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° Issue Brief

The Risky Bet of Large-Scale Capacity Expansion in an Era of Overcapacity and Production Reduction

An Analysis on the Socioeconomic Risks of New Petrochemical Facilities

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Solutions for Our Climate(SFOC) is an independent policy research and advocacy group that aims to make emissions trajectories across Asia compatible with the Paris Agreement 1.5°C warming target.

Publication Date October 2026

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Summary

The South Korean petrochemical industry stands at a crossroads where its long-term competitiveness and viability will be determined by the decisions that are made during this time. Globally, the petrochemical industry is undergoing structural changes due to global overcapacity and oversupply issues caused by increased production from China, the United States, Middle East along with various recent geopolitical issues. South Korea, in particular, which has a high dependence on exports, is facing a more severe crisis than many other countries.

In response, the government and industry are aiming to reduce production capacity to alleviate overcapacity while simultaneously undertaking restructuring to shift the business structure from commodity products to high-value-added, specialty products, in order to secure the long-term competitiveness of this key national industry. However, amidst these restructuring and business transitions, the operation of a new large-scale commodity petrochemical plant is being pursued. Consequently, this has become a major point of contention for the Korean petrochemical industry, raising concerns that the effectiveness of the restructuring may be weakened and the transition to future industries may be delayed.

This issue brief analyzes the socio-economic impacts and potential risks that the continued expansion of commodity petrochemical production may cause, focusing on S-Oil's Shaheen project.

I. Status of the domestic petrochemical industry and progress of restructuring

1. Current status of the domestic petrochemical industry

As of 2024, South Korea is the world's fourth-largest producer of petrochemical product, following China, the United States, and Kingdom of Saudi Arabia. Major products include polymers such as polyethylene (PE), polyethylene terephthalate (PET), polystyrene (PS), and polypropylene (PP).[1]

The capabilities of Korea's petrochemical industry have long provided support for the country's manufacturing and export competitiveness. In 2023, the total production value of the Korean petrochemical industry was 111 trillion won, ranking fifth among all domestic manufacturing sectors. Furthermore, in 2024, it generated $48 billion in exports, ranking as the fourth largest manufacturing export sector.[2] These statistics demonstrate that the Korean petrochemical industry holds a significant position and importance not only in the domestic economy but also in the global market and industry as well.

However, despite these achievements, the Korean petrochemical industry has been facing a structural crisis in recent years as its industrial structure, centered on commodity products, has reached its limits. Notably, while domestic polyethylene production capacity was estimated to be a total of 8.4 million tons in 2025, actual production volume was only 4.935 million tons, resulting in an operating rate that fell short of even 60%.[3] This figure includes all polyethylene (PE) products, including linear low-density polyethylene (LLDPE), low-density polyethylene (LDPE), and high-density polyethylene (HDPE). Issues such as overcapacity and declining operating rates play a significant role in the background of the current calls for restructuring, business reorganization, and corporate consolidation within the industry and from the government.

2. Restructuring situation due to industry downturn

The Ministry of Trade, Industry and Resources (MOTIR) announced on August 20, 2025, that the government and the petrochemical industry had signed an agreement to promote corporate-led, autonomous business restructuring. One of the key points of the agreement was that 10 companies

1 Korea Chemical Industry Association: Current Status of the Petrochemical Industry

2 Korea Chemical Industry Association: Current Status of the Petrochemical Industry

3 Ibid

have agreed to reduce the production capacity of their naphtha cracking centers (NCCs) by a total of 2.7 million to 3.7 million tons or 20-25% of total capacity in Korea.[4]

This restructuring is intended to address the long-term stagnation and deteriorating profitability faced by the Korean petrochemical industry due to a global downturn for petrochemicals following the end of the so-called 30-year "chemical super cycle", which lasted from 1992 to 2021. During the chemical super cycle, demand for petrochemical products increased significantly, particularly driven by China's rapid economic growth.[5] Consequently, production capacity and output expanded substantially worldwide; however, as demand for petrochemicals and plastic has slowed, supply has begun to exceed demand, leading to a structural oversupply across the market. Also following the slowdown in demand, a problem of overcapacity emerged, where a significant amount of production capacity was not being fully utilized, leading to a deterioration in profitability across the industry.[6]

These difficulties are not unique to Korea with major petrochemical producing nations, including Japan, facing similar crises. Japan is pursuing a plan to reduce the number of currently operating ethylene crackers from twelve to eight, and as a result, the country's total ethylene production capacity is projected to decrease by approximately 30%.[7] Large-scale restructuring is also underway in Europe. Ten steam crackers are expected to be shut down between 2022 and 2027,[8] and the European Chemical Industry Association (Cefic) has confirmed that a cumulative total of 37 million tons of production capacity across the entire chemical industry has already been closed between 2022 and 2025. This represented approximately 9% of Europe's total production capacity in 2021, and as a result, it is estimated that direct employment in the industry has decreased by about 20,000 jobs.[9]

The signing of the agreement by the government and companies was followed by policy measures intended to help support restructuring efforts along with incentivizing companies to reach agreements. The National Assembly passed the "Special Act on Strengthening and Supporting the Competitiveness of the Petrochemical Industry" on December 3, 2025, and it was promulgated on the 30th of the same month. The Special Act established research and development (R&D) support, tax incentives, and financial aid to help facilitate the restructuring of the petrochemical industry and to shift its business structure from commodity products to high-value-added specialty products. In addition, it includes regulatory improvement measures, such as simplifying various licensing procedures and introducing

4 Ministry of Trade, Industry and Resource (2025.8.20.): "석유화학산업 구조개편" 민관이 함께 본격 시동

5 ICIS (2025.3.13.): A Different Kind of Cycle - Why this Cycle Won't Simply "Right Itself"

6 Ibid

7 ICIS (2026.5.15.): Japan speeds up petrochemical consolidation, decarbonization amid oversupply

8 Chemistry World (2025.7.10.): Two more European crackers to close

9 Cefic (2026.1.28.): European Chemical Closures & Investments Radar 2022-2025

a rapid approval system for the introduction of new technologies and processes.[10] However, the Special Act did not include specific goals or implementation measures to reduce existing production capacity or prevent future overcapacity situations. To resolve the current overcapacity issue and maintain the effects of restructuring, concrete methods for expanding high-value-added industries must be included. If such plans or future strategies are lacking, Korea's petrochemical business could consequently fall behind in industrial competitiveness again and revert to a commodity-oriented industry; therefore, additional measures are potentially required to prevent this.

The "Daesan No. 1 Project," whose approval was announced on February 25, 2026, was the first restructuring proposal to be submitted and receive government approval since the voluntary business reorganization agreement in August of 2025. Under this proposal, Lotte Chemical and HD Hyundai Chemical plan to integrate their plants and related facilities and establish a new joint venture.[11] Furthermore, once the integration is complete, some of the existing plants in the Daesan region are scheduled to cease operations for the next three years. This is expected to help alleviate overcapacity and oversupply issues, a key challenge for the industry, by reducing production capacity ultimately partial shutdown of the designated plant. The project will receive up to 1 trillion won in new funding for the integration of the two companies' plants and the transition to high-value-added and eco-friendly sectors. Additionally, it is planned that up to 1 trillion won of existing loans will be converted into perpetual bonds to improve the financial structure of the joint venture.[12]

In Yeosu, Yeocheon NCC and Lotte Chemical submitted an agreement for the 'Yeosu Project No. 1' on March 20, 2026. Similar to the Daesan Project, this plan centers on the two companies integrating related plants and facilities and establishing a new joint venture.[13] Once the project proceeds, two Naphtha crackers will be shut down, resulting in a production capacity reduction of approximately 1.3 million tons. Furthermore, the newly established entity plans to integrate downstream businesses producing commodity petrochemical products such as PE and PP. It is reported that not only Lotte Chemical but also Yeocheon NCC's shareholders, Hanwha Solutions and DL Chemical, will participate in the restructuring of product production.[14] The Yeosu No. 1 Project is another restructuring effort aimed at alleviating the industry's oversupply problem and enhancing competitiveness through reducing production capacity and business reorganization. It is particularly noteworthy that this is the result of the joint efforts of three chemical group companies. This, along with the previously mentioned

10 Ministry of Trade, Industry and Resource (2025.12.3.): 「석유화학산업 경쟁력 강화 및 지원에 관한 특별법」 국회 통과

11 Ministry of Trade, Industry and Resource (2026.2.25.): 석유화학산업 사업재편 1호 프로젝트 승인, 금융·세제·원가 등 2.1조원 이상 지원패키지 제공

12 Ibid

13 Ministry of Trade, Industry and Resource (2026.3.20.): 여수 석유화학 산업 구조개편 시동, 고부가 전환 밑그림 드러났다

14 Ibid

Daesan No. 1 Project, demonstrates that companies are following the direction of the government and reaching agreements for petrochemical industry restructuring.

