



Responsible Care®  
OUR COMMITMENT TO SUSTAINABILITY

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# Responsible Care

Our Commitment to Sustainability Issue No + 43

**Special** 'APRCC 2019' hosted by KRCC

**Issue** Best Practice for RC Implementation

**Members Focus** Members' News

**RC Activity** Key Activities of the KRCC Secretariat



 Korea Responsible Care Council

# Responsible Care

2019  
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Responsible Care® is a voluntary program in the chemical industry that continues to promote the environment through safety and health improvement activities by pledging commitment and implementing the program in management policy 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.



## 'APRCC 2019' HOSTED BY KOREA RESPONSIBLE CARE COUNCIL

**WE CREATE A NEW FUTURE FOR THE GLOBAL CHEMICAL INDUSTRY!**

The KRCC held the Asia-Pacific Responsible Care Conference (APRCC) 2019 and side events at the Westin Chosun Hotel in Seoul for 5 days from November 4 (Mon) to November 8 (Fri). Celebrating the 20th anniversary of the KRCC, the APRCC 2019 event was held to prepare for reformation by promoting domestic RC activities, and to strengthen its status locally and abroad. The event was attended by 238 participants (APRCC standards) from 20 member countries around the world. The APRCC has been held every other year since 1995 (Hong Kong) for the purpose of improving the chemical industry's image and long-term cooperative development by promoting RC activities in Asia-Pacific and sharing the best practices. Major participants included general manager from the Ministry of Environment Mr. Jae-cheol Yoo, president of RCLG Baudouin Kelecom, Chairman of APRO Sohei Morita, Vice-Chairman Seungyoon Leem of KRCC, and CEO of Polymirae Maltino Gabelich. There were five sessions including RC, sustainability, plastic, process safety, and management of chemicals; and 22 presentations and comprehensive discussions were conducted to discuss the state of member countries and countermeasures.

### ● Vice-president Seungyoon Leem, "To be an opportunity for seeking RC's future"

Seungyoon Leem, vice chairman of the KRCC, delivered a welcoming speech and evaluated the APRCC as an effective solution to the performance of RC, including addressing environmental and safety issues in the Asia-Pacific region, and acknowledged that APRCC fulfilled its role as a venue for communication for RC. Vice-president Leem said, "In spite of the dedicated efforts to improve the environmental safety of the chemical industry, interest parties such as the government, local communities, and NGOs, are demanding higher environmental standards and safety management" He added, "We therefore need self-reflection on efforts to make industry safety better through new initiatives by the chemicals industry. And to do so, we should seek new ways to move forward in the future. The experience which we gained from the past RC activities and its current state should first be shared and discussed."

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### ● The president of RCLG, Baudouin Kelecom said, "Let's go forward together on this long journey."

The president of RCLG, Baudouin Kelecom added, "We are living in uncertain times, but we are here because this is the time where our past used to be." He cited an example of Cheomseongdae Observatory. This is the oldest building in the world (built in 632). The queen of Shilla tried to understand the origin of the universe to share with people her power she was given by God, which is similar to RC as a symbol. He also said "We want to settle some problems we are facing by talking and sharing with and among small and medium-sized enterprises, large enterprises, and other interested parties. The RC Global 6 Charter cannot be perfect even if it can reach a certain level. So I hope we can persevere and go forward together for the future."

### ● The chairman of APRO Sohei Morita said, "I hope to extend the scope of RC activities"

The chairman of APRO, Sohei Morita, added "I'm glad the 16th APRCC is being held in Seoul, and thank you to the organizers. This event will provide a very important opportunity to discuss future initiatives for RC, helped by relations with and devotion of the UN SDG. I hope this will be an event to not only share information and experiences but also play a role in spreading and informing RC to diverse societies. I hope to extend the scope of RC activities both inside and outside of the company."

### ● The general manager from the Ministry of Environment Mr. Jae-cheol Yoo, said, I hope this will be an opportunity to share various ideas on policy and RC activities."

The general manager from the Ministry of Environment Mr. Jae-cheol Yoo added "Chemicals have been an asset to promote modern civilization and improve the quality of life. Without plastics, we would not be rich in architecture, garments, and the automobile field with which we are blessed." But he also pointed out, "There are many bad things from the chemical industry such as toxic substances of chemicals and their products that are bad for health, as well as deadly accidents caused by explosions. The RC activities provide a foundation for sustainable development. I hope this event will be an opportunity to share various ideas on policy and activities."



● **The president of Polymirae, Martino Gabellich said, “RC is helpful for accomplishment of the UN’s sustainable development goals for the next generation.”**

Delivering the APRCC 2019 keynote speech, the president of Polymirae Martino Gabellich said, “RC has been proposing a consistent and effective approach to many of the challenges our industry has been facing since the launch of RC.”

He also explained that RC has played a role in continuous improvement and development of industrial culture. “In the future, RC can help us to share best practices beyond standards of law,” he added, explaining, “We all will believe in RC achievement which is a spontaneous and preliminary act. And it is helpful for accomplishing the UN’s sustainable development goals for all of us and the next generation.” Martino Gabelic said “All RC initiatives cannot be fulfilled all at once, but we can complete small ones gradually. We can start budgeting to support and implement this. It is important to do what we do without stopping.”

● **Korea Responsible Care Council 20th Anniversary**

The KRCC held ‘The Korea Responsible Care Council 20th Anniversary’ at the Westin Chosun Hotel Orchid Room on Wednesday, November 6th. The event was attended by 75 participants, including Chairman of RCLG Baudouin Kelecom and Chairman of APRO Sohei Morita, as well as RC Board members, CEOs of Member Companies and former Presidents. In this event, we thanked the employees who have contributed to improving the environment, safety and health culture with domestic RC activities for the past 20 years. Vice-chairman Seungyoon Leem first thanked attendees and employees in the chemical industry in delivering the commemorative speech. Lim emphasized that the chemical industry is one of the most important industries in Korea as our own asset that has led to the improvement of quality of life of humankind and modern civilization. He said “I think that the role of RC, the spontaneous activity for environmental safety and health of the chemical industry, will become more important for the sustainable development of the chemical industry. The responsibility we have to carry is heavy, but I believe we will be able to overcome any difficulties if the enthusiasm and hard work we have done so far is supported. I look forward to helping to develop this further after the 20th anniversary.”



