA, implemented from 2025) on Domestic Industries.

Facing such dual challenge, the Korean petrochemical industry's tasks can be summarized into two key points. First, it should reduce the production of general-purpose petrochemical products, which are mostly either primary plastic polymers or raw materials converted into them. Second, it should seek to green transition of the production portfolio and manufacturing processes by adopting recycling and low-carbon processes.

However, since such a transition requires R&D investment as well as large-scale capital investment in innovating facilities, active financial assistance of the government is essential. In this sense, the following sections examine the cases of Germany and Japan to present policy recommendations for Korea based on these examples.

2 Transition Cases in the Overseas Petrochemical Industry: Approaches of Germany and Japan

A. Germany

As of 2022, the manufacturing sector represented 18.4% of Germany's GDP value creation, indicating that manufacturing plays a relatively large role in its national economy.[48] Among the manufacturing sectors, automobiles and petrochemicals consist of major industries, which is similar to Korea in terms of industrial structure. However, the difference is that Germany is securing future competitiveness by reducing the production of general-purpose petrochemical products in its industrial sector and by providing active government support for green industrial transition.

In the 1990s, European petrochemical companies faced a difficult business environment as they were closely followed by latecomers, including Asian countries, in the general-purpose petrochemical product segment. In response, the BASF, Germany's leading petrochemical company, overcame this crisis through an active merger and acquisition (M&A) strategy aimed at reducing its production of general-purpose petrochemical products and expanding its business scope into new areas such as supplying various materials used in secondary batteries. In specific, in recognition that the existing structure with high dependence on general-purpose chemicals would make it difficult to secure a competitive edge, BASF pushed ahead with adjustment of production volumes including optimization of facilities. Then in 2005, it sold off shares in its general-purpose plastics production (Basel, PE/PP, 2005), and actively pursued M&As between 2009 and 2010, including

48 Institute for International Trade, Korea International Trade Association. (2024). Low-carbon Transition of High-emission Industries: Comparison and Implications of Policies in Major Countries. TRADE FOCUS 2024, No. 39.

investing more than USD 9 billion in the acquisition of specialty chemical companies such as Ciba Specialty Chemicals and Cognis.[49] As a result, BASF successfully reduced the proportion of general-purpose petrochemical products in its portfolio from 42% in 2005 to 17% in 2022.[50]

In addition to the shift in industrial production portfolios, Germany has recently been providing financial support in an active manner for reducing carbon emissions in energy-intensive industries such as steel, cement, and chemicals. That is, the German government is investing large-scale public funds in enhancing the competitiveness of high-emission industries including petrochemicals in the environment where carbon regulations are tightening up.

Germany is funding for the green transition of its industry by comprehensively utilizing domestic industrial support policies along with the EU Innovation Fund and the Important Projects of Common European Interest (IPCEI). Over the past three years, about EUR 6.1 billion (about KRW 8.2 trillion) has been invested in low-carbon transition projects related to the steel, chemical, and cement industries.[51] Specifically, Germany injected EUR 2 billion (about KRW 3.1 trillion) into the Industrial Decarbonization program (Dekarbonisierung in der Industrie) from 2021 to 2023. It also invested EUR 2.2 billion (about KRW 3.5 trillion) in the Federal Funding for Industry and Climate Protection: Module 1 (Bundesförderung Industrie und Klimaschutz: Modul 1) from 2024 to support projects aimed at developing innovative carbon reduction technologies in energy-intensive sectors such as steel, cement, and petrochemicals. At the EU level, the Innovation Fund, a large-scale fund to support low-carbon technologies financed by the revenues from the EU ETS, is providing funds for demonstration to support innovation projects in high-carbon industries such as petrochemicals.