Subsequently, on July 22, 2026, the MOTIR announced the approval of the project and unveiled a government support package to support it. According to the announcement, more than 700 billion Won in support will be provided to help companies participating in the restructuring reduce production capacity for commodity products and transition to high value-added specialty products, including financial support, tax benefits, permitting assistance, and R&D support.[15] It is also necessary to examine the agreement between LG Chem, Korea's largest petrochemical company, and GS Caltex, which has entered the petrochemical sector from oil business, for which there has been no concrete progress since the broad agreement was reached. Only by quickly preparing the Yeosu No. 2 agreement, which includes these two companies, can the restructuring plan to address overcapacity be completed.

Meanwhile in between the announcement of government support for the Daesan No. 1 and Yeosu No. 1 restructuring projects mentioned above, the institutional support provided in the Special Act on Petrochemicals also became more concrete. On April 14, 2026, the Enforcement Decree of the Special Act on Strengthening and Supporting the Competitiveness of the Petrochemical Industry was approved at a Cabinet meeting and went into effect a week later. The Enforcement Decree included various institutional mechanisms to support the business reorganization and restructuring of petrochemical companies. Notably, a simplified permitting system was established to enable new corporations established through restructuring to proceed with business reorganization more quickly.[16] In addition, it included provisions to rationalize regulations regarding certain environmental and emission standards applicable to plants and facilities subject to restructuring and newly integrated plants and related facilities. It also specifically stipulates the application procedure for approval of business reorganization, the documents to be submitted, and the government review and approval procedures, and specifies prior notification and compliance requirements regarding information sharing among companies pursuing restructuring.[17] Furthermore, the enforcement decree includes provisions allowing companies participating in restructuring to receive reductions in technology fees for national R&D projects and enabling priority recommendation by the MOTIR and priority review by the Ministry of Employment and Labor for companies requiring employment stability support.[18] Both measures helped to create incentives and an environment where companies could more easily restructure and led to the

15 Ministry of Trade, Industry and Resource (2026.7.22): 대산 이어 여수도 석유화학 사업재편 본격화, 2호 프로젝트도 정부 전방위 지원

16 Ministry of Trade, Industry and Resource (2026.4.14.): 「석유화학 특별법 시행령」 제정안 국무회의 의결

17 Ibid

18 Ibid

announcement of government approval for two agreements in the petrochemical clusters located in Daesan and Yeosu.

In summary, the series of restructuring agreements, government support packages, special laws, and enforcement decrees all demonstrate the determination of the government and companies to resolve the overcapacity problem in the petrochemical industry and adjust production capacity, while simultaneously shifting the industrial structure and processes from being centered on commodity products to instead being focused on high-value-added specialty chemicals. However, despite these efforts, the Shaheen project in Ulsan, which has finished construction and is targeting early 2027 to begin operations, and the possibility of future additional expansions remain significant issues. This is because even if the restructuring in Yeosu or Daesan proceeds as planned, if the production capacity for commodity products is expanded again through new expansion in Ulsan, the effectiveness of the restructuring and business reorganization efforts currently being pursued by each petrochemical complex could be largely offset.

II. Domestic expansion status of large-scale commodity polymer production capacity

1. Progress and overview of the Shaheen Project

The Shaheen Project is a large-scale petrochemical plant construction project being pursued by S-Oil within the Onsan National Industrial Complex in Ulsan. Construction began in January 2023, and following completion in the second half of 2026, commercial operations are scheduled to commence in early 2027. Once operations begin, the upstream operations will produce 1.8 million tons of ethylene, 770,000 tons of propylene, 280,000 tons of benzene, and 200,000 tons of butadiene annually. Additionally, the downstream operations plan to produce 1.32 million tons of polyethylene (LLDPE and HDPE) annually.[19]

The core of this project is the introduction of 'Thermal Crude to Chemical (TC2C)' process technology. TC2C is an innovative technology that bypasses the refining step required in conventional petrochemical production and directly converts crude oil into petrochemical feedstocks such as naphtha or liquefied petroleum gas (LPG). These feedstocks produced are then fed into steam crackers and utilized to produce various petrochemical products, such as ethylene and propylene.[20] Theoretically, some reduction in emissions can be expected as the refining process is scaled down. However, emissions generated from subsequent processes, such as naphtha cracking and polyethylene production, still exist, and the structural dependence on imported crude oil and natural gas will not change significantly. Therefore, while TC2C technology can increase production efficiency, it is difficult to view it as fundamentally resolving the carbon emission issues or the dependence on imported natural resources facing the domestic petrochemical industry.

A more significant issue is the potential problems the Shaheen Project will cause for the restructuring efforts currently being pursued by the Korean petrochemical industry. If large-scale new production capacity is added at a time when the domestic industry is attempting to resolve overcapacity issues through capacity reduction and business reorganization, competition with existing operating plants could intensify, and over in export markets could worsen. Consequently, there is a risk that the effectiveness of restructuring aimed at alleviating the industry's overcapacity problem will be weakened. In fact, the Shaheen Project is having a significant impact on restructuring discussions even though it is not yet operational. While companies in the Daesan and Yeosu regions have prepared

19 Hyundai Engineering & Construction (2025.5.7.): A Mighty Wingbeat Towards an Energy Hub – Hyundai E&C's Shaheen Project

20 S-Oil (2023.3.9.): S-OIL flying high with SHAHEEN Project for expansion into petrochemicals

and received approval for restructuring plans following consultations with the government, a similar agreement has not yet been reached in the Ulsan region. Companies in the Ulsan cluster, such as Korea Petrochemical, SK Geocentric, and S-Oil, have been unable to narrow their differences regarding the extent to which ethylene and NCC production capacity should be reduced, and whether the Shaheen Project, which is nearing completion, should be included in the reduction targets.[21]

