

Responsible Care

Our Commitment to Sustainability



44

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Responsible Care® is a voluntary program in the chemical industry that not only continues to promote the environment through health and safety improvement activities but also by pledging commitment and implementing the program in management policy. This is achieved to protect the environment, safety, and human health throughout its entire lifecycle—from the development of chemical products to their manufacture, sale, distribution, use, and disposal.

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To pass abundance on to humanity and a better world to our descendants, the Korea Responsible Care Council (KRCC) will join forces to strengthen its activities and roles for a sustainable development

Health, Safety and Environment system befitting Korea's international status

In Park, the former Chairman of the KRCC Implementation Committee, is a 'seasoned environment expert' and 'RC Man', who witnessed the birth of KRCC in 1999 and its history. As part of the first generation and an 'older brother' of this field, he has set good precedents in the field and retired December of last year. We asked him about his feelings and future plans.



In Park, former Chairman of the KRCC Implementation Committee

First, please introduce yourself briefly.

Hello everyone, I'm In Park. I started my career at LG Economic Research Institute and later worked for LG Chem as the leader of the Environment & Safety Team. Afterward, I served as an officer in charge of environment and safety at LG. Currently, I'm a management advisor at the company.

For the past 25 years I've worked hard to establish reliable environmental health and safety management systems at domestic and overseas business sites of LG Chem, as well as raise awareness of environmental safety among the executives and employees. I am particularly quite proud to have contributed a tremendous amount to the sustainable development of the chemical industry by improving environmental safety. Still, there is much work to be done, and I am extremely apologetic that I'm leaving the field. With great pride as a member of the chemical industry, I'll ensure that I will keep discovering new ways to make a contribution to the environmental, safety, and health sectors.

As a founding member of the Korea Responsible Care Council (KRCC), you served as chairman of the Implementation Committee and various activities. Would you tell us more about the experience?

KRCC was founded in 1999 when I started working at LG Chem. At that time, the CEO of LG Chem, Jeong-ho Lee, became the first chairman of KRCC, playing a leading role in the establishment of the organization, followed by the CEO, Ki-ho Noh, the second chairman. I participated in the foundation while assisting the two CEOs. Later, I was invited to work for the General Affairs Committee and International Relations Committee. In addition, in 2017, I took on the role of the Chairman of the Implementation Committee so, as you can see, KRCC has a very close rapport with me, which I consider to be an opportunity that was invaluable and that I will forever cherish. Based on the skills I've acquired from KRCC, I was able to grow as a team leader, committee member, and finally a senior executive. Taking this opportunity, I'd like to thank KRCC again for such wonderful experiences.

“
I'll keep looking for ways of contributing to the development of the chemical industry through environmental, safety, and health improvement.

”

What was the most rewarding and also unfortunate part of your career during the past 20 years?

As you well know, RC is a movement involving the entire lifecycle of chemical products, from development to manufacturing, sales, distribution, use, and disposal. Specifically, it is a voluntary program in the chemical industry that continues to promote the environment through safety and health improvement activities. This is executed by pledging commitment and implementing the program in management policy to protect the environment, safety, and human health.

About 20 years ago, before RC was introduced to Korea, our chemical industry lacked in the environmental health and safety management system and also relevant capabilities. However, since joining RC and starting KRCC activities, our chemical industry has developed significantly. Moreover, it has been especially rewarding to establish an environmental health and safety management system and make contributions befitting Korea's international status. On the other hand, it is a pity that the public still have negative views on our industry, considering it to be the major cause of environmental pollution and safety accidents.

In what direction do you think RC should develop in the future?

The achievements of the chemical industry and technological development have profound effects on our life. Synthetic fiber, one of the most widely used chemical products, has revolutionized our clothing, chemical fertilizer has dramatically increased food production, and various plastic construction materials provided comfortable living space. In addition, the chemical industry is providing fundamental technologies to major high-tech industries such as IT, BT, and NT, so we can't imagine life without chemistry. Nevertheless, the industry inevitably deals with various chemicals so the public views it as dangerous and contaminating. It is true that the industry can cause serious environmental problems if management is neglected in the processes such as raw material collection, production, distribution, use and disposal.

Moreover, the chemical industry uses a lot of energy, so it is being recognized as a major source of environmental pollution and accountable for energy depletion rather than a contributor to the modern industrial civilization. From the point of 'Sustainable Development', which is a growing trend these days, those circumstances add to the crises faced by the industry. To overcome the challenge, we do need to make voluntary efforts to reduce environmental and safety risks and to enhance public awareness about the industry. Meanwhile, one of RC's vital roles is to ensure that stakeholders such as the government, consumers, and communities are able to accurately recognize the many activities that we are pursuing to improve the environment, safety, and health, and trust the authenticity of our efforts.





“

The chemical industry will play a large role in completing advanced technologies required by the new millennium era.

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The role of KRCC is especially important.

More recently, interest in 'corporate social responsibility (CSR)' is increasing, requiring us to participate in not just passive activities such as 'charity', but more active social contributions such as education, financial support, and staff participation. Therefore, the importance of 'social responsibility' in the chemical industry, which especially requires open communication with stakeholders, is being emphasized more than ever. Also, young people's interest in chemistry is diminishing, which is not desirable for our future, for it is difficult to expect sustainable development of our industry without competent human resources. It is one of KRCC's vital roles to cultivate capable human resources by inviting young people to the fields of pure chemical and chemical engineering through effective RC activities.