Following the commemoration, the RC Awards award ceremony was held for those who contributed to the spread of RC activities in Korea. In the ceremony, medals and bouquets were presented to Director of LG Chemical, Dupont Korea, Lotte Chemical, SK Chemical, Air Liquid Korea, Kolon Industries, Kumho Petrochemical. After the awards ceremony, the dinner was held with a commemorative performance. Meanwhile, 'APRCC 2019' will be held at the APRO Conference, the second half of the 2019 ICCA RCLG, the 20th anniversary of the KRCC, and the APRCC followed.

● **APRO and RCLG holding**

At the APRO meeting held at the Westin Chosun Hotel Tulip Room on November 4, the first day of the event, 16 representatives from member countries attended to discuss preparations of the status, a panel discussion in APRCC 2019 and discussed the next APRCC venue.

The second half of the 2019 ICCA RCLG meeting, held at the Westin Chosun Hotel Cosmos Room, on November 5 (Wed.) and 6 (Wed.), 2018, discussed and shared key issues related to RC and reviewed the ICCA Board of Directors.



## Session 1 Present and Future of Responsible Care

### Topic 1

#### Lanka Responsible Care Council

(Mr. Sena Peiris, LRCC)



#### ■ Establishment and role of LRCC

- (Established) Established LRCC in 12 years and joined RCLG, has been a member of APRO since 2016
- (Role) Providing support to the field and the safe management of chemical substances, cooperating with the government.
- (Members) Expanded from 20 at the time of establishment to 60 members as of 2019 (to be expanded to 100 companies from now on)

#### ■ Major Activities

- Contributed to drafting policy related to chemicals and preparing national plans, provide online programs on management of chemicals and apply the program to university curriculums including RC, training member companies and building capacity, sharing best practices quarterly, annual meetings (participating member and government), promoting RC Awards, CEO Forum, RC annual audit, etc.

#### ■ Future plans

- Endeavor to prepare a national action plan for marine plastic waste (5th in the world)
- Strengthen international cooperation such as RCLG, connected with UN SDGs, and various programs to be developed.

### Topic 2

#### Responsible Care: Past, Present and Future Challenges

(Mr. Kiyoung Kim, KRCC)



#### ■ RC Status (Shared with the 8 Fundamental Features)

- (Basic policy) Adopted by all member companies after the confirmation of the basic policy at the founding meeting in 1999. It is mandatory that signatures are renewed even when the company's name and CEO are changed since 2008. (signed by 52 companies so far)
- (Logo) Recommended for member companies after confirmation of RC logo mark usage standard
  - The proportion of member companies using the RC logo on business cards and homepages is low at 16.7%.
- (Code) Development of four RC codes in 2001 → Expanded to six codes in 2006 and revised the code to strengthen application and increase performance standards.
  - Development of evaluation tools for six codes in 2018 and trial application of member companies to introduce external advisory evaluation system
- (Indicator) Researching data on 12 items and submit them to RCLG once per year
  - However, due to the low membership participation rate of 53.3%\*, more efforts are needed to make more members participate.
    - \* Internal failure factors for submitting related data (such as leaking company information) and lack of understanding of the person in charge of performance investigation.
- (Communication) Promoting Outreach program (Come! Fun World of Chemistry) and chemical industry interest parties forum. Expanding exchanges with local communities from now on. We will keep developing the forum.
- (Sharing Information) Since 2002, annual workshops have been held to share RC cases and build networks, publish RC weekly newsletters, Held Environmental Safety Seminar
  - Held a safety leadership workshop for executives (2018 ~) and will establish a network and exchange information on the healthcare field.
- (Spreading and Encouragement) Promoting RC proliferation by supply chain ('09 ~) and operating RC advisory group (2013) Awarding excellent employees
- (Verification) Self-assessment is promoted at present, but ultimately the third party verification system will be introduced by the development of an evaluation tool (checklist) for 6 RC codes. However, many people think that member companies will increase the burden of work and new checks due to the strengthening of environmental safety regulations. Inactive participation in pilot projects
  - will implement an external advisory evaluation system (3rd party verification), focusing on the introduction of advanced environmental safety programs and the autonomous improvement plans by promoting an external advisory evaluation system, and the domestic application of self-assessment tools developed by Cefic.

#### ■ Future Plans

- Continuing environmental safety and health improvement activities by the implementation of 6 RC codes, and promoting works in the health field that have been a low priority in Korea.
- (Promoting settlement of external advisory evaluation system) Although it is difficult to introduce a self-evaluation system due to strengthened environmental safety regulations, focusing on autonomous improvement advisory to settle the system
- Strengthen cooperation with interested parties and promote SDGs to domestic companies.

### Topic 3

#### European Way to Responsible Care Innovating for Enhanced HSE Performances

(Mr. William Garcia, Cefic)



- (Overview of RC) A total of 62 chemical industry associations around the world, promoting RC in 70 countries (recently getting three countries in West Africa to join and expanding to 73 countries)

#### ■ Background of Rejuvenation Project

- In Europe, RC was introduced in the mid-80s, following the Seveso dioxin leak in Italy (1976).
- In the early stages, it was actively promoted, but several standards related to environmental safety (ISO, etc.) were introduced, and since then, the concept of sustainability forming (CSR, SDGs, etc.) was promoted.
- As a result, the necessity of differentiation between RC and new standards has been raised, and the EU recognized this as a crisis and a challenge.
  - Promoting the fact that large and small businesses can access multiple standards more easily with RC

#### ■ Key factors of the Rejuvenation project

- (Connected with standard) Connected RC with multiple standards. best practices can be seen not only in the ISO series but also in industry (and consider special situations in Europe such as Chemistry Can, SDGs of UN)
- (Maturity model introduction) In order to sustain improvement of performance, which is the basic spirit of RC, it is necessary to evaluate the current situation. Four levels of maturity are needed for this.
  - Each grade is based on the PDCA model, and is determined by answers for several questions (Six chapters, 101 questions, including risk analysis)
  - Maturity ratings can be measured by anyone, from employees to CEOs, to every field from manufacturing to transportation for chemicals, can be applied to the whole area.
- (Share of Information) It is important not only to improve the performance of RC but also to share best practices. Substantial support with which the associated toolbox is needed, and the activation project has been implemented since last year.
  - (Management Framework) Guidebook on how to increase the RC Maturity grade (80 pages in PDF format), which is about how to build a new management system, how to use self-assessment tools, and what results come after that.
  - (Self-assessment) Level test through 101 queries (local specificity can be considered) Excel-based user-friendly questionnaire divided into six chapters according to the global charter

- (Future Plan) Developing web-based tools to facilitate data collection and use (will be opened in June 2020)

### Topic 4

#### WHY RESPONSIBLE CARE?

(Mr. Barry S Dyer, RCNZ)



#### ■ Meaning of RC Promotion

- We cannot live without chemicals, but there are big risks if we manage them incorrectly.
  - The RC Initiative in Canada in 1985 focused on the dangers of chemical accidents after the 1984 Bhopal gas leak in India.
  - There has also been a global perception of the need to strengthen environmental safety and health in the chemical industry, and as a result of that many challenges have emerged.
- The chemical industry is responsible for protecting not only safety but also the environment. Without a healthy environment, humans cannot survive.
  - Considering how our products are delivered to consumers along with efforts to minimize the production of harmful products. (Proper handling of product labeling and transportation is needed by using GHS systems)
- RCs in each country should be adapted and promoted according to the situations they face. However, environmental safety and health

related activities need to be harmonized with RC.