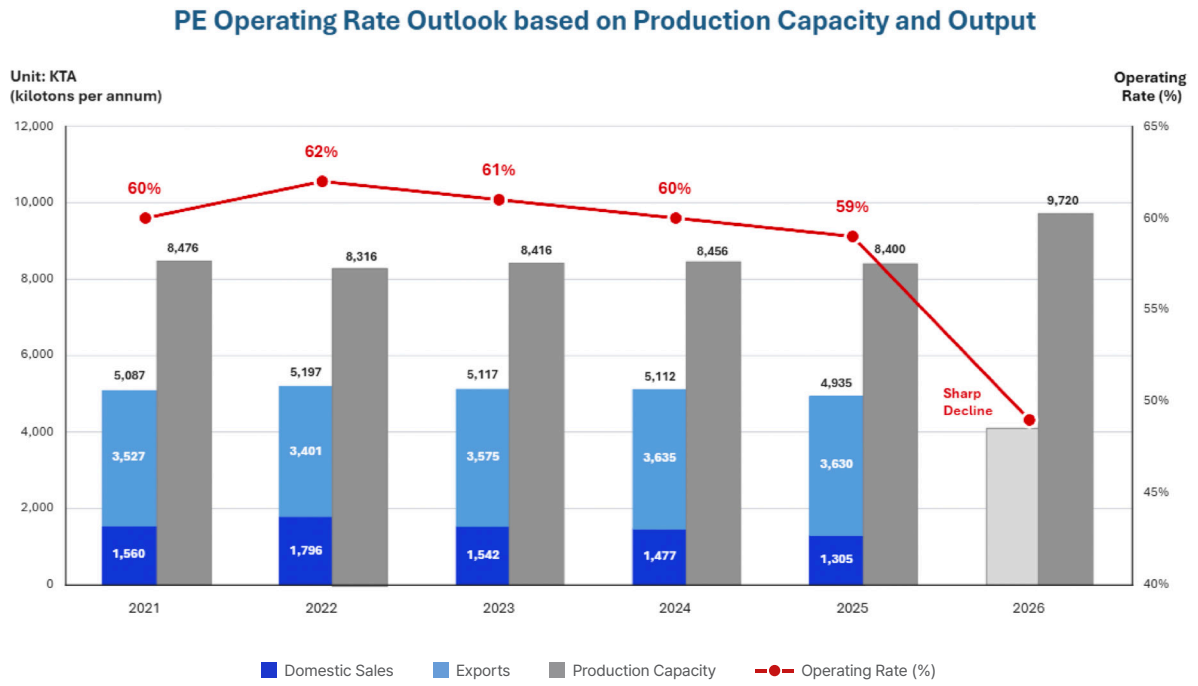
Ultimately, the success or failure of the restructuring policies and agreements currently being pursued depends on how the balance between efforts to reduce the plant capacity and plans for new expansions is managed. While the Shaheen project and potential future expansions may be seen as a way to strengthen competitiveness at the individual company level, from the perspective of the entire industry, such projects could undermine the policy objectives of resolving overcapacity and implementing comprehensive restructuring, in which all companies are participating. Therefore, whether these projects will substantially contribute to enhancing industrial competitiveness or effectively weaken the effects of restructuring is expected to become a significant policy issue for the Korean petrochemical industry in the future.

21 ChosunBiz (2026.6.23.): Ulsan petrochemical overhaul waits on S-Oil Shaheen startup in Korea

III. Industrial and employment risks from increased domestic overcapacity

1. Decline in operating rates due to domestic overcapacity

[Figure 1] Domestic PE Production Capacity and Volume (Domestic Sales + Exports)



According to data from the Korea Chemical Industry Association (KCIA), over the past five years, polyethylene (PE) exports have stagnated, showing only a slight increase from 3.12 million tons in 2021 to 3.152 million tons in 2025, while domestic demand actually decreased from 1.95 million tons to 1.783 million tons.[22] Despite this stagnation in demand, PE production capacity will have expanded and when considering the capacity Shaheen will add as it begins operations in 2027, the increase is expected to be significant. Domestic production capacity, which stood at 8.476 million tons in 2021, is projected to exceed 9.7 million tons once the Shaheen project is completed in the second half of 2026.[23] This shows that new production will be put into operation in a situation where domestic and global demand for Korean PE has not increased enough to support such large-scale expansion. Once large-scale new

22 Korean Chemical Industry Association: Petrochemical Industry Statistics

23 Ibid

facilities such as Shaheen begin operations, they will contribute to existing domestic and international overcapacity and oversupply issues, and competition between existing facilities will increase as more facilities fight over a smaller market. Furthermore, expanding production capacity without sufficient supporting demand will further exacerbate the problem of low operating rates facing the Korean petrochemical industry. This will cause difficulties in returning to the minimum operating rates needed for profitability that have sustained the industry.

The operating rate refers to the ratio of a plants capacity used for production out of total production capacity.[24] For reference, the operating rate of ethylene production capacity in Korea for 2025 was 78.9%.[25] Considering that the general operating rate for petrochemical plants is 90% and often exceeds this depending on market conditions, it is evident that the 2025 operating rate was significantly low. This is even more pronounced when compared to other major petrochemical producing countries or regions,[26] with the average operating rate of the chemical industry in Gulf Cooperation Council (GCC) countries reaching 93% in 2023,[27] while China's was at 85% in 2024.[28]

In the case of polyethylene (PE), a downstream commodity product, the operating rate has already been low for several years. Based on statistics from the KCIA, calculations of the PE operating rate in the Korean petrochemical industry over the past five years reveal that the domestic PE production operating rate was already at 59.8% in 2021 and had dropped 58.8% by 2025.[29] Korea's low PE operating rate is significantly lower when compared to the global PE operating rate of 81% in 2024,[30] and China's plant operating rate of 76.1% in May 2026.[31] This suggests that the core problem currently facing the industry is not only excessive oversupply but also that domestic companies are already lagging significantly behind in cost competitiveness in the global market. Therefore, under these circumstances, there is considerable concern regarding the impact that further expanding production capacity for commodity products such as ethylene or polyethylene will have on the competitiveness of the global industry, as well as the domestic market.

24 August Brown (2025): Industrial Capacity Utilization – What It Means, Why It Matters, and How to Improve It

25 Korea Chemical Industry Association: Calculations based on Petrochemical Handbook 2026

26 ICIS (2025.2.11.): The first of three things you should do during the rest of this downturn

27 GPCA (2024): The GCC Petrochemical and Chemical Industry Facts and Figures 2024

28 Market Reports World (2026.7.26.): China Petrochemicals Market Size, Share, Growth, and Industry Analysis, By Type (Ethylene, Propylene, Benzene, Methanol, Xylene), By Application (Plastics, Automotive, Construction, Pharmaceuticals, Consumer Goods), Regional Insights and Forecast From 2026 To 2035

29 Korea Chemical Industry Association: Calculations based on Petrochemical Handbook 2026

30 ICIS (2025.9.10.): INSIGHT: Global ethylene and PE cycle to bottom by 2028/2029 even with capacity closures

31 SunSirs (2026.5.9.): SunSirs: China Domestic PE Capacity Operating rate Shows Significant Month-over-Month Increase

Large-scale expansion projects like the Shaheen project make it difficult to fundamentally resolve the existing problem of low operating rates of existing plants. This is because, given the significant amount of available idle production capacity already present, the addition of new plants would force more production to compete for limited demand. Consequently, the possibility cannot be ruled out that the overall industry operating rate may decline further, or the profitability of existing facilities may deteriorate even more. Moreover, as previously discussed, the government and industry are currently pursuing restructuring aimed at mitigating the problem of oversupply through capacity reduction and plant consolidation. Under these circumstances, if restructuring and large-scale new operations occur simultaneously, the effects of the restructuring may partially offset each other. If individual companies target similar markets, utilizing existing idle facilities may be a more economically advantageous choice than executing large-scale investments in the latest technology. Of course, while there will be differences depending on process efficiency and raw material procurement conditions for each plant, the repercussions of continued investment in commodity products will be significant in a situation where the global market is already stagnating due to oversupply and overcapacity. In this regard, the necessity and economic feasibility of future additional expansions need to be reviewed more carefully, considering the overall industry demand forecast and the current levels of existing production operation.

2. Industry and employment risks resulting from the large-scale commodity plant operations

1. Current employment status in the petrochemical industry

The Korean petrochemical industry has played a significant role in domestic employment by creating not only jobs within the industry but also indirect jobs in related sectors such as manufacturing, transportation, logistics, and construction.[32] Based on statistics from the Mining and Manufacturing Survey, the total workforce in the chemical and chemical product manufacturing sector in 2024 was 157,803, of which 151,819 were permanent employees.[33] However, as domestic and international petrochemical market conditions have deteriorated in recent years, negative impacts are appearing on the job market. This can be seen in new hiring having significantly contracted in 2025 as the overall economic downturn in the industry persisted. According to survey results released by the Federation of Korean Industries (FKI), 68.7% of petrochemical companies responded that they had no plans for new hiring in the second half of 2025 or had not yet decided, and the percentage of companies with

32 Korea Employment Information Service (2025.12.): 산업전환에 따른 석유화학산업 동향 및 고용 현황 분석

33 Korean Statistical Information Service Online Publications (2024): 광업제조업조사보고서

"undecided hiring plans" was recorded at 43.7%, the highest level among all industries.[34]

The scale of employment has also had a declining trend. Major companies such as LG Chem, Hanwha Solutions, and Lotte Chemical showed a significant decrease in the number of employees in 2025 compared to the end of 2024.[35] Furthermore, even before the restructuring projects in Daesan and Yeosu were officially announced, concerns had been raised within the industry that additional workforce reductions might be inevitable to resolve oversupply and improve profitability. If the closure of production capacity like plant shut-downs and the reduction of production capacity begin in the future, there is a possibility that pressure for employment adjustments will intensify in some regions and for certain companies. These statistics demonstrate that the Korean petrochemical industry is currently under significant pressure not only in terms of production and profitability but also in terms of employment. However, it is unclear whether large-scale new projects like the Shaheen can resolve these issues. While the construction of new plant may generate temporary employment effects, it appears virtually impossible to achieve sustainable job creation unless the problems of overcapacity and declining profitability affecting the entire global industry are resolved.