The modern society is demanding a strong social responsibility from the chemical industry. What do you think about this?

Until the 20th century, the society had strived to satisfy mans' material needs by focusing on industrial development. However, the information society of the 21st century will show keen interest in not only material abundance, but also our mental health needs. Thus, the chemical industry will play a large role in completing advanced technologies required by the new millennium era. In addition, we will continue to lead the efforts to protect the environment and improve the quality of human life to fulfill corporate social responsibility. 🌱

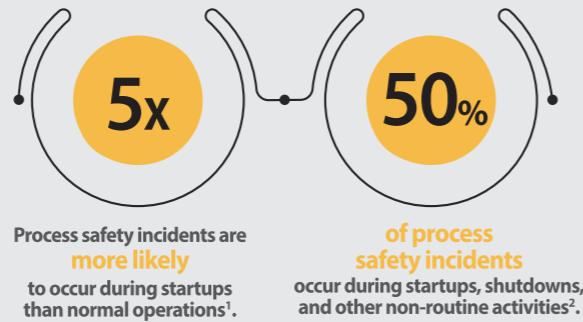
Successfully Restarting Operations Following the COVID-19 Crisis

As COVID-19 infection rates around the globe begin to slowly decline, leaders of many nations have begun discussing how and when to relax public safety social distancing efforts and allow businesses not already deemed essential to restart operations. With attention beginning to transition from response to recovery, only those organizations with well thought-out plans to get their operations up and running again will be able to get ahead of the curve and gain a competitive advantage.

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Numerous Uncertainties Loom Large

Successfully restarting operations is not as simple as flipping a switch. There are many things that companies should keep in mind before a restart occurs, especially in the current environment.



Even a restart under normal circumstances increases the risk of having a safety incident. A study by the Center for Chemical Process Safety shows that process safety incidents are 5 times more likely to occur during startups than normal operations¹. A similar study in the refining industry shows that 50 percent of process safety incidents occur during startups, shutdowns, and other non-routine activities². Restarting operations following the extended shut down due to COVID-19 adds levels of uncertainty that make it even more challenging. In addition to the higher risk for process safety incidents, these can include the uncertainty around the readiness of supply chain to support a restart, the changing customer behavior that affects production demand, the state of assets from potentially deferred maintenance, and the level of employee anxiety surrounding their return to work. Another significant and unpredictable challenge to consider is the potential for subsequent COVID-19 infection waves and how governments will respond to them. While companies may understand the importance of these considerations, the complexity of developing an effective restart plan may nevertheless be overwhelming. Failing to do the necessary planning, however, can lead to a restart that negatively impacts the long-term performance of a company.

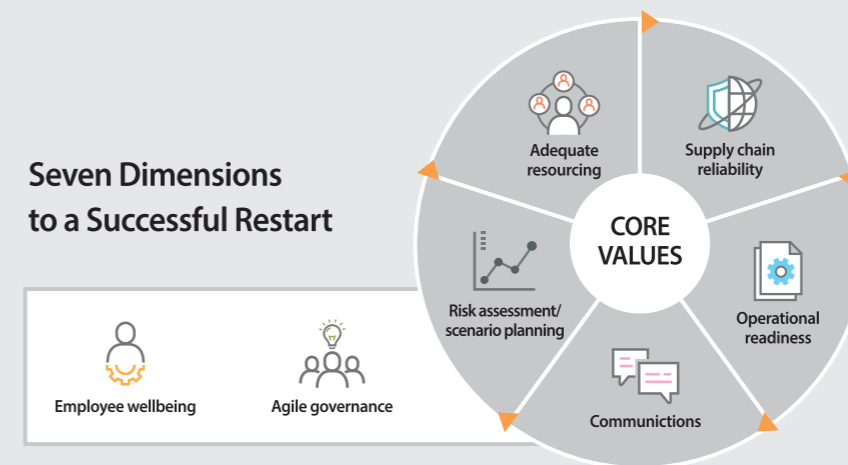
The emotional desire to recover quickly needs to be supported by the tangible evidence that suggests the organization is indeed ready for a restart.

Understand Your Current Readiness for a Restart

Before restarting, it's critical to understand how the pandemic has affected your organization and assess your organization's readiness to return to work. When assessing your risk, do not just focus on those that have been brought about by COVID-19, but rather look at all risks your company faces. Employees returning to work, changes to status of equipment and facilities, availability of financial resources, new government regulations stemming from the COVID-19 pandemic, and any changes with suppliers, customers or distribution capabilities, to name just a few. But be mindful of confidence that is unsubstantiated; that is, answers that are based on 'feeling' rather than 'facts'. The emotional desire to recover quickly needs to be supported by the tangible evidence that suggests the organization is indeed ready for a restart. 🌱



Seven Dimensions to a Successful Restart



SEVEN

Dimensions to a Successful Restart

1

Ensure Employee Well Being

To say that employees are your most important asset during this time is an understatement. It will be important to take steps that ensure employees are in the right mindset. Show sensitivity and take steps to address their concerns. Provide them the necessary tools to enable them to work safely and confidently, and establish a work environment that is supportive and caring. Don't be reluctant to adjust existing policies if necessary. And be sure to check-in often with all employees to proactively seek their thoughts and input.