Furthermore, in 2023, the German government introduced the Carbon Contracts for Difference (CCfD) scheme, where the government guarantees a fixed carbon price to companies over the contract period, thus mitigating their investment risks by allowing the companies in the high-emission industries to cover additional costs incurred from transitioning to carbon reduction facilities with the carbon price. In March 2024, the German government selected the first 15 companies for climate protection contracts and announced plans to provide up to EUR 2.8 billion (about KRW 3.1 trillion) over the next 15 years. These initial beneficiaries include major emitters in the petrochemical and paper

49 LIM Jisu, MUN Sangcheol. (2014). Slump in the Korean Chemical Industry Is Not a Problem of Business Cycle. LG Business Insight. 2024. 11. 5.

50 KDB Future Strategy Research Institute. (2023). Business Outlook and Strategy for Domestic Petrochemical Industry in Accordance with Slowed Exports to China

51 Institute for International Trade, Korea International Trade Association. (2024). Same Report.

industries, with BASF among them. Meanwhile, the total fund size for carbon contracts approved by the EC stands at EUR 4 billion, and the German government is expected to enjoy an effect of reducing 350 million tons of carbon emissions by 2045 through this initiative.[52]

In addition, through the Special Equalization Scheme, the German government also supports energy-intensive industries such as steel and petrochemicals for their energy bills, provided they meet 'green conditions' such as improving energy efficiency or investing in the decarbonization of production processes.[53]

Backed by such government support, BASF, jointly with SABIC and Linde, began construction a demonstration plat for large-scale electrically heated steam cracking furnaces at its Ludwigshafen site in September 2022. It has also tested alternative processes such as methane pyrolysis, taking the lead in the technology development for low-carbon production. Given this, S&P Global analyzed that German chemical companies are likely to become industry leaders in providing solutions related to low-carbon and circular economy under carbon neutrality regulations, potentially securing a competitive edge in the global market.[54]

B. Japan

Japan is a major manufacturing powerhouse, taking up 5.3% of global manufacturing output as of 2022, and is highly dependent on the manufacturing industry with manufacturing contributing 20.3% to its national GDP. Therefore, Japan is considered the country with the most similar industrial structure and conditions to Korea.[55] It is noteworthy that the Japanese government has led the restructuring of production capacity of petrochemical companies and supported their efforts to ease the overproduction. Recently, the Japanese government has been actively supporting the green transition of the industry as its petrochemical industry faced another crisis due to the oversupply from China.

Japan was once the world's second-largest producer of ethylene, but as emerging Asian economies undertook massive capacity expansions, its competitiveness declined. In response, the Japanese government took the initiative in promoting consolidations and M&A of production facilities. A representative example is Mitsui Chemicals, created from

52 "Germany earmarks $3 billion for decarbonisation subsidies". Reuters. 2024. 10. 15.

53 CHUNG Hun, LEE Sangjun. (2024). Japan and Germany's Strategies to Strengthen Carbon-Neutral Industrial Competitiveness and Their Implications for Korea. National Assembly Futures Institute National Future Strategy Insight No. 117.

54 S&P Global. (2024. 3. 20.) "German Chemical Industry's Decarbonization Is A Team Effort".

55 CHUNG Hun, LEE Sangjun. (2024). Same Report.

the merger of Mitsui Petrochemical and Toyo Sakae Chemical in 1997. More recently, as the domestic industry has been at the risk of renewed crisis due to the oversupply from China, the industry is working on a second round of restructuring. For example, Mitsui Chemicals shut down its PET plant in 2023 and is gradually downsizing its PP and PE lines in the Chiba region. Furthermore, around 2027, the company is exploring a plan to spin off its entire general-purpose division to merge it with an external company. The strategy appears to aim at restructuring its portfolio by centering on high value-added specialty chemicals.[56]

Companies' bold strategies to restructure their business portfolios are interlinked with government's strong policy support. To promote a Green Transformation (GX) across its economy and society, Japan enacted the GX Promotion Act (Act on the Promotion of a Smooth Transition to a Decarbonized Growth-Oriented Economic Structure) in May 2023, and established the GX Promotion Strategy based on the said Act. The GX Promotion Strategy, announced by the Ministry of Economy, Trade and Industry (METI) in July 2023 in accordance with the GX Promotion Act, include diverse policy tasks from introduction of renewable energy to resource circulation. Among 14 policy tasks, structural transformation (shift in fuel/ raw materials) in the manufacturing industry was included in the Strategy.