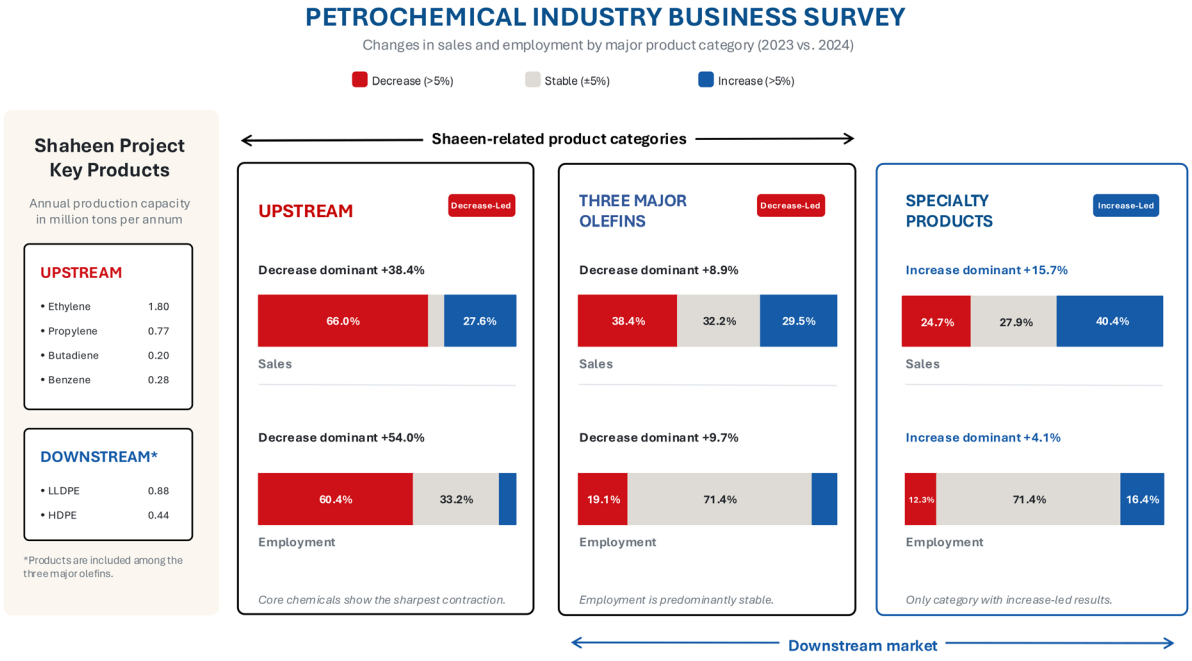
Ultimately, employment stability in the petrochemical industry depends on the recovery of profitability and the strengthening of structural competitiveness rather than merely building or expanding production capacity. Therefore, the success of ongoing restructuring and the transition to an industry centered on high-value-added specialty products is expected to have a greater impact on future job retention and the creation of quality jobs.

34 Korea Employment Information Service (2025.12.): 산업전환에 따른 석유화학산업 동향 및 고용 현황 분석

35 Ibid

2. Analysis of industry and employment risks due to an increase in new commodity production capacity

[Figure 2] Differences in sales and workforce changes by key petrochemical product groups (based on data from Korea Employment Information Service)



Source: Korea Employment Information Service (KEIS), 5th Petrochemical Industry Business Survey, Tables 5-7 and 5-16.

There are several reasons why the operation of new large-scale plants (such as the Shaheen Project) is unlikely to yield a positive overall impact on employment. First, while the region hosting the new plant may see some job creation, other regions facing downsizing or plant shutdowns could suffer greater hardship due to intensified competition. The entry of new plants, equipped with new technology and economies of scale, places an increased burden to secure competitiveness for existing sites operating older equipment. Furthermore, if new plants like the Shaheen Project are exempted from production reduction quotas mandated by restructuring efforts; companies that have already reduced capacity could face the burden of additional reduction obligations. This could ultimately lead to further job losses and economic stagnation in the regions and companies that have already made restructuring agreements.[36] Secondly, the Shaheen Project focuses on producing basic petrochemicals and commodity polymers, both of which have limited potential for demand growth. These products currently face oversupply and declining profitability in domestic and global markets, with little prospect

36 Ibid

of a significant increase in future demand.[37] Consequently, if these new plants fail to secure stable markets for their products, further reductions in production volume, capacity, or additional restructuring may become necessary in the long run. Thirdly, expanding production capacity fails to address the structural issues currently limiting employment in the domestic petrochemical industry. The industry's slowdown in employment is not a result of insufficient production capacity; rather, it stems from more fundamental problems, such as stagnant or decreasing global demand, overcapacity, oversupply, and deteriorating profitability for commodity products. Unless global market demand recovers and the profitability of domestic companies improves, it is difficult to expect sustainable employment growth solely through expanding commodity production.[38]

This means that while new projects may create temporary employment effects during construction and initial commissioning, they are not free from the market environment and structural challenges faced by existing petrochemical companies. If new plants are also affected by oversupply and deteriorating profitability, it is difficult to rule out the possibility of future workforce adjustments or operational downsizing. Ultimately, the employment effect of capacity expansion projects like the Shaheen cannot be evaluated solely by direct job creation at the site. Such projects may deepen oversupply and overcapacity across the industry and worsen job security in other regions undergoing restructuring. Therefore, how new or expanding production capacity affects employment across the industry requires a comprehensive evaluation of not only job increases at individual sites but also employment decreases in regions undergoing restructuring and decreases in overall industry competitiveness.

3. The necessity of specialty conversion due to employment impact

From the perspective of employment impact, it is necessary to prioritize converting existing commodity production to high-value-added specialty chemicals rather than further expanding production capacity for commodity products. This is because it is considered a more advantageous strategy in terms of economic viability and employment stability. In fact, companies that have focused on specialty products have performed better than those that maintained business structures centered on basic chemicals or commodity polymers.[39] This difference is also evident in Total Shareholder Return (TSR) statistics. TSR not only measures the financial return shareholders receive over a specific period but also indicates the growth rate of corporate value.[40] It has become a widely used indicator to measure

37 Korea Chemical Industry Association: Petrochemical Industry Statistics

38 Boston Consulting Group (2025.8.28.): Chemical Companies Won't Recover by Doing More of the Same

39 Ibid

40 Ibid

the performance of industries and companies.[41] An analysis of five major regions from 2020 to 2024 showed that the median TSR for 'concentrated specialty chemicals' exceeded 55%, while the TSR for basic chemicals and commodity polymer was only 17%.[42] Generally, a high TSR means that a company's value will be sustainable over the long term. In other words, it means that companies will face less pressure to downsize or reduce their workforce, and consequently, there is a higher likelihood of maintaining a more stable employment environment. Therefore, a company expanding the proportion of its portfolio made up of specialty products can be viewed as a strategy that is expected to have positive effects not only on enhancing corporate competitiveness but also on employment stability.