2

Design an Agile Governance System

A working group of company executives and senior leaders that represents all functions across the organization and is dedicated to the various elements associated with restarting the company is an ideal way to effectively manage the process. Such an Executive Recovery Committee(ERC) can identify business critical processes, appropriately prioritize restart activities and efficiently make required decisions. The ERC should consider situational constraints, business and operational goals, and input from all risk assessments and scenario planning. It should also ensure that necessary resources (manpower, financial, etc.) are made available and establish performance measures to keep initiatives on track for a successful restart. Finally, it is important to remember that the ERC's responsibilities will not end as soon as restart occurs. It will be vital that the ERC review progress of the restart and adjust any plans as necessary to ensure its long-term success.

3

Conduct Risk Assessment and Scenario Planning

Assessing the current situation of the organization in the midst of the COVID-19 pandemic and considering various credible scenarios that could impact the company are critical to effective restart planning. Again, remember that the inherent risks faced by your organization still exist. A thorough risk assessment should consider those risks as well as additional risks that have been brought about by COVID-19. Critical before restarting is understanding changes and risks to your customers' buying habits. It is important to understand these risks to realistically set production targets, build in agility to rapid changes in the marketplace and to ramp up production in a sustainable way. The more thorough a company's risk assessment and scenario planning, the better its chances for a sustained successful restart. Consider any departmental dependencies. Identify failure modes and model each scenario. Then develop and implement necessary preventative and mitigative actions, and make sure contingency plans are in place. Be sure to establish and monitor performance indicators and leverage all available data. Assessments and scenarios should be reviewed with the ERC for alignment. Finally, remember to continually update scenario models and risk assessments with new information and data as it becomes available.

4

Ensure Adequate Resourcing

It is important that companies determine the critical steps necessary for business recovery and provide at least the minimum amount of resources required to meet these critical needs. Companies should also fully understand the competencies required for needed personnel. As highlighted by the example above, companies should have a firm grasp of the availability of necessary resources and the need for any back-up crews, and prepare for the possibility that any resources brought in to supplement the required workforce may not have previous experience or adequate competencies and will require some level of assessment and training.

5

Determine Supply Chain Reliability

Determine the current and longer-term availability of critical supplies and the reliability of their transport mechanism. If the raw materials you need aren't currently shipping, or won't be available for long, you'll need a backup plan. Decide if access to alternate suppliers is available. If not, develop a specification sheet and implement a quality assurance process for input materials from new suppliers you identify. Assess your company's raw materials storage capacity, develop demand projection analyses and subsequently, a production plan. Just like your supply chain, if your distribution logistics including warehouses and distribution centers are impacted by COVID-19 restrictions, you'll need a backup plan for that, too, to ensure the ability to transport your products to end-users.

6

Assess Operational Readiness

Before initiating a restart, companies need to make sure all equipment and systems are fully ready to operate. Organizations should conduct a hazard identification and risk assessment on each operating unit to make sure it can restart safely and without incident. Here, companies should be sure to engage operating personnel and seek their input. After all, these personnel working on the shop floor or on-site at facilities are in the best position to be aware of and expose potential or existing hazards. Organizations should also determine critical controls, assess them for integrity, and inspect and test them for proper functionality. If it is determined that additional controls are necessary, they should be implemented before any restart occurs. At this point, a comprehensive start up procedure should be developed to guide all restart activities, and it should be reviewed with operating personnel and their feedback and input should be incorporated. Detailed pre-startup checklists should also be prepared for personnel to use. Managers and appropriate company leaders should be involved and walk the line to participate in all readiness assessments. If deficiencies are identified, they should be addressed, and the assessment should be repeated. Once all operations are determined to be ready for safe restart, the ERC should be briefed on all readiness efforts and provide its approval to proceed with start-up.

7

Ensure Prompt and Open Communication

The company's recovery plan should be shared among all employees, and communication mechanisms between leadership, managers and front-line workers should be in place to track progress of the plan and respond to direct input from workers implementing it. Their input should be actively encouraged, and any concerns raised or ideas proposed should be acted upon promptly. Similarly, it is important to maintain regular and clear communications outside the company. For example, check in frequently with suppliers to make sure there are no potential disturbances to your supplies of raw materials. Manage expectations among customers and shareholders to provide them with a realistic view of your operational capacity and any difficulties you may anticipate to meeting their orders now or in the future.

Conclusion

COVID-19 has resulted in a business environment the likes of which few, if any, companies have ever experienced. The path ahead contains numerous challenges and additional unforeseen risks for organizations that are eager to resume operations. While it will not be "business as usual," with thoughtful and deliberate planning companies can develop a process for resuming their operations that results in a workforce that is ready, confident and assured of its wellbeing; a safe restart that minimizes disruption and ultimately improves operations; and an organization that is fully in control of its plan to recover to pre-disruption performance levels despite today's uncertainties.

Response measures to deal with tightened air conservation regulations

Regulations for improving the atmospheric environment have been constantly tightened and newly established. It is especially necessary for the manufacturing industries including petrochemical industry, which is one of the major targets of the laws, to proactively respond to air conservation regulations.

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Laws enacted to improve air quality

Centering around the Framework Act on Environmental Policy, the so-called “Four Fine Dust Acts” include the Clean Air Conservation Act (hereinafter referred to as the “Clean Air Act”), the Enforcement Decree of the Act on the Integrated Control of Pollutant-Discharging Facilities (“Integrated Control Act”), and the Special Act on the Reduction and Management of Fine Dust (“Fine Dust Special Act”), and the Special Act on the Improvement of Air Quality in the Atmospheric Management Area (“Management Area Act”).