- Need to expand influence of RC
  - (Promotion of good science) Misunderstanding and dissemination of science without its verification. Through outreach programs, it is important to communicate and share best practices.
  - (Sustainable improvement and encouragement) Need for continuous and active improvement activities. Support for various associations and companies
    - Communicate the expertise, know-how and resources of large enterprises to SMEs, and the importance of cooperation, such as support for Africa and developing countries. (Capacity-building support because it uses chemicals)
    - Experience of existing associations (success / failure) will help startups
  - (Strengthening of communication) Need to provide reasonable opinions against the criticism of interested parties.
  - (Expansion of members) Promotion of RC influence by expansion of associations and members.

## Session 2 Responsible Care and Sustainability

### Topic 1



#### Responsible Care and Sustainability (Ms. Jenny Heumann Godes, ACC)

- Sustainability Challenges in the Chemical Industry
  - The more the chemical industry expands globally, the more increase there is in the demands on and responsibilities of the industry.
    - The chemical industry faces questions about environmental efforts, process operations and product safety
    - Also, the chemical industry should strive to solve global problems such as climate change, plastic waste, resource use, and water conservation in the world.
    - Campaigns are often held around the world, including restrictions on chemicals and plastics.
- Striving for sustainability in the chemical industry
  - Chemicals are essential for a sustainable future, and the chemical industry has made significant contributions to the 17 SDGs of the UN.
  - The ICCA introduces the SDGs contributions of the chemical industry on its website (sdg.icca-chem.org).
  - The industry sets goals to reduce waste and emissions, and prioritize environmental protection and safety, and to make products contribute to the sustainability.
- Share examples of RC implementation by the American Chemistry Council
  - ACC Sustainability Initiative
    - (the beginning) The main focus of Responsible Care was on safety of processing facilities, especially the security code introduced by ACC after 9/11, which is recognized by the U.S. government as anti-terrorism technology.
    - (the middle) ACC members adopt the Responsible Care Management System to report performance on indicators of the environment, health, safety and security through three-way verification.
  - Development of sustainability Matrix
    - Develop indicators to measure the contribution of the global chemical industry for sustainability, and open it to governments, NGOs, and scientific organizations to prove the value of the chemical industry
    - Reduction of greenhouse gas emissions, cases of increasing energy efficiency, contributing to the construction of a circular economy with product recovery and recycling.
- (The role of the chemical industry) The chemical industry, as a global leader, is responsible for the safety of the local community and products and the well-being of the environment. We need to look at the industry by itself and take the right action to improve. We must move forward and accept the challenges that the chemical industry faces.

### Topic 2



#### JCIA's Activities toward UN SDGs (Mr. Kozo Tachibana, JCIA)

- ICCA's efforts to implement SDGs

- (2012.5) Cefic publishes sustainability report for the first time
- (2014.10) Update Responsible Care Global Charter written in 2005, including sustainability contribution
- (2015.12) Made sustainability T / F in RC Leadership Group
- (2017.10) Cefic Sustainability Charter published
- (2018.5) ACC Sustainability Principles published
- JCIA's efforts to implement SDGs
  - (2017.1) SDGs T / F composed of five member companies
  - (2017.10) Published three visions for the Japanese chemical industry
    - Made innovations with chemistry and contributed to a healthy and affluent life
    - Support global initiatives to solve environmental and safety problems
    - Promote the contribution of the chemical industry through dialogue with interest parties
  - (2018.3) Established SDGs subcommittee and hosted the 1st SDGs subcommittee (quarterly)
  - (2018.10) Hosted the 1st SDGs Working Group meeting (22 persons from 19 companies)
    - Settlement of in-house SDGs through interviews with members of advanced companies, surveys and analyzed SDGs, and building networks as core goal
  - (2018.12) Conduct case study of SDG, exclusive tab on JCIA website
- JCIA's other activities related to SDGs
  - In April 2018, an institution, called SCEJ (Society of Chemical Engineers, Japan), was established to review the contribution of the chemical industry to SDGs.
  - On September 7, 2018, the Japan Initiative for Marine Environment (JaIME) was established to collect information on settlement issues related to the marine environment
  - Planned that establishes an initiative for 'low carbon society' with 339 companies and two organizations to reduce 6.79 million tons of CO<sub>2</sub> by 2030.
  - Published annual reports including activities which chemical industry should do, JaIME, development of human resources, etc.

### Topic 3



#### Implementation of Circular Economy Program in Mailiao Industrial Complex (Mr. Cheng-Yu Yu, Formosa Plastics Group)

- (Circular Economic Program of Mailiao Industrial Complex) Taiwan's petrochemical industry contributes greatly to the economy of Taiwan and job creation, as the most relevant industry to other industries.
- However, Taiwan relies on imports (approximately 99%) for energy, and the need for a circular economy program increases, especially due to water shortages for climate change.
  - (Water) The industrial complex is usually bordered on farmland, sharing water with each other, often causing industrial water shortages because agricultural water is the most used at 94.41% (22.72 billion m<sup>3</sup>), in Zhuoshui River, Changhua-Yunlin area.
    - \* Governments and industry can encourage the participation of farmers in the circular economic program to adopt measures for water conservation.
- (CO<sub>2</sub>) The petrochemical industry's share of Taiwan's CO<sub>2</sub> emissions is 42.38% or more, which is the highest rate. Industry endeavors to reduce energy consumption and greenhouse gas emissions
- (Carbon) Taiwan has applied high pressure on carbon reduction in accordance with the Paris Agreement and domestic laws for its own greenhouse gas reduction.
- (Plastic) Considering changing the after-use disposal methods according to the use of plastic
- Circular Economy Response and Action of Formosa Plastics Group (FPG)
  - (Change Organization) The FPG promotes the concept of the circular economy, and implements reorganization to realize energy conservation and carbon reduction
  - (Introduction of circular economy) Since Taiwan lacks energy and water resources, the FPG Mailiao Industrial complex has actively promoted the circular economy, which is energy-saving and emission reduction, to reduce consumption of water, steam and electricity
    - But as in Korea, as laws and regulations are tightened, the higher energy saving targets need be achieved.
  - (Application of the unit process) After the stage four expansion of the 6th naphtha cracker project was completed in 2006, energy efficiency will be increased. The president of FPG Sets annual goals to encourage energy conservation and carbon reduction between two cross-plants and companies