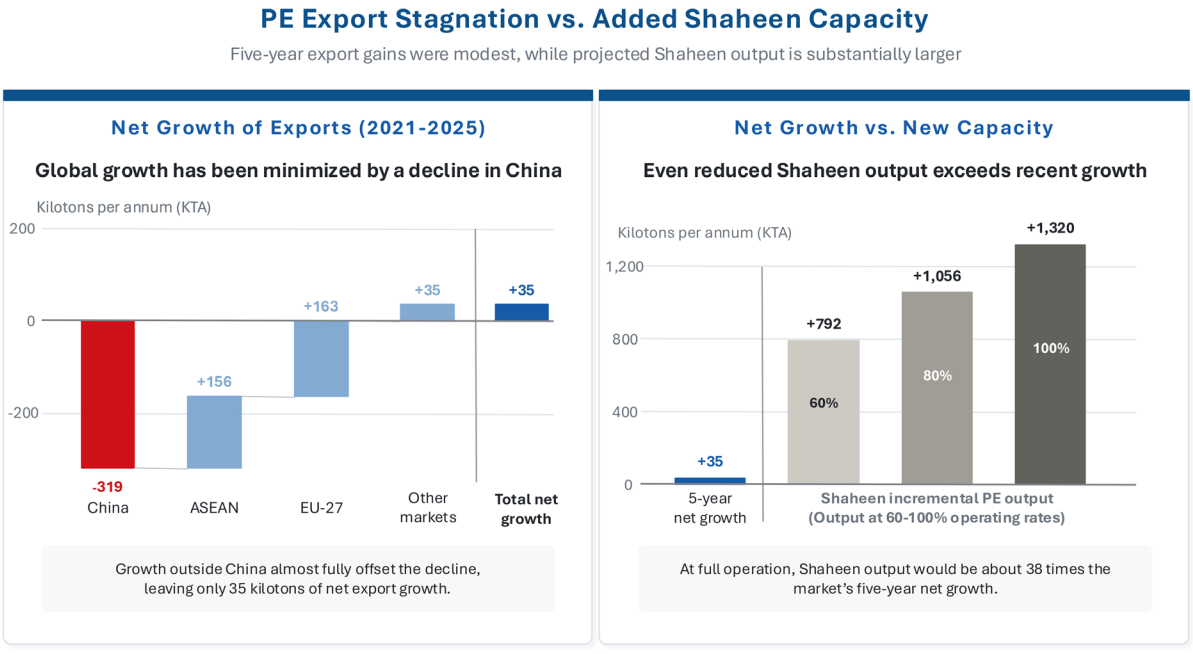
On the other hand, projects aimed at new or expanding production capacity for commodity products, such as the Shaheen Project, run counter to this direction. As previously discussed, there is no significant increase in demand from global export markets sufficient to absorb new production volume, and the growth of the domestic demand market also remains limited. Under these conditions, further expansion could exacerbate oversupply and worsen profitability, which could have a negative impact on employment stability in the long term. Consequently, the government and companies need to concentrate their strategies and financial capabilities on converting existing production capacity into specialty product systems rather than building or expanding new commodity production. This approach aligns with the direction of ongoing industrial restructuring and can serve as a more effective alternative for simultaneously achieving the dual goals of strengthening industrial competitiveness and maintaining quality jobs.

41 Harvard Business Review Magazine (2022.3.1.): A Better Way to Assess Managerial Performance

42 Ibid

IV. Limited export market for additional commodity petrochemical production and capacity

[Figure 3] Comparison of Korea's PE export volume over the past five years and Shaheen's added production capacity



Note: ASEAN includes Vietnam, Thailand, Indonesia, Malaysia, the Philippines, Singapore, Brunei, Cambodia, Laos and Myanmar. EU-27 excludes the United Kingdom.

SFOC analysis based on Korea Customs Service export statistics. HS codes 390110, 390120, and 390140.

Shaheen and any future domestic petrochemical expansion projects will potentially face challenges amidst structural changes in the global market. These changes in the global market are particularly significant as they represent a long-term trend fundamentally changing the demand for petrochemical products and the market landscape itself, rather than merely short-term economic fluctuations. The first structural change is the increase in self-sufficiency rates among major nations and the resulting decrease in import demand. Recently, many countries have been expanding domestic production of petrochemical products for purposes such as strengthening industrial competitiveness, securing supply chain stability, and fostering strategic industries. In particular, China has significantly increased its self-sufficiency in the fields of basic petrochemicals and commodity polymers through the expansion of large-scale production capacity. Consequently, import demand is declining in regions that were once major export markets for Korean companies, and competition between nations and companies for limited global demand is intensifying. The second structural change is the tightening of regulations on virgin commodity polymers and single-use plastics worldwide. Governments around the world are expanding regulations on production, sales, and use to address plastic waste and

environmental issues, while also pushing for stricter recycling mandates and the introduction of circular economy policies. Such policy changes will likely act as a constraint on demand growth for virgin-based commodity polymers and the base chemicals needed to make them.

Ultimately, the business performance of the Shaheen project will depend on how much process innovation can be demonstrated in the global market environment of oversupply, allowing the company to enter the Asian market first and secure sustainable global market competitiveness. In this regard, it can be suggested that simply expanding production capacity is not sufficient to properly address the structural challenges currently facing the industry. Furthermore, these challenges will become even more difficult due to continuous large-scale expansion in the global market, which will be examined in detail below.

1. China

China has significantly expanded its production capacity for basic chemicals, including ethylene and propylene, to increase the self-sufficiency rate of commodity synthetic resins such as polyethylene (PE) and polypropylene (PP).[43] This is considered one of the most significant causes of the difficulties faced by the global petrochemical industry in recent years. Since China is the world's largest petrochemical market and the biggest buyer of Korean petrochemical product exports, the expansion of Chinese production is directly affecting the export conditions of Korean companies. The importance of the Chinese market is evident in trade flows. In 2025, China imported 1.2 million tons of PE, ethylene, and other olefin products from South Korea, spending approximately $1.45 billion.[44] Although South Korea's exports to China are showing a declining trend, China remains Korea's largest petrochemical export market in terms of export volume and value. However, if China's self-sufficiency rate continues to rise, it remains uncertain whether this relationship can be maintained at its current level.

It is important to note that China is not only reducing its import dependence but also expanding its influence in the global export market based on its expanded production capacity. As a result, Korean companies are facing a situation where they will find difficulty not only in maintaining their existing export markets but also having to directly compete with Chinese firms in third-country markets. The scale of these expansions can be seen in numerous different statistics. For example, in just 2026, new polypropylene (PP) production capacity is expected to reach 4.55 million tons, and new polyethylene (PE) production capacity is expected to be 6.2 million tons.[45] According to the Oxford Energy Institute

43 ICIS (2026.2.9.): China's HDPE Market In 2025 Versus 2021 – Major Structural changes

44 Korea Customs Service: Calculations based on Import and Export Statistics

45 ICIS (2026.4.24): CHINAPLAS'26: Insight: China petrochemical industry destocks amid unabated capacity expansion

(OIES), China's ethylene production capacity is expected to expand from 55 million tons annually in 2024 to 80 million tons by 2028.[46] This represents an increase of 25 million tons over four years, nearly half of the global increase in new ethylene production capacity during that time. This trend is especially significant for the Shaheen project, which focuses on ethylene and its polymer derivates as its core products. This is because competition in the export market for ethylene and related commodity derivatives is likely to intensify due to this large-scale expansion from China. The propylene market is showing a similar trend as China plans to secure an additional 22.7 million tons of propylene production capacity annually by 2030 through a total of 32 projects.[47] If China's capacity expansion continues, Korean companies may face greater difficulties in securing export markets and customers where new production from new capacity such as Shaheen can be sold to.

Ultimately, China's expansion of production capacity is not simply a matter of reducing Korea's exports to China. It is changing the competitive landscape across the global market and fundamentally threatening the existing business models that Korean petrochemical companies have grown through exports. In this context, large-scale new projects like Shaheen may find it difficult to expect the same success in exporting as in the past (especially with the increased volume caused by expansion), and future capacity expansion projects are likely to face the same competitive environment. Therefore, rather than simply expanding production capacity, the Korean petrochemical industry needs to seek clear differentiation strategies through high value-added product businesses that can escape direct market competition with China.