In addition, the GX Promotion Act stipulates the issuance of GX Economic Transition Bonds, with plans to issue JPY 20 trillion worth bonds (Bonds for Transition to a Decarbonized Growth-oriented Economic Structure) over the next decade starting from 2023 to support innovative technology development and facility investment that contribute to decarbonization and enhanced profitability. Japan issued the world's first GX Economic Transition Bonds in February 2024, amounting to total JPY 1.6 trillion at the central government level. It also created the Green Innovation Fund worth of JPY 2 trillion after establishing the Green Growth Strategy in 2020. Through these policy efforts, the Japanese government has invested a total of JPY 632.9 billion (about KRW 5.8 trillion) in low-carbon transition projects of high-emission industries (steel, chemicals, cement).[57]

Furthermore, based on the Strategic Domestic Production Promotion Tax Incentive, the green chemical sector is eligible for corporate tax credits of up to 40% over 10 years in proportion to production and sales volume.[58]

56 ""Japan Closes Facilities, Korea Holds on"... 'Speed Gap' in Restructuring Petrochemical Industries"". eToday. 2025. 6. 9.
57 Institute for International Trade, Korea International Trade Association. (2024). Same Report.
58 Institute for International Trade, Korea International Trade Association. (2024). Same Report.

3 Domestic Policy Recommendations

Based on such case study as above, the report presents the following recommendations for the domestic industry policies that can be pursued in parallel with international diplomatic strategies to advocate for global production reduction targets.

A. Developing Strong Green Transition Support Measures Linked to National Carbon Neutrality Goals in the Development of Support Measures for the Petrochemical Industry

In December 2021, the Ministry of Trade, Industry and Energy (MOTIE) under the Moon Jae-in administration, announced the 'Vision and Strategy for a Great Carbon-Neutral Industrial Transformation.' In accordance with the Strategy, the 'Carbon-Neutral Core Industrial Technology Development Project' was introduced to provide large-scale financial support for R&D on the carbon-neutral green transition of industries by 2030. However, under the Yoon Suk Yeol administration, the scale of the Project was significantly reduced from the originally proposed KRW 6.729 trillion (2023–2030) to just KRW 935.2 billion (2023–2030).[59] Furthermore, the 2024 government budget allocated only KRW 41.2 billion to the Project, a drastic cut from the initial financial investment target of KRW 105.5 billion specified in the National Basic Plan for Carbon Neutrality.[60] The amount is notably small compared to industrial green transition support funds in Germany and Japan.

Meanwhile, the petrochemical industry has recently shown keen interest in the government's restructuring efforts and the introduction of additional R&D support measures. The government announced 'Measures to Enhance the Competitiveness of the Petrochemical Industry' on December 13, 2024, which included policy measures to suspend restrictions on holding companies. This initiative also included plans to establish a Petrochemical R&D Investment Roadmap for 2025–2030, supporting domestic petrochemical companies in developing technologies for high-value-added and eco-friendly chemical materials. However, the announcement of this roadmap, originally expected in the first half of 2025, has been delayed while the specific budget size and target technologies have yet to be presented. That is, it seems difficult to expect immediate impacts on facilitating investment and transition of domestic industries as they lack R&D capacity due to the extended slump in operating profits.

59 "Carbon Neutral Core Technology Development Project Passes Preliminary Feasibility Study with 86% Cut in Budget to KRW 935.2 Billion", ETNews, 2022. 10. 31.