- Conversion technologies and projects for low carbon
  - (Technology) FPG embodies the concept of "Think of It from Zero" and should develop an innovative technology for increasing energy efficiency to reduce emissions and use value added.
    - "Think of It from Zero" aims for zero wastewater, coolant and process material emissions and leaks.
  - (Project) FPG is promoting 12 saving projects for water and energy.
    - In 2019, the project combined with AI and big data analytics and integrated process intelligence, water and energy savings are expected to be maximized due to additional implementation
  - (Evaluation of performance) Mailiao FPG Industrial Complex operates 53 factories in about 2,603ha. There is a significant improvement in circular economic performance from 2007(completed to construct the complex) to 2018
    - Reduction of raw materials 3.9%, water 30.4%, energy 16.8%, emissions 95.3%, wastewater 24.9%, solid waste 1.0%
    - By 2018, 1,779 water saving projects have been conducted, saved 98,842,730 tons of water annually, 284 water saving projects are followed afterward Additional project will be carried out (estimated water saving: 18,217 ton / day)
  - (Future Plan) Plans to solve water shortage problems in the region with other circular economic ideas such as rainwater collection and wastewater recovery.
    - Also using the concept of a "cyclic economy" to extend the effect of carbon reduction of energy resource integration throughout the plant and will increase use value of resources and create more green business opportunities.

## Topic 4

### The Bromine Industry's Commitment to Responsible Care

(Dr. Kevin Bradley, BSEF)



- Introduction to the Bromine Science and Environmental Forum (BSEF)–International organization BSEF was established in 1997, and is dedicated to sharing bromine-based technology and studying how the industry contributes to the world.
  - (Key tasks) Funding technology research, collaborate with international and regional downstream companies, improved recognition of Bromine, collaborating with post-use processing, researching the contributions for sustainability of Bromine Industry the RC approach way by the Bromine side
- Efforts to Implement RC of BSEF
  - (Mercury reduction movement) In the fuel cell industry, bromine is used to reduce emissions of mercury. Join the partnership to share mercury reduction technologies in full activity.
  - (Development of new material) Bromine is the most widely used flame retardant (about 40% of the total). The development of new materials that are harmless to the environment and human body, such as butyl rubber, fuel cell, is under way (→ all BSEF member companies are participating in RC)
  - BROMAID-European Bromine Transportation Safety
    - (Definition) BROMAID is a system that enables European bromine companies to respond to each other immediately in case of a bromine related emergency, playing a role in maximizing the safety of bromine in transporting, storing and using bromine.
    - (System) Establishing a contact network that can work 24/7; developing routes the settlement team can reach within the shortest time; drawing up plans to minimize damage in case of accidents; and act as an agent before the company's representative arrives at the site.
    - (Future Plan) Produce bromine safety handbook and apply system in India, share best practices, etc.
  - Reduction of Bromine waste -The Polystyrene Loop Project. This project has been undertaken since early 2016, Pilot project is under way which makes the downstream industry process properly bromine, as an additive.
    - (Background) In the construction field, HBCDD (brominated flame retardant) is often used as a heat insulator and has not been managed due to a long service life of 30-100 years. (has been sent to landfill unconditionally)
    - (Effort) The ultimate goal is to retrieve bromine and minimize landfill by using innovative technologies, such as applying the "CreaSolv Dissolution process" technology, which incinerates insulation wastes at a super-high temperature.
- (Future Plans) Continuing research on innovative bromine products that meet social and economic needs, minimizing harmful effects on the environment and human society.
  - The RC Initiative will be launched so that brominated products can continue to be used, at the association level, becoming more responsible producers as bromine makers.
  - Developing ideas is related to RC, and planning to find SMEs that implement RC well among collaborating companies of members.

## Session 3 Countermeasures and Challenges Regarding Plastic Issues

## Topic 1

### Alliance to End Plastic Waste

(Mr. Baudouin Kelecom, RCLG)



- (AEPW Overview) As a private initiative, to settle plastic waste disposal issues, a new organization was launched without using existing organizations to sustain its independent actions and without external influences.
  - Recruited a CEO from ICCA, who also has work experience at UNEP, with 18 staffs in the secretariat in Singapore, and the interested parties of the plastic value chain comprise 42 member companies.
- (AEPW Activity) Strategies for Solving Plastic Problems
  - Raising fund of US\$ 1.5 billion to solve problems specifically and has raised US\$ 1 billion so far.
  - Improvement of infrastructure construction and waste collection system: 50% of the total budget is invested to prevent plastic waste generation.
- Introduction of project activity
  - (City Partnership) The STOP project, selecting one of the cities in Indonesia, is currently in progress. Connecting to job creation through local government funding as zero waste to the environment
  - (Global Information Project) Collecting and analyzing data on plastic waste research worldwide recently
  - (UN) Inducing local participation and local funding based on cooperation with the UN. Currently in India, the RENEW project (plastic flowing from river to sea), aimed to collect 100,000 pounds of plastic waste in the first year
  - (Circulate Capital & Second Muse) Supporting incubation of plastic waste disposal-related start-up companies
  - (Plug & Play) Plug & Play takes charge of a secretariat in Silicon Valley to collect plastic processing technology and receives financial support based on this
- (Future Plans) Currently, monthly performance announcements are conducted and checked by all CEOs. AEPW official report and newsletter will be published in January 2020

## Topic 2

### Actions for Marine Plastic Issues by Japan Plastics Industry Federation(JPIF) and Japan Initiative for Marine Environment(JaiME)

(Mr. Kotato Kishimura, JPIF)