2. United States

Another reason behind the recent significant expansion of global petrochemical production is the U.S. shale gas boom. With the rapid increase in shale gas development, the supply of natural gas and natural gas liquids (NGL) has become abundant, and the U.S. has now become the world's largest producer and exporter of propane and ethane. Ethane is a key feedstock for ethane cracking centers (ECCs), making it a key feedstock in the petrochemical industry.[48] U.S. ethane production increased from about 1 million barrels per day in 2014 to 2.8 million barrels per day in 2024, reaching an all-time high. As a result, U.S. petrochemical companies have been able to reliably secure affordable ethane, which has led to a clear advantage in feedstocks and cost competitiveness compared to global competitors.[49]

46 OIES & Argus (2025.5.): Tariffs, China's Petrochemicals Sector, and China-GCC Oil Relations

47 Offshore Technology (2025.4.29): China to lead global propylene expansions through 2030

48 OIES & Argus (2025.5.): Tariffs, China's Petrochemicals Sector, and China-GCC Oil Relations

49 Ibid

Based on this cost advantage, more than 100 production capacity expansion projects have been completed or are currently underway in the United States. Most projects are concentrated in the states of Louisiana and Texas, where existing petrochemical complexes are located.[50] Meanwhile, in 2025, the U.S. spent about $63 million importing ethylene, other olefins, PE, and other products from Korea. Therefore, the U.S. is also one of the main export markets for Korean petrochemical products, but if domestic production capacity continues to expand, Korea's exports to the U.S. are likely to shrink. Furthermore, similar to China, as competition with U.S. companies intensifies as they continue to expand their capacity and output, export competition burdens are expected to increase in other overseas markets as well.[51]

However, expanding ECC-based production capacity does not necessarily lead to or guarantee success. One example is the Shell Monaca ethane cracker complex in Beaver County, Pennsylvania, which began operations in November 2022. This facility was built to leverage its geographic advantage adjacent to the Utica and Marcellus shale basins to source the ethane needed for cracker processes, cheaply and efficiently.[52] Additionally, Shell received over $1 billion in incentives and tax benefits from the Pennsylvania state government. Nevertheless, the complex failed to achieve Shell's expected profitability and was evaluated to have failed to deliver significant results in revitalizing the local economy.[53]

This case clearly demonstrates that even new facilities with the strengths of large-scale government support and competitiveness in low-cost feedstocks will have difficulty in succeeding in the current global petrochemical market. With the current global petrochemical market being in a highly competitive cost environment and making it difficult to guarantee success, caution should be taken in continuing to approve or build new capacity expansion projects like Shaheen.

3. Middle East (Gulf Cooperation Council, GCC)

The third producer driving global petrochemical capacity expansion is the Middle East. Specifically, large-scale capacity expansions continue in the GCC member countries of Saudi Arabia, the United Arab Emirates (UAE), Qatar, Kuwait, Bahrain, and Oman. The ethylene production capacity of the six GCC countries has nearly doubled, from 12.4 million tons in 2007 to 23.7 million tons in 2023.[54]

50 CIEL (2026.3.24.): Toxic Finance – The Banks and Investors Funding the Expansion of Petrochemicals in the United States

51 Korea Customs Service: Calculations based on Import and Export Statistics

52 IEEFA (2026.6.11.): Shell's Monaca plant exposes Pennsylvania's failed trickle-down petrochemical renaissance

53 Ibid

54 GPCA (2025): GCC Petrochemicals Landscape - Perspectives on Trends Shaping the Future of the Industry

Additionally, these countries have plans for further production expansion. Specifically, between 2024 and 2028, seven large-scale expansions and mega-projects are expected to begin operations.[55]

This expansion of production capacity means that new expansion projects in Korea, including the Shaheen Project, will face a very competitive environment going forward, especially when considering expansions in China and the US as well. Competition in the fields of basic chemicals such as ethylene and commodity synthetic resins such as polyethylene is likely to intensify further due to oversupply. There are two main reasons behind Middle Eastern countries' active investment in the petrochemical industry. First, to reduce their high dependence on oil extraction and refining industries and to diversify their economic portfolios. Second, they have abundant reserves of petrochemical feedstocks such as LPG and naphtha, and the reserves of oil and natural gas, which form the basis for producing these feedstocks, are also among the highest in the world.[56]

Based on this resource abundance, GCC countries can produce petrochemical products at relatively lower costs than Korea, which relies heavily on imports of feedstocks, thereby securing cost competitiveness over Korean companies. Moreover, the policy goals of economic diversification and maximizing resource utilization are unlikely to change in the short term. Therefore, the trend of GCC countries expanding production capacity is expected to continue, and this Middle Eastern competitiveness will continue to burden Korean companies in maintaining market share and base customers.

4. Southeast Asia (Association of Southeast Asian Nations, ASEAN)

Although ASEAN countries have yet to expand large-scale production like the United States or the Middle East, they are highly likely to emerge as major hubs for petrochemical investment and new expansions in the future. As of February 2026, production in Southeast Asia's petrochemical sector will account for only about 4.5% of global output, but it is expected to account for 13% of global petrochemical industry growth over the next decade.[57] The biggest reason for this growth potential lies in the region's population structure. Currently, the ASEAN region has entered the so-called 'demographic dividend' period. While the working-age population continues to grow, the proportion of dependent population, such as children and the elderly, remains relatively low.[58] These demographic strengths have already led to some large-scale investments. In fact, foreign direct investment (FDI)

55 Ibid

56 Ibid

57 RMI (2026.2.26.): How Southeast Asia's Low-Emission Chemicals Sector Can Expand

58 Singapore Economic Development Board (2024): Southeast Asia Chemicals

in the ASEAN region exceeded $224 billion in 2022, with a trend of global manufacturing production bases relocating to ASEAN countries, especially in heavy industry, with petrochemicals expected to follow this trend.[59]

Beyond population structure, cost competitiveness is considered an important strength of ASEAN. Many ASEAN countries are actively attracting new investments and capacity expansion projects from petrochemical companies, based on relatively low manufacturing wages compared to major global production hubs.[60] In addition, government policies promoting the industry, stabilizing supply chains, and aiming to increase self-sufficiency rates, are also reasons why the growth of the petrochemical industry is expected to accelerate even further.

This trend is also evident in Lotte Chemical's large-scale investments in Indonesia. In November 2025, Lotte Chemical completed the LINE Project in Indonesia, a petrochemical complex worth $3.95 billion, with an annual production capacity of 1 million tons of ethylene and 520,000 tons of propylene.[61] This LINE Project means more than just an economic investment. The Indonesian government has stated that it expects this facility to help reduce dependence on imported petrochemical feedstocks, which currently account for about half of domestic demand, and strengthen industrial competitiveness.[62]

However, this case highlights another challenge faced by South Korea's petrochemical industry. On one hand, Korean companies are demanding government support for restructuring, facility reductions, and expanded R&D investment in the domestic market. On the other hand, in global markets where sustained growth is expected, these same companies are investing in expanding new production capacity and building large-scale plants. This suggests that there may be tension between domestic policy goals such as strengthening industrial competitiveness, maintaining employment, and resolving oversupply and corporate global investment strategies.

As with GCC countries, the factors driving the expansion of production capacity in ASEAN are structural elements that are difficult to change in the short term. Population structure, manufacturing growth, cost competitiveness, and industrial development policies are likely to remain strong for a considerable period in the future. Therefore, Korean companies must also accept intensified competition with this region as an inevitable market environment. This is particularly important as ASEAN countries are major export markets, importing about $5.59 billion worth of Korean petrochemical products in 2023 alone,

59 Ibid

60 Ibid

61 Lotte Chemical (2025.11.7.): Lotte Chemical completes construction of petrochemical complex in Indonesia, accelerating expansion into Southeast Asian market

62 Tempo (2025.11.5.): Lotte Group Invests US$3.9 Billion in New Petrochemical Plant in Indonesia's Cilegon

with increased competition meaning a decrease in export value.[63] However, if local production capacity and output continue to expand in the future, dependence on imports is likely to gradually decrease. This will likely reduce export opportunities for Korean companies, making strategic decision-making necessary.