60 "'Despite Emphasis on Carbon Neutrality...Climate Response Budget for the Next Year, Cut by 16% from Initial Plan". Chosun Daily. 2023. 9. 22.

It is a positive move for the government to decide to strengthen R&D investment support as part of its efforts to support the domestic petrochemical industry in crisis. However, instead of ad-hoc measures to improve business outlook through deregulation and sporadic support for a few companies, it is more necessary to provide bold financial support linked with the government's long-term carbon neutrality strategy and vision of restructuring its industrial structure. In other words, instead of a limited R&D support targeting a single ministry or project, the government should inject its funds to achieve a green transition of high-emission industries such as the petrochemical industry in close connection with the government-wide carbon neutrality strategy including the Basic Plan for Carbon Neutral Green Growth.

As for Germany, at the EU level, the European Green Deal (2019), the European Industrial Strategy (2021), and the Net-Zero Industry Act (2024) have shaped basic frameworks to support industrial green transition. Within Germany, it also announced the Industrial Policy in the Transition Period (Industriepolitik in der Zeitenwende) in October 2023, establishing a comprehensive strategy that encompasses supplying renewable energy, strengthening technological sovereignty in transitional technologies, and providing financial support programs. All of these together form the institutional foundation for Germany's industrial decarbonization support program as discussed above. Similarly, Japan has linked its national carbon neutrality strategy with industrial R&D support through the GX Promotion Strategy, which includes a wide range of policy tasks including the enactment of the GX Act, the introduction of renewable energy, and resource recycling.

In conclusion, the petrochemical industry support measures currently under review by the MOTIE should go beyond a mere stopgap measure that focuses only on overcoming the short-term industrial crisis through scattered R&D supports for a few projects. Instead, integrated measures should be in place at an inter-ministerial level, including the Ministry of Environment, to achieve industrial transition of high-emission industries. Such measures may include the expansion of financial subsidies, the adoption of CCfD, and the introduction of strong incentives such as increased tax credits for carbon neutral technologies.

B. Expanding Green Transition Incentives at the Upstream Stage of Plastic Production

Specifically, support for the green transition of the petrochemical industry should bring about changes in the following upstream stage of plastic production.

First, to address the overproduction of primary plastics, there needs to restructure product portfolios to shift to products that replace conventional general-purpose petrochemical products and reduce primary plastic production such as those using recycled raw materials. The portfolio also needs to include, instead of single-use plastic products, high value-added products that are used in the essential industrial sectors over relatively long periods. Among them, it is necessary to provide incentives for investment in production facilities when it comes to the recycled-based resins that can reduce the production of primary plastics. The government can review providing subsidies for transforming facilities or tax credits to support development of eco-friendly products including those utilizing recycled raw materials.

Furthermore, given that carbon regulations become tightened up in international trade such as the implementation of carbon border taxes, providing incentives is essential for process innovation aimed at minimizing GHG emissions during plastic production.

The MOTIE announced its plan to invest KRW 185.8 billion by 2030 through the Carbon-Neutral Core Industrial Technology Development Project to develop core technologies for reducing GHG emissions in the petrochemical industry, including the electrification of NCCs. Similarly, the Ministry of Environment has included an investment of KRW 127.7 billion in its 2024 work plan to support the installation and replacement of corporate GHGs reduction equipment. However, the amount of support currently allocated to individual projects remains at only several billion won per project. However, large-scale demonstration projects like NCC electrification, a key tool for petrochemical decarbonization, require massive investments. For example, BASF, SABIC, and Linde jointly constructed an electrically heated steam cracker pilot plant with approximately EUR 14.82 million (about KRW 23 billion) in funding from the German government's industrial decarbonization program. The total cost of the project was about EUR 69 million (approximately KRW 110.3 billion).[61] In light of this, the current level of government support in Korea does not provide enough financial incentives to invest in facility conversion.