The Clean Air Act, Fine Dust Special Act, and Management Area Act are managed by the Director General for Atmospheric Environmental Policy (Air Conservation Dept.) while the Integrated Control Act is administered by the Director General for Environmental Economy Policy (Integrated Permit System Dept.). Although these laws have the same goal of improving the air quality, the Clean Air Act, Fine Dust Special Act, and Management Area Act regulate from the standpoint of environmental protection, while the Integrated Control Act promotes environmental technology and business investment along with environmental protection.

Enforcement Time and Features of the Laws to Improve Air Quality

Laws	Enforced	Objectives
Framework Act on Environmental Policy	February 1991	Promotion of public health
Clean Air Conservation Act (Clean Air Act)	February 1991	Clean air
Act on the Integrated Control of Pollutant-Discharging Facilities (Integrated Control Act)	January 2017	Integrated management of discharge facilities (e.g. air, waste water)
Special Act on the Reduction and Management of Fine Dust (Fine Dust Special Act)	February 2019	Specialized management for fine dust
Special Act on the Improvement of Air Quality in the Atmospheric Management Area (Management Area Act)	April 2020	Management of total emission by area

The environmental standards provided by the Framework Act on Environmental Policy, as an expression of the nation’s strong commitment to protection of public health, specify the environment standards that “the people can enjoy and are entitled to enjoy”. However, the government has recognized the public opinion that it is necessary to raise the PM2.5 emission standard to the world level (that of US and Japan) due to the serious issue of fine dust and, as a result, the standard has been changed from 25 $\mu\text{g}/\text{m}^3$ to 15 $\mu\text{g}/\text{m}^3$ despite the high PM2.5 levels in Korea. In the past, such environmental standards, which were often considered merely a

Issues arising from the regulations tightened by the Clean Air Act

declarative meaning, did not lead to actual industrial regulations. But the Integrated Control Act has tightened environmental standards and has become a key factor in determining the “emission permit standard” (set based on emission impact analysis so that facilities can comply with the environmental standards)

In 2015, the “allowable emission standard” that all discharge facilities must comply with, (“emission permit standard” applied first if a facility is regulated by the Integrated Control Act) had a reinforcement rate of 14% for dust, 13% for SOx, 8% for NOx but, in 2020, 33% for dust, 32% for SOx, 28% for NOx, 38% for ammonia, and 38% for hydrocarbons, showing a significant increase. In addition, the “allowable emission standard” has been strengthened or newly established for some air pollutants with high direct/indirect hazards at medium/low concentrations. For example, the standards for cadmium increased to 21%, hydrogen cyanide to 20%, lead to 19%, chromium to 34%, arsenic to 38%, and mercury to 42%. Chemicals to which the “allowable emission standard” is newly applied include tetrachloroethylene, benzopyrene, 1,2-dichloroethane, chloroform, acrylonitrile, styrene, ethylbenzene, and carbon tetrachloride.

General air pollutants with reinforced allowable emission standard in 2020

Pollutants	Allowable emission standard		Reinforcement rate (%)
	Current	Revised	
Dust(mg/m ³)	10 ~ 70	5 ~ 50	33
Zinc and its compounds(mg/m ³)	5	4	20
Carbon monoxide (ppm)	50 ~ 300	50 ~ 300	3
Ammonia (ppm)	20 ~ 50	12 ~ 30	39
Nitrogen oxide (ppm)	20 ~ 530	10 ~ 250	28
Sulfur oxide (ppm)	10 ~ 540	10 ~ 250	32
Hydrogen sulfide (ppm)	2 ~ 10	2 ~ 5	26
Carbon disulfide (ppm)	30	10	67
Hydrocarbon (ppm)	40 ~ 200	40 ~ 200	38
Copper and its compounds (mg/m ³)	5	4	20

In the case of “emission charges”, basic charges are imposed when the discharge concentration is below the “allowable emission standard”, and surplus charges are imposed if the concentration is higher than the standard. The amount of Korea’s annual charge collection is less than 10 billion won. However, NOx charges are introduced from 2020 and the emission charges will be gradually reinforced (both the criteria and unit charge), rapidly increasing the amount of emission charges to be paid by the industry (NOx charges are expected to increase progressively from

1,490 won in 2020 with 70% (or less) exemption to 1,810 won in 2021 with 50% (or less) exemption, and 2,130 won in 2022 with 30% (or less) exemption).

Emission charges

Pollutants		Basic charges	Surplus charges	Unit charge (won/kg)
Sulfur oxide (SOx)		○	○	500
Dust (TSP)		○	○	770
Nitrogen oxide (NOx)		○	○	2,130*
Ammonia		X	○	1,400
Hydrogen sulfide		X	○	6,000
Carbon disulfide		X	○	1,600
Specific air pollutants	Fluoride	X	○	2,300
	Hydrogen chloride	X	○	7,400
	Hydrogen cyanide	X	○	7,300

Some say that it is unavoidable to base the emission control measures on the total emissions rather than on the concentration, as in the case of the “allowable emission standard”, but others say that the system has been improvised due to the increasing demand for fine dust control measures. Of course, the current trends include the “allowable emission standard” (developing-country-type) for the rapid improvement of air quality, the cap & trade system based on market access (advanced-country-type), applicable if a certain level of air quality is reached, and an environmental tax based on emissions of all sources is applicable if the air quality is good. Nevertheless, as there is no or insufficient analysis of toxic emissions and hot spots in a management area, the number of participants in the emission trading market, accurate measurement of emissions, price formation, promotion of technological progress, and effects of improving air quality, many wonder whether or not the government was in a hurry to introduce the total emission management system. Unlike the current total emission management system for the metropolitan area (hereinafter referred to as the “metropolitan area system”), the system for each management area (hereinafter “management area system”) not only targets land with high availability, but also strongly requires new TMS installations for facilities that were not previously required to do so. In addition, the “management area system” drastically reduces exemptions from “allowable emission standard” and emission charges. Also, surplus charges are set to 5 times the air emission charges, and the new NOx emission charges mentioned above are expected to be

Issues resulting from the establishment of regulations for total emission in the Management Area Act

Issues following the establishment of the Fine Dust Special Act

significantly higher than those for SOx and dust, thus the burden on the industry would be very high.