- JPIF's plastic issues related activities
  - (Prevention Campaign of Pellet Spill) Started campaign for prevention of resin pellet spill from 1992
    - Surveys were conducted for companies that launched campaigns in the 2000s to confirm their anticipated results.
    - Especially for small companies, pellet leakage prevention is not fulfilled because of the lack of a system
    - In recent years, the Japanese government has for small companies produced, distributed and applied a manual for prevention of pellet spills.
  - (Declaration of the People) introduced in 2018, whereby the association or company announced by public declaration that their products will not be discarded as plastic waste, and signed by the representatives (as of September 2015, declared by 14 associations, 50 companies)
    - Will be promoting consumer goods companies and non-JPIF members
  - (Communication with NGOs and NPOs) Have been cooperating with other NGOs and NPOs since 2016, especially with organizations for riverside area environmental improvement.
  - (Cooperation with China) MOUSs signed with CPCIF and CPPIA, China's relevant associations, to jointly solve plastics issues. Held with CPPIA the first annual meeting in Oct 2019
- Japan Initiative for Marine Environment (JaiME)
  - (Overview) Established in Sep 2018 to respond to marine plastics issues, consisting of five associations and 47 member companies.
    - Four action plans: ① Sharing Information; ② Responding Policymaker; ③ Plastic Management in Asia; ④ Collecting scientific evidence data on plastics issues; and recently added a fifth educational item

## Topic 3

## Indonesia Plastics Waste Management Solution

(Mr. Edi Rivai, PT Chandra Asri Petrochemical Tbk)



- State of Plastics in Indonesia
  - (Consumption of PE, PP) per capita consumption is 19.8kg, which is very low, compared to Korea (141kg) and Thailand (66.4kg), but is continuously increasing due to population growth and economic growth (expected plastic consumption in 2030 is 30kg per year per person)
  - State of Marine Plastics Spill
    - The second-largest marine plastics discharger country following after China
    - Only 17.4% (71.3 thousand tons) of all plastics manufactured or imported from Indonesia (4.14 million tons) are recycled and 2.9% (11.9 thousand tons) are discarded.
    - Due to the geographical characteristics of more than 17,000 islands, and with most of the people living on the coast, most of the discarded plastics are spilled into the ocean (estimated 0.48 to 1.29 million tons per year).
- Efforts to overcome plastic issues
  - National Plan for Marine Plastics Management
    - Achieving 30% recycling rate by 2025 and reducing 70% of marine plastics
    - Indonesia is a linear economic structure, and plastics are buried after use. Efforts are being made to reduce landfilling and to increase the recycling rate with the circular economy. For this purpose, separate discharge and collection should be a priority, but it is not properly implemented due to low technology level, lack of public recognition, and lack of regulation.
  - Management activity of Plastic waste
    - (Promoting Recycling Business) Creating a large-scale plastic processing complex, currently participating in 1,527 companies, and planning to collaborate with related associations
    - (PR and Enlightenment) Conducting education on the production process of regeneration fuel using waste plastic, and promoting it using social media. As a result, we founded 10 plastic-based energy companies. The Government recognizes funding and partnerships (government, NGOs, businesses, academic circles) as key solutions for this problem.
    - (Clean Day) Plastic Cleaning Campaign. Seven million participants over two years

## Topic 4

## Biodegradable Plastic Market Status and Challenges &amp; SKC PLA Film

(Mr. Daeyoung Shin, SKC)



- State of Plastic Waste Issues
  - Recycling and reuse are key factors in resolving these problems, but there are practical limitations
    - In the case of a village in Japan, there are 56 classification rules, including by materials and uses, for separate collection.
    - Pre-treatment step required due to commercially immediate recyclable and reusable sewage or product cleanliness (decreasing of economic utility)
  - In the case of bioplastics made from natural materials, it is not easy for it to be used as an alternative because production cost is too high
- Biodegradable Plastic
  - It is a plastic that decomposes itself naturally by breaking the linkage of polymer by microorganisms, is applicable to both petrochemical and bio raw materials.
    - There are petroleum resins (PBAT, PBS), bio resins (PLA, TPS, PHA), and physical properties are changed by raw materials and processing methods.
  - According to international standards, biodegradable plastics should be decomposed more than 90% within six months based on temperature, humidity and oxidation.
  - Biodegradable Plastics Market
    - As of 2018, 600,000 tons, a market worth 2.3 trillion won market was formed (mainly through government regulation)
    - Major product groups are injection molding and thermoforming, and in the case of oriented film, there is no government regulation and the market growth is slow due to lack of consumer convenience
  - (Challenge) In Europe, the introduction of the Organic Recycling\* connect the plastic waste problem to the circular economy and

legislation.

- \* Separate collection bio-degradable plastics to produce compost and biogas in the bio waste plant. The compost is reinvested as raw materials and gas is used as a power source.
- Increasing demand for biodegradable plastics in the food packaging field due to the increase of single-person households, fresh food delivery, and various deliveries, and required institutional strategy (labeling, mandatory discharge of bio-waste).

## Topic 5

## Recent Trends of Environmentally friendly Plastics

(Mr. Sang-hyun Park, Lotte Chemical)



- Changeover of Paradigm – Plastic Cycle Economy
  - A total of 8.3 billion tons of plastic was produced during Korea's 1950-2015 industrial growth eras, of which only 600 million tons (7%) were recycled and 4.9 billion tons of plastic was discarded.
    - However, plastic is an essential material in modern society, and contributes Good eco-friendly comparing to raw materials from the nature.
      - \* In case of replacing 500ml glass water bottles with PET bottles, environmental costs were reduced by 74%
  - The cause of the plastic waste problem is the management before and after use, and through the changeover paradigm from the existing linear economy to the circular economy can lead to reuse and recycling of plastics and solve problems
- Eco-friendly Plastics Trend
  - Internationally, the market is divided into two major products, PLA (Poly Lactic Acid) and PBCT (Polybutylene carbonate-co-terephthalate).
    - PLA has the disadvantage of heat resistance and strength, and PBCT has the disadvantage of mold ability and hydrolysis in moisture.
- Lotte Chemical's goal – 5Re slogan
  - ① RPET technology development for (Recycle) bottle and open market are goals, ② (Reduce) reduction of weight, ③ (Reuse) Disposable cup → Development of multi-use cup, ④ (Replace) Development of high quality PLA and PBCT resin, ⑤ (Redesign) collaborates with affiliates to redesign for new uses such as banners and production of bag.