61 German Competence Centre on Climate Change Mitigation in Energy-Intensive Industries (KEI) (Kompetenzzentrum Klimaschutz in energieintensiven Industrien). eFurnace – Klimafreundliche Chemieproduktion durch elektrifizierte Steamcracker-Öfen. https://www.klimaschutz-industrie.de/foerderung/dekarbonisierung-in-der-industrie/projekt/efurnace/

Case Study:
LG Chem's Portfolio Diversification with Eco-Friendly Products[62]

LG Chem is considered a representative example to relatively diversify its portfolio among domestic petrochemical companies. In particular, it is building its portfolio with the products that can replace primary plastics through the development of bio-based products as well as mechanical and chemical recycling technologies for waste plastics.

First, in terms of mechanical recycling, LG Chem began commercializing Post Consumer Recycled (PCR) materials in 2009, which were produced through mechanical recycling. It currently produces and sells products such as PCR ABS, PCR PC and PC/ABS, PCR PE and PP, and PCR PVC. Mechanical recycling involves collecting, crushing and washing single-material waste products such as home appliances, vinyl, automotive headlamps, and fishing nets, and then reprocessing them into pellets. Since last year, LG Chem has expanded its PCR business to the Americas and China, where it is now selling these products.

Chemical recycling refers to the process of breaking down plastic waste back into basic raw materials or high molecular substances through chemical conversion such as pyrolysis. With regard to this, LG Chem built a supercritical pyrolysis plant in Dangjin, Chungnam Province, that decomposes mixed plastic waste into pyrolysis oil with the use of high-temperature and high-pressure supercritical steam. Now, LG Chem is pushing ahead with commercializing so-called 'Circular Balanced' products made from 'Circular Naphtha' distilled from this pyrolysis oil. Furthermore, LG Chem developed technologies to produce polymers such as ABS, PBT/TPEE by depolymerizing plastic wastes such as waste artificial marble or waste PET into monomers. In 2022, it launched pilot samples of products such as PC using this technology.

Besides, LG Chem also manufactures products that use bio-renewable feedstock, extracted from renewable sources, after blending it with other materials.

However, though LG Chem had early started commercializing PCR materials in 2009, its 'Sustainability' products represent a small share in its total revenue with about KRW 1.9 trillion of sales in 2022 (LG Chem's sales in 2022 (consolidated basis): about KRW 51.8 trillion). LG Chem has stated that it has continued to make R&D investments with an aim to increase the sales of its sustainability product line to KRW 8 trillion by 2030.

This LG Chem's case illustrates not only the potential of commercializing recycled plastic products as alternatives to primary plastics but also underscores the need for the government to actively support the early stages of technology development and demonstration for eco-friendly products, while working to create related markets.

62 This Case Study was written with reference to LG Chem's '2023 Sustainability Report', 'Eco-friendly Brand Product Book', LG Chem. (2025). LG Chem's Recycle Portfolio Strategy in Response to Global Plastic Regulations. Speech for Plastic Policies and Industries Seminar. 2025. 6. 4.

In addition, domestic carbon credit prices remain low, and most major petrochemical companies continue to receive free allocations of emission permits. As a result, the economic benefits as a reward for reducing GHG emissions are minimal.

Therefore, there is a clear need to expand paid allocations of emission permits to secure funding and in turn, to increase financial incentives for investments in the development of core technologies for industrial decarbonization. This topic will be examined in more detail below.

C. Expanding Paid Allocation of Emission Permits to Secure Funding and Provide Emission Reduction Incentives

The GHG Emission Trading System (ETS) is a policy tool whereby the government allocates a set amount of emission permits to companies. Companies that emit less than their allocated amount can sell the remaining emissions for profit, while those that emit more than their allocation should purchase additional emission permits. As such, this policy induces the decarbonization of industry through market-based mechanism.