Metropolitan area system vs. Management area system

Systems	Metropolitan area system	Management area system		
Target areas	Metropolitan area (Seoul, Gyeonggi, Incheon)	Metropolitan, central, southern, and southeastern areas (Equivalent to 38% of the national land, 88% of the population, and 81% of national emissions)		
Total emission management system	Applied to any Type of 1/2/3 industrial sites (10 tons or more per year) with annual emissions exceeding 4 tons of SOx, 4 tons of NOx, and 0.2 tons of TSP in the past 2 years			
TMS installation	Facilities to install TMS according to the Clean Air Conservation Act (power generation facility, boiler, incineration facility, combustion process facility, non-combustion facility)	Criteria for installation exemption Stacks with 3 tons of SOx/NOx and 0.15 tons (or less) of dust * Existing facilities 1,146 new facilities 1,899 * 99.2% expected to be managed (based on emissions)		
Total emission allocation	(Initial year) Average allowance of the last 5 years (Final year) Emission attainable by BACT installation Subtract the next year's assigned amount from 2 times the excess emission	(Initial year) Average allowance of the last 5 years or emissions of the recent years (Final year) Emission attainable by BACT installation (partly alleviated) Subtract the next year's assigned amount from 2 times the excess emission		
Concentration exemption	Exemption from the allowable emission standard (130%), applicable to Type 1, 2, and 3 industrial sites Exempted from the basic/surplus charges by the Clean Air Act	Only Type 3 site is exempted from the allowable emission standard (130%) Exempted from the basic charges only		
Total emission transfer	-	Transfer allowed within 10% of the next year's amount only in the management area		
Increased fines for excess emissions	(Unit: KRW/kg)	NOx	SOx	Dust
	Metropolitan area system	2,900	4,200	6,500
	Management area system*	10,650	2,500	3,850
※ Emission charges by the Clean Air Act		2,130	500	770

In 2017, it was pointed out that there was no or lack of legal basis for the emergency fine dust reduction measure as this is dependent upon administrative discretion and, thus, the legal ground was secured in 2019, after which a seasonal management system was introduced along with the emergency reduction measure. Some have argued that the adjustment of uptime and utilization rates of private facilities, unlike public facilities, requires careful approach, so adjustment is being done through voluntary agreements. Depending on the circumstances, however, the emergency reduction measure can be applied to private facilities.

Complex regulatory standard issues relating to the Clean Air Act, Management Area Act, and Integrated Control Act

Discharge facilities subject to the emergency reduction measure

Laws	Features
Primary metal manufacturing	Sintering furnace, roaster (iron ore pretreatment process)
Petroleum refined products manufacturing	Heating facility
Basic organic chemicals manufacturing	Heating facility
Cement manufacturing	Firing facility, grinding facility
Power generation	Power generation facility using solid fuel
Other facilities announced by the Ministry of Environment in consultation with the head of the relevant central administrative agency	

The “allowable emission standard” of the Clean Air Act, the “total emission allocation” of the Management Area Act, and the “emission permit standard” of the Integrated Control Act are often applied simultaneously according to a unique logic. For example, it is said that the “total emission allocation” is more effective in improving air quality than the “allowable emission standard” (concentration-based standard), so the “total emission allocation” and “allowable emission standard” are applied at the same time. In some cases, the “emission permit standard” (calculated by an emission impact analysis based on both emission concentration and amount) and “total emission allocation” (based on BACT) are applied at the same time.

Relation between various emission standards and matters to be understood by the industry (examples)

Application of the laws	Case 1 Clean Air Act	Case 2 Management Area Act (Type 3)	Case 3 Management Area Act and Integrated Control Act (Type 1)	Case 4 Integrated Control Act (Type 2)
Compliance standard	Allowable emission standard (e.g. 100ppm)	Type 3 allowable emission standard (e.g.130ppm) *130% exemption for Type 3	Emission permit standard (e.g.70ppm) * Standard set between 70-100 based on the emission impact analysis	Emission permit standard (e.g.100ppm) * Standard set between 49-100 based on the emission impact analysis
		Annual emission allocation (e.g. 9.2 tons)	Annual emission allocation (e.g. 2,431 tons)	
Standards for the industry to note (examples)		Type1/2 allowable emission standard (e.g. 100ppm) by the Clean Air Act	Allowable emission standard (e.g. 100ppm) by the Clean Air Act	Allowable emission standard (e.g. 100ppm) by the Clean Air Act
			Integrated Control Act Maximum emission (100ppm) Emission limit (70ppm) Strict standard (49ppm) *Strict standard is not applied if the Management Area Act is applicable However, standards for pollutants discharged from facilities not related to the total emission allocation being discussed (e.g., facilities with less than 4.4 or 0.2 tons, carbon monoxide).	Integrated Control Act Maximum emission (100ppm) Emission limit (70ppm) Strict standard (49ppm) *Strict standard is not applied if the Management Area Act is applicable
		BACT standard by Management Area Act (70->50ppm)	BACT standard by Management Area Act (70->50ppm)	