## Session 4 Best Practice of Process Safety

## Topic 1

## Best Practice of Process Safety Management System during Design and Construction of Plants(Mr. Mahajan Sarang, DuPont Sustainable Solutions)



- On May 10, 2010, a facility collapsed during the construction of the stack in Plant A, resulting in many people killed.
  - Although unexpected casualties occurred when the stack facility collapsed and hit a cafe, there was no construction personnel killed. The accident was a reminder that the risk assessment should be applied to all stages, including the construction stage.
- Not applying PSM (Process Safety Management) from the design stage can result in project budget increase, serious accident, and frequent changes to cause a great loss from the enterprise aspect.
  - The reason PSM is not properly applied from the design phase is the design team and project management team are not formed at this stage. Therefore, it is necessary to predict what can happen during the construction process accurately.
- As the first step to apply PSM effectively, it is necessary to organize a team with the necessary capability for each stage of the construction.
  - The executives and managers should understand and provide the capacity needed at each construction stage.
  - The teams with integrated capabilities should be formed and all departments should review the execution from the first stage of the plant construction to deduce necessary matters for each step.
- The second step is to understand the overall interval (schedule) related to the construction work.
  - The teams with integrated capabilities should be formed and all departments should review the execution from the first stage of the plant construction to deduce necessary matters for each step.
- It is necessary to organize departments with safety consciousness and capability and establish a specific strategy and the proper governance



mechanism. The top management should participate from the design stage, and the active dialog between departments and effective training of employees is continuously needed.

## Topic 2

### Journey of PSM Implementation at FPG, Taiwan

(Mr. Chen Chin-Chuan, Formosa Plastics Group)



- Formosa Plastics Group (FPG) experienced many fire accidents in 2010, and it led the government to order FPG to shut down its plants. As a result, FPG began an overall review of PSM implementation.
- It analyzed the current PSM system according to the four-step method with consulting from experts at the University of Texas and introduced the FPG's PSM system by adopting the facility maintenance program. The consulting deduced 38 recommendations, including organization, facility maintenance, process safety, outreach, emergency plan, and accident investigation plan.
- In 2010, the top-7 affiliates signed the pledge for environmental safety, and the personnel in the environmental safety department increased from 80 persons to 160 persons.
  - Moreover, it created the technical strategy part in the environmental safety department to review all environmental safety-related procedures and policies and whether the group regulation conforms to the global regulation.
  - Moreover, it formed the Accident Investigation Committee to analyze the causes of the accidents and establish follow-up measures to prevent accidents.
- FPG also began managing employee safety (workplace safety) and facility safety (process safety) separately.
  - Although the management focused on workplace safety initially, it began paying more attention to process safety since, although the frequency of accidents was low, the process accidents could result in devastating damages.
- It began building the accident database in 2014 and is continuously updating various accident data in the platform. In 2015, the Vice Chairman of FPG announced the FPG Safety Roadmap and declared that the safety was the highest priority. FPG currently manages the process risk based on past accident cases.

## Topic 3

### Process Safety in Chemical Park in China

(Mr. Xiao Li, AICM)



- In March this year, large accidents occurred in a pharmaceutical plant and a chemical plant that processed intermediate materials in China.
  - A fire broke out in the storage of hazardous chemicals, and it greatly affected the chemical industry. The government carried out extensive inspections and audits of all chemical companies, and many chemical companies filed complaints about it.
- As such, sustainable development in the chemical industry has become the subject of conversation among chemical companies in the chemical industrial complexes.
  - China made efforts to establish more RCs, and AICM took actions like establishing Sustainable Development Subcommittee to fulfill it.
  - AICM intended to actively utilize PSM, which is a good means to support the industries and planned to focus on SMEs rather than large companies.
- Although there were many difficulties in applying PSM to SMEs, AICM continued to support SMEs in chemical industrial complexes so that they understood the concept of RC and how to implement PSM. AICM continues to establish plans specific to each industrial complex to share the expertise and spread it to more than 140,000 companies.

## Topic 4

### Six Senses for Process Safety

(Mr. Bernard LEONG, Petrochemical Corporation of Singapore)



- When a fatal accident occurs at a chemical plant, it is possible to restore the damaged facilities, even if it requires high cost, but human casualties cannot be reversed. (Accidents can be lowered to "zero," but it is difficult to reduce human error to "zero.")
  - Although accidents can lead to injuries or deaths, human errors can occur at any time and can be reduced through safety training of

workers and the establishment of safety awareness.

- As it is possible to properly manage elephants only by utilizing all six senses of human beings, reducing accidents of factory facilities also requires all six human senses.
  - As it is possible to tame and manage elephants through repeated training, repeated education of workers on factory facilities is necessary.
  - The management and attitude to listen to even trivial sounds of motors, pumps, reactors, and other equipment are necessary to prevent roaring of elements (facilities).
  - Since not all employees have the same abilities, it is important to form a team that can supplement the weaknesses among the members.
  - It is also necessary for workers not to neglect minor and visible risks.
  - The 3R system (Retreat, Refresh, and Retain) is used to manage facilities effectively.

## Topic 5

### Disaster Prevention by Process Safety Assessment

(Mr. Wei-Ping Zeng, Kao Corporation)



- The analysis of the statistics of recent accidents in Japan shows that the portion of fire accidents has been increasing.
  - KAO Corp. analyzed fire accidents internally and confirmed that spontaneous ignition and runaway ignition occurred at the time of fire accident and is actively conducting the risk assessment and change management of facilities to prevent accidents.
- Regarding activities to prevent spontaneous ignition accidents, KAO Corp. investigated the causes of fire accidents that had occurred frequently since 2006 and deduced the measures to prevent accidents.
- The investigation of past spontaneous ignition accidents showed that the temperature of the facility that initiated the fire was lower than the ambient temperature, increasing the risk of spontaneous ignition. The simulation confirmed that the accident risk increased when the difference was 60oC or higher.
  - As it became possible to measure the start temperature of spontaneous ignition with the SIT device; we classified the risk level according to how much the temperature had risen after one week.
- We classified the risk level of more than 8,000 flanges in the workplace and manufactured aluminum foils to cover the flanges.
  - The frequency of leakage decreased, and it reduced the possibility of spontaneous ignition when the aluminum foil was applied to leaking areas like flanges.
  - We established the interval for the replacement of aluminum foil according to the risk classification of the facility and performed the inspection and management accordingly.
- Fire accidents decreased significantly since 2011, and it is important to the number of fire accidents has decreased significantly. It is important to create and manage rules specific to the situation and process characteristics of the enterprise rather than applying the single standard for the cause analysis of each accident.