The ETS also plays a crucial role in securing financial resources to support the green transition of industry. Revenues generated from the sale of emission permits are funneled into the Climate Response Fund, which was established under the Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis (commonly referred to as the Carbon Neutrality Framework Act). This fund serves as a primary source to support GHGs reduction and transition of industry. Above-mentioned Carbon-Neutral Core Industrial Technology Development Project by the MOTIE or the Carbon Neutral Equipment Investment Support Program by the Environment Ministry are both funded through this Climate Response Fund.

Korea introduced the ETS in 2015 and established the Climate Response Fund in 2022. However, questions and criticisms have been raised as to whether these measures have had a meaningful impact on combating the climate crisis. This skepticism stems from the low price of emission permits and the free allocation of permits to high-emission sectors such as steel and petrochemicals, which have failed to provide effective incentives for reducing greenhouse gas emissions.

Even looking at the petrochemical sector alone, the climate policy group Solutions for Our Climate (SFOC) analyzed the 2023 emission permit allocations for 15 companies in

the so-called 'Million Ton Club' in Korea's oil refining and petrochemical industries. As a result of the analysis, the SFOC pointed out that most of these companies received free allowances covering over 90% of their actual emissions and 11 out of the 15 companies were even granted more free permits than their actual emissions, effectively receiving a surplus.[63] Such practices have undermined the economic motivation for high-emission companies to invest in green technologies for decarbonization.

Furthermore, it is difficult to secure stable funding for the Climate Response Fund with the current way of operating the ETS, which in turn hampers the government's ability to provide consistent financial support to industry. Due to the high rate of free allocation, Korea's carbon price has been on a downward trend since 2022. As of the end of October 2024, the price per ton stood at KRW 12,550, significantly lower than the EU (KRW 96,350), the UK (KRW 67,930), and even China (KRW 20,140).[64] Considering the OECD's recommendation that global carbon prices need to reach the level of EUR 60-120 per ton (approximately KRW 80,000 to 160,000) to meet the goals of the Paris Climate Agreement, Korea's current carbon pricing is at the remarkably low level.[65]

The declining carbon price directly leads to a shortage of resources for the Climate Response Fund. In 2022 and 2023, its first two years, the actual revenues from the auctioning of emission permits reached only 43.6% and 21.3% of the planned amount respectively. This resulted in a shortfall where approximately KRW 300–400 billion in annual revenue from the Climate Response Fund was not secured compared to initial revenue expectations.[66]

As such, while emissions trading revenue, the primary source of revenue for the Climate Response Fund, is unstable, the Fund is currently maintained through a structure in which 7% of the Transportation, Energy, and Environment Tax is transferred to the general account. However, since these taxes are temporary taxes with a set expiration date, a long-term decrease is inevitable.

Therefore, in order to secure stable funding to support industrial carbon neutrality of industry, it is necessary to increase the proportion of paid allocations of GHG emission permits.

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63 Solutions for Our Climate. (2024). Carbon Neutrality at a Standstill: The Lost Promise of South Korean Petrochemical Companies.

64 National Assembly Budget Office. (2024). Current Status and Future Tasks of GHG Emission Trading System. National Assembly Budget Office NABO Focus No. 83

65 OECD (2021), Effective Carbon Rates 2021: Pricing Carbon Emissions through Taxes and Emissions Trading, OECD Series on Carbon Pricing and Energy Taxation, OECD Publishing, Paris

66 National Assembly Budget Office. (2024). Assessment of the Climate Response Fund. National Assembly Budget Office Project Assessment

As discussed earlier, Korea's current financial support programs for industrial green transition remain insufficient in scale to accelerate the decarbonization and green transition of the domestic petrochemical industry. However, SFOC analyzed that according to a policy scenario that gradually reduces emissions in line with Korea's 2050 carbon neutrality target while increasing the share of paid allocations, it would be possible to secure revenues from paid allocation reaching between KRW 32.6 trillion and KRW 66.5 trillion annually by 2040. The analysis also shows that the faster the NDC (Nationally Determined Contribution) reduction targets and paid permit allocations are strengthened, the greater the potential revenue.[67] By increasing the proportion of paid allocations, the government can both strengthen incentives for companies to transition and unlock bold financial support, which will strongly support the industrial transition aligned with the carbon neutrality era.