VOCs issues in the petrochemical industry

Although VOCs was one of the main causes of PM2.5, the accurate emission statistics and reduction efforts have been neglected (in July 2018, VOCs emitted from the petrochemical industry was identified as the cause of high-concentration fine dust in Busan/Ulsan/Gyeongnam), and the amount discarded in the form of VOCs (leakage from crude oil during processing) is 0.8% in Korea, but only 0.05~0.07 in the EU. Based on these facts, it is possible that development of the inventory and monitoring/supervision of VOCs will be strengthened in the near future, and new types of regulations such as total emission management system will be introduced. Unlike other air pollutants, VOCs have different causes of emission at various stages such as production, storage, and transport, and have many monitoring points. Also, there are insufficient application examples of various reduction technologies. Most of all, the burden of the industry can increase significantly as it should perform management which was not necessary previously.

Response measures

The priority should be given to finding and introducing active technical measures to reduce air pollutants. This is because greater investment costs or production loss is expected if the industry fails to preemptively review and prepare for the continuously tightened emission concentration regulation or the total emission allocation system. Those operating the discharge facilities are not those who develop/supply the reduction facilities and, therefore, it is difficult for them to expect the eased application granted. Of course, it is understandable that companies are not very willing to take the initiative due to the challenging management environment and increasing complexity of technologies. For this reason, it is necessary for governments and public institutions to intervene and look for solutions together. Industrial sites should make their own efforts too and actively communicate with the government to resolve difficult issues. From the institutional point of view, it is important to accurately understand regulatory changes and issues. In particular, companies need to actively participate in the process of planning/developing systems, a public-private consultative group, meetings for discussion and exchange, relevant committees, and technical working group subject to the Integrated Control Act in order to express their own opinions. They can also make recommendations to the government by actively leveraging the matters discussed with the Ministry of Environment and central administrative agencies (e.g. “allowable emission standard” of the Clean Air Act, VOCs regulation, exemption of emission charges, permission limit of the Management Area Act, adjustment of allowable total emission, etc.). 🌱

Thorough preparation for EU carbon border adjustment

The world is now focusing on development of new measures to overcome the economic downturn and employment crisis caused by COVID-19. The EU has quickly responded last year by proposing a new growth strategy centered on climate change. The “carbon border adjustment” is included in the strategy.

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Carbon Border Adjustments

Europe's new growth strategy European Green Deal and new industry

The European Green Deal is a comprehensive strategy with a vision of sustainable transformation across the European economy/society. The European Green Deal was established to strengthen the EU's response to climate change, and its goal is to achieve climate neutrality by 2050.

The goals of the Green Deal for various sectors largely include measures to achieve climate neutrality and a fair transition to support the vulnerable sectors in the process.

The European Green Deal materializes its objective with strategies for each sector after presenting a comprehensive vision. In this regard, the European Commission (EC) announced a new industrial strategy in March this year. In the new strategy, the green and digital transformation of the industrial sector serve as two major axes, suggesting the direction for strengthening the competitiveness of the European industry. The new industrial strategy sets a key agenda on the industrial transition for each sector to achieve carbon neutrality by 2050 and does not provide specific policies, but it is still noteworthy because the strategy shows the future direction of EU's industrial policies. The overall direction of the strategy is to foster new industries to achieve carbon neutrality, support decarbonization of heavy industries which have particular difficulty in carbon reduction, and protect industries in Europe from global competition in the process.

Carbon border adjustment, industrial protection policy for carbon leakage prevention

Carbon Border Adjustments (CBA)¹⁾ refer to a trade-restrictive measure that can adjust the differences in the nations' ambitions for reducing greenhouse gas emissions. In general, businesses located in a country where strong greenhouse gas regulations are introduced are more likely to suffer damage from rising production costs. As a result, such companies may either move their operations to unregulated countries or increase production in unregulated countries.

Accordingly, there is a risk of carbon leakage, referring to that, emission sources move outside Europe due to the implementation of carbon reduction policies.

The CBA is a policy introduced to protect the industries in EU, which are exposed to tough competition in the course of promoting decarbonization in the region, by preventing carbon leakage. The EC announced a review for introduction of the CBA through the Green Deal, and the EU new industrial strategy also reaffirmed the CBA introduction. The CBA's direction is relatively clear in the Green Deal communications. The system will focus on the sectors exposed to the risk of carbon leakage as EU raises its climate targets, and import prices are likely to be adjusted to reflect carbon prices.

Currently, EU's CBA completed its feedback collection from March 4 to April 1, 2020, and aims to be adopted by the EC in the second quarter of 2021

after the public consultation to be done in the third quarter of 2020.

The CBA methods being discussed include 1) imposing carbon tax on specific products (both domestic and imported products), 2) introducing new customs duty on imported products, and 3) expanding the EU Emissions Trading System (EU ETS) to imported products.²⁾ The EC is considering whether these measures have legal/technical feasibility. In particular, it is reviewing the relations between CBA and other regulations such as WTO regulations, EU's trade agreement regulations, EU's carbon pricing systems (e.g. ETS), and current carbon leakage prevention measures.