5. Europe (European Union, EU)

Unlike other major export markets, the EU is currently not pursuing large-scale expansion of petrochemical production. However, this does not necessarily have a positive effect on Korea's petrochemical industry. The decline in demand in the European market is driven more by strengthened environmental regulations than by capacity expansion. Recently, the EU has continuously strengthened plastic-related regulations, including restricting or banning the production, sale, and use of single-use plastics, while also increasing the proportion of recycled materials included in products and packaging.[64]

Most of these regulations are relatively new policies introduced within the past five years. Although their effects have not yet fully manifested, changes in production methods and consumption patterns over time are likely to gradually reduce plastic usage. Accordingly, demand for petrochemical imports in Europe is also expected to decline in the long term. Considering that about 9% of Korea's petrochemical exports (worth $4.8 billion) depend on the EU market, the continued decline in European demand could limit the long-term growth potential of the industry and the Korean economy.[65] In this regard, the EU market presents significant challenges for Korea's petrochemical industry in terms of environmental regulations and changes in demand structure rather than expanding production capacity.

63 Korea Chemical Industry Association: Petrochemical Mini Book 2024

64 Your Europe (2026.6.23.): Single-use plastics

65 Korea Chemical Industry Association: Petrochemical Mini Book 2024

V. Strengthening of global and domestic plastic regulations and policies

1. (Overseas) Increased disposable plastic regulations in the EU, UK, Canada, Australia, etc.

The decline in demand for Korean petrochemical products is not simply due to the expansion of global production and intensified competition. The spread of policies restricting the production and use of single-use plastic products and plastic packaging in major markets worldwide is also an important factor. A representative example is the European Union (EU). The EU enacted "Directive (EU) 2019/904" in 2019 and has been in effect since 2021, banning the use of various single-use plastic products such as straws and plates.[66] It also introduced requirements from the product design stage to reduce plastic use, such as ensuring that beverage container lids do not separate during use.[67] Canada also restricts the production and distribution of similar items through the Single-Use Plastic Prohibition Regulation (SUPPR),[68] and the UK, Australia, New Zealand, India, and others are implementing or expanding similar policies.

Alongside this, policies that not only reduce plastic usage but also mandate the use of recycled materials are spreading. Such legislation poses another challenge to the petrochemical industry, as it makes it difficult to meet regulatory standards with newly produced plastic alone. The UK's Plastic Packaging Tax is a representative example. In the UK, companies manufacturing or importing more than 10 tons of plastic packaging annually will be taxed on products containing less than 30% recycled plastic.[69] This is a measure to encourage companies to reduce the use of new plastics and expand the production of recycled materials. The EU is also strengthening regulations in the same direction. According to the aforementioned "Directive (EU) 2019/904," it introduced design standards that ensure beverage container caps do not separate from the body, and by 2030, it is mandatory to include at least 30% recycled plastic in single-use beverage bottles.[70] The EU has also introduced the Packaging and Packaging Waste Regulation (PPWR), which took effect on August 12, 2026. According to the regulations, packaging materials must be designed to minimize the content of harmful substances to protect people's health and the environment. Furthermore, from 2030, regulations will gradually tighten

66 Your Europe (2026.6.23.): Single-use plastics

67 Ibid

68 Environment and Climate Change Canada (2026.3.2.): Single-use Plastics Prohibition Regulations (SUPPR) – Overview

69 HM Revenue & Customs (2026.2.12.): Plastic Packaging Tax – steps to take

70 Your Europe (2026.6.23.): Single-use plastics

to ensure that only packaging with recyclability meeting certain standards can be released to the market.[71] These policies are gradually changing the structure of plastic production and consumption and are expected to ultimately reduce demand for new commodity petrochemical products and the plastics made from them.

South Korea has not yet implemented European-level regulations but has announced various policies and regulatory measures aimed at reducing plastic use and expanding recycling. This shows that plastic regulations are not limited to specific countries or regions but represent a structural change spreading globally. Therefore, Korea's petrochemical industry not only faces growing competition due to global capacity expansion but also changes in the policy environment aimed at reducing plastic use altogether. In the long term, growth strategies centered solely on commodity polymers may have limitations, and the need to shift toward recycling and circular economy sectors and high value-added materials are expected to increase.

2. (Domestic) Government's "Plan to Promote the Transition to a Plastic-Free Circular Economy"

Policies to reduce the production, sale, and use of single-use plastics and plastic packaging are being actively promoted not only overseas but also in Korea. A representative example is the "Plastic-Free Circular Economy Transition Promotion Plan" announced by the Ministry of Climate, Energy and Environment (MCEE) on April 28, 2026. This plan sets a goal to reduce the amount of newly produced plastic (virgin plastic) generated from all plastic waste by 30% by 2030.[72] To achieve these goals, the government has proposed three key strategies. First, reduce unnecessary use at the source of plastic waste generation. Second, expand recycling infrastructure and promote the circular use of resources. Third, gradually reduce the use of single-use plastics.[73] If these policies proceed as planned, the domestic production and consumption environment for general and single-use plastics is likely to gradually decrease. As a result, demand for related products is also expected to decline in the long term.

Considering this policy direction, the government's push to reduce virgin plastic use and transition to a circular economy while supporting large-scale expansion projects like the Shaheen project that add hundreds of thousands of tons of petrochemical products could cause policy tensions. If policies aimed at reducing plastic use and expanding new production capacity are pursued simultaneously,

71 EUR-Lex (2025.9.26.): Packaging and packaging waste (from 2026)

72 Ministry of Climate, Energy and Environment (2026.4.28): 석유 수입에 의존하지 않는 지속가능한 탈플라스틱 순환경제로 도약

73 Ibid

the imbalance between supply and demand could intensify in the future. Overall, South Korea's petrochemical industry is under pressure on both the supply and demand sides. On the supply side, domestic and global over supply and intensified competition are underway, while on the demand side, regulations to reduce plastic usage are being strengthened. Moreover, with the expansion of recycling obligations and the spread of circular economy policies, the long-term demand outlook for commodity polymers is becoming even more uncertain.

These changes suggest that Korean petrochemical companies must move away from their traditional commodity-centered strategies to maintain competitiveness and profitability going forward. In fact, the shift to a business structure centered on specialty products, which many companies are already pursuing, is likely to become not a choice but an essential response strategy. High value-added materials and specialty chemicals are less affected by price competition compared to commodity products, and the direct impact of plastic reduction policies is relatively limited.

VI. Trends and necessity of specialty transition

1. (Overseas) Examples of Saudi Arabia, Singapore, Japan

Recently, many countries around the world have been accelerating the development of high-value specialty chemicals, moving away from traditional commodity-centered production to address oversupply and worsening profitability in the general petrochemical market. Specialty products are produced in relatively small quantities, and examples include high value-added products tailored to the performance requirements of specific customers and applications.[74] Saudi Arabia is actively pursuing this transformation strategy alongside producing commodity products. Saudi Arabia continues to have new production based on low costs, and through its National Industrial Strategy (NIS), it has selected 20 key specialty chemicals sectors and is growing them as strategic industries.[75] The Saudi Ministry of Industry, Mineral Resources of Saudi Arabia assesses these sectors as having the greatest potential to contribute to national economic growth. Additionally, according to NIS, the specialty chemicals sector's production capacity is planned to be expanded to 8.7 million tons annually by 2030, with an additional 6.7 million tons of new production capacity planned for this.[76]

Singapore is another country that is actively invested in fostering the specialty chemicals industry. The country has focused not only on expanding new production but also on building an industrial structure focused on high value-added chemical products through R&D, advanced manufacturing capabilities, and the establishment of global supply chains. In a February 2026 interview, the Executive Vice President of the Singapore Economic Development Board (EDB) explained that specialty chemicals products account for about 40% of the total added value creation in Singapore's energy and chemical industry.[77] This case demonstrates how important an industrial strategy centered on high value-added products is more important than simply expanding production volume.