D. Incorporating Full Lifecycle Measures Including Production of Plastics into the 'Plastic-Free Roadmap'

Finally, this report intends to emphasize that the upcoming "Plastic-Free Roadmap" should be designed to contain full lifecycle measures, including measures for the upstream stage of plastic production.

With the complete revision of the Framework Act on Resource Circulation on December 31, 2022, the Act on Promotion of Transition to Circular Economy Society was introduced. This Act stipulates the principle that measures should be taken "in the entire process of production, distribution, consumption, etc. of products" to realize a sustainable circular economy and society (Article 1 of the said Act). However, Korea's plastic policies have still focused on post-consumption (waste) management and improvement of recycling.

On October 20, 2022, relevant ministries jointly announced "Full Lifecycle Plastic Measures", which clearly stated circularity assessment as a policy at the design and production stages, and additional steps like the mandatory labeling of recycled materials proportion were introduced in March 2024 to expand producer responsibility. However, these measures have lacked efficacy because they are either indirect regulations requiring for information disclosure or recommendations for voluntary compliance, rather than imposing actual obligations on producers to reduce primary plastic production.

67 Solutions for Our Climate. (2024). End the Free Emissions: Recommendations for Reforming K-ETS Based on Market Activation Scenario Analysis.

Therefore, when establishing a Plastic-Free Roadmap, the policy scope should be expanded beyond how to tackle plastic wastes, to how much primary plastics to be produced and consumed.

In the short term, it is necessary to transform current recommendatory policies for production stage into binding obligations. A starting point can be to lay the foundation for reducing primary plastic production by imposing obligations on plastic product manufacturers to increase the proportion of sustainable designs and recycled materials that can be repaired and reused. Setting targets to reduce the total consumption across the board, rather than just a few single-use plastic products, can also be a means of inducing supply reduction.

In this regard, the EU Packaging and Packaging Waste Regulation (PPWR) can be referred to, which sets targets for reducing the generation of packaging waste, mandates that all packaging must be designed for reuse or recycling, and establishes mandatory minimum recycled content requirements. Additionally, the EU Single-Use Plastics Directive (SUP) introduced differentiated sales bans and consumption reduction provisions for 10 types of single-use plastic products. Other examples include the introduction of plastic taxes by the UK, Spain, and Italy, which require manufacturers or importers of plastic packaging that is difficult to recycle to pay charges proportional to the weight of the packaging.

In summary, the roadmap is aimed at establishing a foundation for reducing the production and consumption of primary plastics by placing actual responsibilities on producers regarding reusable and recyclable design, as well as the use of recycled materials. The roadmap also should include setting targets for the overall reduction in single-use plastic products (particularly those that are difficult to recycle) and imposing corresponding obligations on manufacturers.

Furthermore, in the mid- to long-term, it seems necessary to develop a roadmap for reducing the production and consumption of primary plastics in alignment with global discussions on the adoption of global targets to reduce plastic production in the proposed global plastics treaty. The first step should be to collect data in a transparent manner on the volume of primary plastics produced domestically, per capita consumption, and import/export volumes. Based on this, a “peak year” for plastic production and consumption can be identified, from which medium-term targets can be set. At this time, the reduction goals for production and consumption should be established in consideration of introducing comprehensive measures including green transition at the

production stage (including sustainable design, expansion of recycled products, adoption of decarbonization technologies), along with changes in consumption patterns and strengthened circular economy (including increased reuse).

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Solutions for Our Climate (SFOC) is an independent nonprofit organization that works to accelerate global greenhouse gas emissions reduction and energy transition. SFOC leverages research, litigation, community organizing, and strategic communications to deliver practical climate solutions and build movements for change.