Implementation of the CBA requires evaluation of the carbon content of imported goods or the level of carbon prices to be applied. The EC has explained that the EU ETS has a benchmark system for industrial processes, and that the CBA can also be adopted based on the benchmark system. It has also specified that the application could be waived if the exporting country can certify low carbon content of the product or high carbon prices of the country of origin.

Ultimately, Korean industries which export a lot to the EU are also likely to be affected by the CBA.

1) Carbon border tax can be interpreted more broadly in a sense, encompassing various methods such as imposing import duties based on greenhouse gas emissions or imposing carbon taxes on specific items.

2) European Commission, Inception Impact Assessment, Carbon Border Adjustment Mechanism, 2020.

Impact of CBA

Large-emitting sectors and exports to the EU

It is not easy to foresee the impact of CBA on Korea's industrial sectors because the specific methods and scope of the CBA are not yet determined. In the short term, however, it appears that the sectors where CBA will be first applied would be more sensitive to the impact of the new system. CBA is expected to be applied first to the sectors where the risk of carbon leakage is greatest, and then expand its application scope.

In the case of the EU ETS, the risk of carbon leakage is generally considered high in the greenhouse gas-emitting industries (e.g. steel, petrochemical, cement, etc.).³⁾ In particular, it should be noted that the EU's new industrial strategy will support the decarbonization of these large emitting sectors. The risk of carbon leakage will further increase if de-carbonization of these large-emitting sectors increases costs and, therefore, it is highly likely that active protection measures will be implemented for these industries. On the other hand, sectors where Korea exports a lot to the EU are also likely to be affected by the CBA. Looking at the CO₂ emissions inherent in net exports⁴⁾, it is estimated that the manufacturing industry will be directly exposed to the effects of CBA in Korea. Among manufacturing sectors, transportation equipment, computers and electronics, and electrical equipment sectors are expected to be the most affected by the CBA.

CO₂ emissions by sector inherent in the net exports

Sectors	Car sharing	Rental car	Ride sharing	Carpool
	World	Korea	World	EU
Agriculture, forestry and fisheries	-5.4	0.1	-2.6	-0.1
Mining	-157.9	0.7	-34.8	-0.7
Power, gas and water supply/treatment	-1.2	0.2	-1.7	-0.2
Service	-29.7	1.9	8.0	-1.9
Manufacturing	-308.1	-12.7	79.3	12.7
Chemical and non-metal	-76.5	-0.8	4.5	0.8
Metal	-38.5	-0.7	11.4	0.7
Computer and electronic/electrical equipment	-98.5	-2.5	27.1	2.5
Transport equipment (automobile/other)	0.1	-9.7	42.6	9.7

Source: Jin-young Mun et al., Key issues and implications of the international community relating to the European Green Deal, Korea Institute for International Economic Policy. 2020: p.22.

3) At the end of 2019, Bernd Lange, Chairman of the Committee on International Trade of the European Parliament, announced that the first carbon border tax will be imposed on cement products in the coming months.

4) According to the indicators based on carbon emissions inherent in products exported or imported by Korea, if the net export is a positive value, it means that the share of the product in Korea's exports is very high.

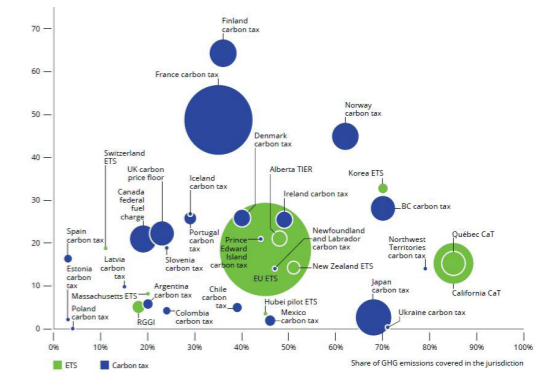
Necessary to actively present opinions to the EU and prepare for relevant indicators

To assess the ultimate impact of the CBA, it is necessary to comprehensively assess specific measures to implement the system, competition between Korean and EU companies in terms of greenhouse gas emissions, and the interests of competitors exporting to the EU. The CBA is essentially a trade-restrictive measure, so it is quite obvious that it will be a disadvantage to Korea's industries. However, if we are thoroughly prepared and stay competitive, there is room for minimizing the potential impact and gaining an edge among competitors exporting to the EU.

First, we need to actively comment on the progress of the CBA. Looking at the trends so far, unlike the previous efforts, it seems that the EU member states have high support and willingness to introduce it this time. Therefore, it is necessary to actively present our opinions so that the system can be introduced in a way that we can easily respond to it. CBA must be implemented in a transparent and simple manner in order for us to establish a reasonable response system. If so, it would be easier to reduce the risk of arbitrary interpretation/application by the EU and to facilitate Korea's response measures.

In addition, it is necessary to prepare for relevant indicators so that an exception or favorable treatment (compared to competitors such as China) can be granted for products of Korea. The objective of the CBA is to adjust the differences in reduction policies among countries, and the carbon price imposed on products serves as a major indicator.

Application of carbon prices and price levels



Source: World Bank, State and Trends of Carbon Pricing 2020: p.13.

For instance, Korea has an emission trading system corresponding to the EU's regulation, and the carbon price level is high. As of April 2020, Korea's emission trading system has a wider scope of application than EU ETS and a higher price level than EU.⁵⁾ In other words, Korea is already applying EU-level carbon prices.