Japan is also restructuring its production structure centered on commodity chemical products to respond to the changing global market environment.[78] Japan's petrochemical industry is expected to reduce annual supply of about 2 million tons, equivalent to more than 25% of total ethylene production capacity, by shutting down four production capacity by 2030. Along with these restructurings, the

74 Cefic: Industry in sectors

75 Ministry of Industry and Mineral Resources (2025.12.22.): National Industry Strategy (NIS)

76 Ministry of Industry and Mineral Resources (2025.12.22.): National Industry Strategy (NIS)

77 Handelsblatt (2026.2.13.): Unlocking Asia's Specialty chemicals Opportunity – Why Singapore is Europe's Gateway to Asia

78 S&P Global Energy (2026.5.26.): APIC 2026 – Emerging Stronger

share of commodity polyolefin production such as HDPE is expected to decrease, while production of high-performance polyolefins such as ethylene vinyl alcohol copolymer (EVOH), polyolefin, and cycloolefin copolymer (COC) is expected to expand.[79]

Japan's strategy does not stop at transforming its production structure. On April 21, 2026, Japan's Ministry of Economy, Trade and Industry announced plans to invest approximately $6.28 billion in the metal and plastic recycling sector by 2030.[80] This can be seen as part of Japan's strategy to maintain its leading position in Asia in chemical recycling and the plastic circular economy. In other words, Japan is simultaneously promoting production capacity reduction of commodity, expansion of high value-added products, and fostering the recycling industry, attempting a comprehensive transformation of its industrial structure. These international cases provide important implications for Korea's petrochemical industry. According to the Korea Institute of Planning and Evaluation for Industrial Technology, Korea's chemical industry will rank fifth globally in the category of high value-added item conversion by 2025.[81] However, considering that major competitors such as the United States, Saudi Arabia, Singapore, and Japan are rapidly expanding their specialty chemicals product manufacturing capabilities through large-scale investments and long-term strategies, even if Korea sets the goal of fostering high-value products, without a mid-to long-term strategy, concrete implementation strategies, and investment plans that make this possible, it will not be able to secure a future advantage and stable market share in this sector.

On the contrary, since competitor countries have already set specialty products as a core growth pillar and are aggressively investing in specialty production capabilities and technology development, if Korea does not sufficiently accelerate the pace of transition, there is a risk of falling behind in both technology and production capabilities. The Korean government has also announced various policies and industrial development roadmaps to respond to these changes. Therefore, the future competitiveness of Korea's petrochemical industry will likely depend more on developing high value-added specialty products, securing advanced material technologies, and strengthening innovation capabilities in the circular economy sector rather than expanding commodity production.

79 Ibid

80 Ibid

81 Ministry of Trade, Industry and Resource (2025.12.23.): 화학산업의 새로운 재도약을 위한 「K-화학 로드맵 2030」 나왔다

2. (Domestic) Special Act on Petrochemicals, launch of the Chemical Industry Alliance, etc.

The Korean government is also implementing various support policies to help companies move away from a production structure centered on commodity products and expand the proportion of specialty products. For example, the "K-Chemical Next-Generation Technology Innovation Roadmap 2030," announced on December 23, 2025, selected R&D and related infrastructure support in specialty and high value-added product fields as one of the three key tasks under the goal of fostering Korea's specialty chemicals industry to become the world's fourth largest by 2030.[82] Alongside this, R&D and infrastructure support to secure capabilities to transition to eco-friendly production systems and strengthen global environmental regulations were also presented as key tasks. To implement this roadmap, the government-led 'Chemical Industry Innovation Alliance' was officially launched on March 4, 2026.[83] This alliance aims to share R&D project trends and investment information from potential demand companies, and to strengthen cooperation between companies across the entire chemical industry value chain (feedstocks, materials, applications) to demand industries and companies.[84] Through this, chemical production is expected to gradually shift away from mass production without close consultation with consumers, such as commodity chemicals or commodity synthetic resins, to one that reflects the specific needs of customers and market demand.

This approach highlights the fundamental differences between commodity production and the production of specialty chemical products. While commodity petrochemicals are structurally designed for mass-producing relatively standardized products, specialty chemicals products are often developed and manufactured to meet the specific requirements and performance standards of the customer industry. Therefore, cooperation with demand companies is important from the R&D stage, and production focuses more on providing customer-tailored solutions rather than simply economies of scale. However, the success of these policies depends not only on the scale of R&D investment but on how quickly companies can restructure their commodity-centered business structures and create new markets. Ultimately, the long-term competitiveness of South Korea's petrochemical industry is likely determined more by how effectively it builds a system of specialty product development, advanced material technologies, and close cooperation with demand companies, rather than expanding large-scale new production.

82 Ibid

83 Ibid

84 Ministry of Trade, Industry and Resource (2026.3.4.):「화학산업 혁신 얼라이언스」본격 가동, 석유화학 구조개편 위한 고부가 전환 전폭 지원

Conclusion

The Korean petrochemical industry is currently facing a double squeeze on both the demand and supply sides. On the demand side, regulations aimed at reducing plastic use are tightening, while on the supply side, global production capacity is expanding, and competition is intensifying. The success or failure of the restructuring policies being pursued by the Korean government and the petrochemical industry depends on the implementation of capacity reductions across the entire industry and a successful transition to high-value-added specialty chemicals businesses. While new large-scale projects like Shaheen may be presented as means to strengthen competitiveness at the individual company level, from the perspective of the entire industry, such projects could undermine the ability to achieve restructuring goals needed for the future of the industry.

Under the current situation where restructuring aimed at resolving overcapacity and shifting away from commodity production is taking place simultaneously with the additional expansion of commodity plant, the issues and challenges facing the Korean petrochemical industry can be summarized as follows.

Firstly, as major competitors continue to increase their production capacity and export markets worldwide tighten regulations on plastics and plastic packaging materials, the market environment for commodity petrochemical products will gradually deteriorate. Under these circumstances, even products made using the latest processes and possessing the potential for cost advantage are highly likely to face difficulties in securing sufficient and stable markets. Second, investment in commodity products may fail to yield the expected benefits for the regional economy or in terms of employment. Given that some regions are already reducing production capacity through restructuring, there is a concern that new capital expenditure could diminish the overall effect of reduction while maintaining the commodity production structure that has already caused employment stagnation. Third, expanding production centered on commodity products could further exacerbate the oversupply problem already facing the domestic and global petrochemical industries. Furthermore, despite government support, the possibility cannot be ruled out that additional capacity reductions and further restructuring will become necessary if the industry is negatively impacted by large-scale new expansions. Finally, even if the operation of new large-scale commodity plants is expected to cause a decline in profitability for the petrochemical industry, the government lacks the policy tools needed to anticipate and intervene in advance. Specifically, if the market entry of new commodity production capacity accelerates, the effect of voluntary reductions by companies may be offset and additional pressure for restructuring may arise with countermeasures for this potential situation being necessary. This is especially important given that the government has pledged significant public and financial support for the restructuring of the

Daesan and Yeosu plants along with business restructuring for the companies involved. This means the failure of restructuring efforts could have financial consequences that impact the government rather than only companies and the industry.

In conclusion, the government and petrochemical companies need to rationally adjust existing production capacity while also prioritizing securing production capabilities and technological competitiveness in specialty fields that can create high added value. This will not only create higher economic value than simply expanding production volume but will also help enhance the competitiveness and sustainability of the Korean petrochemical industry in the long term. Furthermore, regarding new commodity production exceeding a certain scale, it is necessary to conduct a thorough analysis of supply and demand impacts that comprehensively considers domestic and global demand and export forecasts, existing production capacity and operating rates, overseas expansion plans, and the impact of domestic business restructuring. By disclosing the results and reflecting them in the government's decisions regarding fiscal and financial support and restructuring, policy signals can be provided to the market. Through such policy efforts, the effectiveness of restructuring can be enhanced, and the competitiveness of the domestic petrochemical industry can be sustained.

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