## Session 5 The Status on Global Chemical Management and Countermeasures in the Chemical Industry

### Topic 1

#### Korea Chemical Regulations and Product stewardship

(Mr. Jeeseop Hwang, BASF)



- Trends in chemical substance regulations in Korea
  - (History) 1991 Enactment of the Hazardous Substance Act→2015 Enactment of the Chemical Assessment Act and Chemical Management Act→2019 Amendment of the Chemical Assessment Act→2020 Planned Restriction of the Occupational Safety Act
  - (Key amendments) 2019 Regulatory restrictions
    - (Chemical Assessment Act) Expanded subjects to all materials that are manufactured or imported 1 ton or more annually
    - (Chemical Management Act) Introduced the notification scheme for contents of chemical substances and assignment of the tracking number
    - (Occupational Safety Act) Obligated the generation of MSDS and its submittal to the Ministry of Labor and allowed the request for business secrets
  - (Response) Checking before regulatory enforcement
    - (Chemical Assessment Act) Checking of registration and advance notification before exporting
    - (Chemical Management Act) Checking of the product notification status and management of the tracking number
    - (Occupational Safety Act) Checking of MSDS and business secret approval and management of the MSDS number
- Precautions of Enforcement of the Chemical Assessment Act
  - (Polymer) Checking of exemption and review of a registration condition
    - (Exemption application data) GPC data and residual monomer content
    - (Polymer of low concern) Less than 5% of the number average molecular weight of 10,000 or more or less than 1,000 and less than 2% of the molecular weight of less than 500
  - (Common registration) Establishing standards for identifying homogeneity among council members
    - Need to check homogeneity and select appropriate test data based on physicochemical properties, structure, and application information

### Topic 2

#### Taiwan Chemical Management Regulatory Landscape

(Ms. Renata Hsu, TRCA)



- Trends in chemical substance regulations in Taiwan
  - (History) 2006 Adoption of GHS→2009 Beginning to select existing chemical substances→2015 Construction of existing chemical substance inventory→2016 Establishment of Authority of Chemicals of toxicity concern→2019 Selection of 106 substances subject to registration and beginning of registration
  - (Relevant agencies) Regulation of chemical substances by 7 agencies
  - (Management system) Classification of hazardous materials into 4 levels
    - ①Materials that do not easily decompose, ②Chronic toxic substances, ③Acute toxicity, and ④Substances of toxicity concern
  - It is difficult to regulate foreign companies since there is no original representative (OR), and the common registration is not obligatory.
- Trends in the Occupational Safety and Hazard Act in Taiwan
  - (Description) Registration of new chemicals, classification of hazard, exposure assessment and working environment monitoring, and designation of priority managed substances
  - (Management) 23 managed substances (2017), 1,088 priority managed substances (2018), 19,000 GHS execution materials (2016), and 101,089 existing chemicals (2015)
  - (Hazardous chemical labeling) Listing of risks and hazards above the critical point in SDS
  - (SDS business secret): Not applicable substances: Acute toxicity 1-3, Skin corrosion 1, Specific long-term harmful substances, etc.
    - Applied items: CAS No., chemical substance information, and manufacturer/importer/supplier name
    - Mandatory submittal: Applicant/representative information, protected items, hazardous chemical content information, the document confirmed to be national security or importer's business secret and description and certification of the hazardous component classification (difficult to certify)

### Topic 3

#### PH Regulatory Landscape on Chemical Management & Industry's Response to Compliance

(Ms. Cynthia Reyes, SPIK)



- Status of the chemical industry in the Philippines
  - (Size) Third largest manufacturing industry with 178,000 employees (2016) and 1,405 chemical companies
  - (Type) Divided into basic chemicals, chemical products, rubber products, and plastic products
  - (Association introduction) 80 member companies and established in 1977, Divided into the manufacturing industry, international trading, purchase, and logistics
- Trend of chemical substance regulation in the Philippines
  - (Regulating agency) Need to respond specifically for each issue since there are many agencies and organizations involved in the regulation of chemicals
    - DENR\*: Regulation of raw materials for manufacturing \*Department of Environment & Natural Resources
    - DOLE\*: Regulation of chemicals in workplaces \*Department of Labor & Employment
  - (Amendment) Removal of polymers from the procedure for pre-manufacturing and import of polymers
    - Requirement to reissue the license for handling, such as manufacturing, import, export, wholesale, and distribution, of specific materials
- Response
  - (RC code execution) Positive contribution to the industry with the “Product liability, process safety, employee safety and health, environmental protection, community awareness and emergency response, security, and transportation safety”
    - Increased credibility through the positive contributions by stakeholders
    - Effective method from the efficiency and cost aspects
    - Sharing of best practices and management that goes beyond the regulatory requirements
  - (Information sharing) Information sharing and submittal of opinion on common industry requirements through cooperation with other associations in the Philippines
    - ICCA to share best practices and provide the expert and funding support
    - Participation in the early stages of policy development to have the opportunity to provide opinions on international standards
    - Requirement to promote industrial cooperation in ASEAN and regulations based on science

### Topic 4

#### Product Stewardship in Japan

(Mr. Shinichi Umeda, JCIA)



- (ICCA product stewardship) Risk management throughout the entire lifecycle to promote the safe use of chemical products
  - (GPS (Global Product Strategy)) Chemical production and use goals to minimize adverse impact on human health and the environment by 2020 to improve product stewardship of individual companies and the entire chemical industry
- Execution of product stewardship of the Japanese chemical industry
  - JIPS (Japan Initiative of Product Stewardship) Japanese version of GPS (2009)
    - The objectives to improve enterprise credibility, strengthen the relationship with stakeholders, the expectation of regulation and cost-saving, and reduction of responsible problems
  - BIGDr (Base of Information Gathering, sharing & Disseminating for Risk management of chemical Products)
    - (Purpose) Construction of DB of hazard and exposure information, hazard assessment, best GPS practices, and information delivery throughout the supply chain (SDS, RMM, and GHS)
    - (Description) Hazard information and regulation, hazard assessment description, worker exposure assessment (Japanese workplaces), safety summary report, etc.
    - Encouragement of member companies to submit the data since they are useful for communication of hazard
- Future plan
  - (Sharing) Distribution of JCIA's BIGDr to SMEs and low-level users for the management of hazards
  - (Expansion) Increase of GPS to expand the use of Safety Summary and expansion of risk communication
  - (Voluntary participation) JCIA's plan to contribute to voluntary product stewardship through JIPS 🌱

# LANXESS

Energizing Chemistry

## Best Practices of RC Implementation

LANXESS is a leading specialty chemicals company with sales of EUR 7.2 billion in 2018. The company currently has about 15,500 employees in 33 countries and is represented at 60 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics.

LANXESS is recognized as a true global partner that can respond to the needs of local customers based on more than 150 years of technical expertise in the specialty chemicals and global production and R&D networks.

LANXESS considers sustainability as its top priority, conducting eco-friendly business activities and fulfilling its corporate responsibility. Consequently, the company has been listed in the Dow Jones Sustainability Index (DJSI) for the ninth time in succession, a global index to track the largest and leading sustainability-driven publicly listed companies. It has also met the criteria for inclusion in the FTSE4Good Index since 2011. Created in 2001 by the Financial Times and the London Stock Exchange the FTSE4Good is a main criterion for decisions about sustainable investment.