Besides, there are indicators that we can actively review to prove the current position of Korea on this issue, such as the OECD's Effective Carbon Pricing. We should continually examine the impact of the CBA in advance and actively explain our position on this system. 🌱

5) World Bank, State and Trends of Carbon Pricing 2020.



Seung-ho Yun, CEO of Lotte MCC
New RC Auditor



Baudouin Kelecom
Chairman of ICCA RCLG



Jong-gyeong Chae
Chairman of KRCC



Signature renewed by 36 members
Basic Policy on Environmental Safety and Health



RC Global Charter signed
by KRCC

2020 Extraordinary Board of Directors' Meeting held in writing

On January 13, the Korea Responsible Care Council held the '2020 Extraordinary Board Meeting' in writing for the succession process (according to Article 13 of the Articles of Association, Election Methods for Officers) following the retirement of the previous RC auditor (Jae-yong Cho, CEO of Lotte MCC), and appointed Seung-ho Yun, CEO of Lotte MCC, as the new RC auditor.

Participated in the ICCA RC Leadership Group Meeting in the first half of 2020

The RC Leadership Group Meeting for the first half of 2020 was held for two days between April 16 and 17 in a teleconference format. At the meeting, about fifty RC members from around the world, including Baudouin Kelecom, the chairman of RCLG, attended in order to share RC issues and discuss implementation measures. Major issues included business cases for safety, an ICCA mentoring and expert network, RC self-assessment tools, adoption of RC security codes, and Key Performance Indicators (KPIs). Meanwhile, the RC Leadership Group Meeting for the second half of 2020 will be held in London, England (or in teleconference) in September.

2020 1st Board of Directors and 21st Regular General Meeting held in writing

On February 11, the Korea Responsible Care Council held the '20th 1st Board of Directors and the 21st Regular General Meeting' for the board of directors, including Chairman Jong-gyeong Chae. The meeting was held in writing due to the influence of COVID-19. The three major agenda items were reviewed, including the 2019 business and settlement report, 2020 business plans and budget (draft), and executive issues (consecutive appointment of Chairman Jong-gyeong Chae)

Signature for 'Basic Policy on Environmental Safety and Health' renewed


The KRCC is endeavoring to renew the signature of the Basic Policy in case of any change in the member company's name and CEOs (resolved at the 9th regular general meeting, Jan. 30, 2008). Accordingly, the signature renewal for the 36 companies was completed this year. The Basic Policy is the expression of the CEOs' firm determination and willingness to take responsibility for environmental safety and health in chemical management.

Signing the RC Global Charter

The International Council of Chemical Associations (ICCA) issued the 'RC Global Charter' for sustainable development of the global chemical industry (developed in 2005 and revised in 2014) to provide the guidelines to be followed by the industry. The world's top 100 chemical companies are also signing the Global Charter as an expression of the industry's commitment to safe chemical management. In addition, chemical associations in each country are also signing the Charter (developed in 2019) to strengthen RC activities, and the Korea RC Council participated in this movement in February 2020.



RESERVATION



Renewed the website of the Korea Responsible Care Council
 Opened early July 2020
Website address : www.krcc.or.kr




RCLG in the second half of 2020 (RC Leadership Group) Meeting
Date: September 3-4, 2020
Place: London, UK or conference call



2020 Safety Leadership Workshop for executives
Date: September 2020
Place: To be announced later
Target: Officers in charge of environmental safety

2020

KRCC's major events in the second half of 2020



2020 Come! Fun World of Chemistry
Date: September 2020 (online opening to be reviewed)
Target: Elementary school students (4th-5th grade) in Ulsan, Yeosu, and Seosan Area



Chemical Industry Sustainable Development Forum
Date: September or October 2020
Place: Seoul (to be announced)



Regular Members

- | | |
|------------------------------|--------------------------|
| Air Liquid Korea | KPX Chemical |
| AK Petrochemical | Kumho P&B Chem |
| ARKEMA | Kumho Petrochemical |
| Axalta Coating Systems Korea | Lanxess Korea |
| BASF Korea | LG Chem |
| Covestro Korea | LG MMA |
| Daelim Industrial | Lotte Advanced Materials |
| Daesung Industrial Gases | Lotte BP Chem |
| Dongwoo Fine Chem | Lotte Chem |
| Dow Chemical Korea | Lotte Fine Chem |
| Dupont Korea | Lotte MCC |
| Eastman Fiber Korea | Merck |
| Evonik Korea | OCI |
| GS Caltex | Polymirae |
| Hanhwa Solutions | Samnam Petrochemical |
| Hanhwa Total | SH Energy Chemicals |
| Hansu | SK Global Chemical |
| Hyosung Chemical | SK Materials |
| Ineos Styrolution Korea | SKC |
| Infineum Korea | Taekwang |
| ISU chemical | Tongsuh Petrochemical |
| Kolon Industries | TRINSEO KOREA |
| Korea Alcohol Industrial | Yeochun NCC |
| Korea ASK Chemical | Yongsan Chemical |
| Korea Petrochemical | |

Associate Members

- Korea Chemicals Management Association
- Korea Chloride Alkali Industry Association
- Korea Fertilizer Industry
- Korea Petrochemical Industry Association
- Korea Petroleum Association
- Korea Specialty Chemical Industry Association
- Korea Testing & Research Institute



Member Companies

Please scan the QR code to see the application process for the membership for the Korea Responsible Care Council.

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