The objectives and goals of the company are inherent in the name, LANXESS, which is a compound of the French word "lancer," meaning "to set something in motion," and the English word "success" - indicating our determination and commitment to long-term success and renewal.

### LANXESS' corporate responsibility

As part of society, LANXESS is committed to balancing the demands of economics, ecology and society with a strong responsibility for people and the environment. With the guiding principle, "Good for business, good for society," LANXESS operates its business in the priority of sustainability.



LANXESS has announced its grand objective of climate protection to remove the greenhouse gas emission completely and achieve 'climate-neutrality' by 2040.

LANXESS not only measures its success in terms of profitability, but also by social impact of the business operation. The company provides products and solutions that can make a significant contribution to supporting its customers, protecting the climate and environment and improving the quality of life in the long term. LANXESS evaluates the sustainability of products in terms of economic, ecological, and social impacts every year to manage the sustainable product portfolio.

Safety is also a top priority of LANXESS. LANXESS prioritizes occupational safety and safeguarding health administration for the protection of the employees. Hence, the company requires and encourages compliance with safety, environmental and social standards at each location across the world. LANXESS supports initiatives such as Responsible Care® and the UN Global Compact, and it is certified according to international standards such as ISO 9001 and ISO 14001 🌱

### LANXESS wins Responsible Care competition 2019 of German Chemical Industry Association (VCI)

Specialty chemicals company LANXESS received the first prize in the nationwide Responsible Care competition 2019 from the German Chemical Industry Association (VCI). This year's competition was held under the motto "Sustainability in the supply chain." The company submitted the project "Resource-efficient manufacturing of leather chemicals" (ReeL).

In this research project, LANXESS has developed a completely new technology for tanneries. Thanks to a modular system, it is possible to recycle all the residues from leather production directly on site. Tanners can now produce X-Biomer retanning agents from these byproducts themselves and use them for the production of leather.

A medium-sized tannery produces about one to two tons of shavings per day. The waste materials used in the plant can

be fully recycled – no residues remain and no emissions are generated.

The pilot plant for the project was developed in cooperation with the Leverkusen research institute INVITE. The process has since been tried and tested at the third cooperation partner HELLER-LEDER GmbH & Co. KG and proved its feasibility. Eight-times larger production plants are currently being planned in cooperation with leading large-scale tanneries in Europe.

"Sustainability is also crucial for the leather industry and this award confirms to us that we are on the right track. In particular, the recycling of residual materials and the development of material cycles are essential topics," said Jewoong Ko, CEO of LANXESS Korea. "Our ReeL project is not only good for the environment, but also brings economic benefits for the tanners." 🌱

**LANXESS**  
Energizing Chemistry



LANXESS received the first prize in the German Responsible Care competition 2019 with new technology to produce X-Biomer eco-friendly retanning agents by recycling all the residues from leather production directly on site and using them for the production of leather.

## Lanxess' declaration to be "climate-neutral" by 2040

**Execution of projects to reduce greenhouse gas (GHG) in Belgium and India**

**Carbon footprint to be the critical indicator for future growth**

**Focusing on R&D capability on climate-neutral processes and technology innovation**

The German specialty chemical company Lanxess announced the impressive climate protection goal of achieving "climate-neutrality" by fully offsetting GHG emissions by 2040.

The company also plans to reduce the current GHG emissions, which is currently 3.2 million CO<sub>2</sub>e (carbon dioxide equivalent, GHG emissions converted to the equivalent amount of carbon dioxide emission), to 1.6 million tons by 2030.

"We need global efforts to achieve the Paris Convention's goal of lowering the global average temperature rise to less than 2 degrees. Lanxess intends to fulfill its responsibility as a global specialty chemical company and become a more sustainable partner to its customers by achieving climate-neutrality by 2040. The efficient use of resources can lead to enough long-term cost-saving to consider that climate protection is part of our business," Matthias Zachert, the CEO of Lanxess, said.

### LANXESS' corporate responsibility

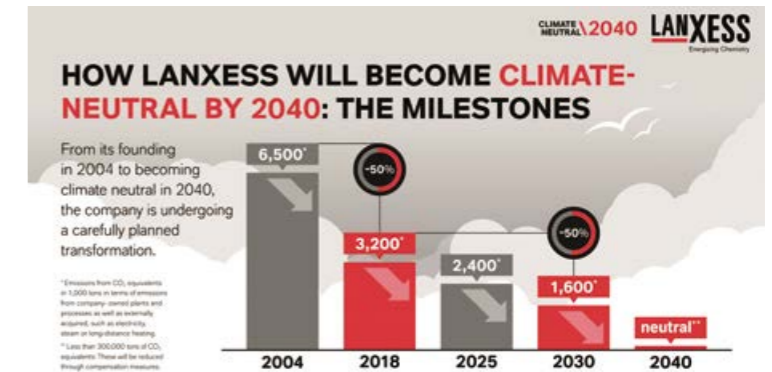
Lanxess is executing special projects to reduce GHG emissions within a few years. Significantly, one of them is the nitrous oxide decomposition facility that the company is constructing at its Antwerp plant in Belgium. The facility is scheduled to start operation in 2020 and reduce 150,000 tons of GHG emissions annually and 300,000 tons further by 2023 after the second expansion.

Lanxess is also converting all energy sources into renewable energy sources at its Indian plant. The company is significantly expanding the biomass and solar power generation and has the policy of not using coal or gas in the future. It can reduce additional 150,000 tons of GHG beginning in 2024. In addition to these projects, Lanxess plans to invest up to EUR 100 million to reduce a total of 800,000 tons of GHG emissions by 2025.



### Separation of the EHG emission targets and growth

As Lanxess is in a growing phase, it intends to reduce GHG emissions by each business unit even when the production increases. It plans to make investment decisions for organic growth and M&A based on the impact on carbon footprint and provide financial benefits to business units that achieve above-average performance in GHG reduction. It also plans to introduce GHG reduction as the evaluation criterion for the performance bonus of its managers.



\* Lanxess announced the impressive climate protection goal of achieving "climate neutrality" by fully offsetting GHG emissions by 2040.

### Strengthening of the production process and technological innovation

Lanxess is upgrading many existing production processes to achieve climate neutrality by 2040. As part of the effort, it plans to continue to improve its integrated production network, Verbund, by exchanging waste heat between facilities and integrating air purification facilities. Moreover, it plans to focus its R&D capability on climate neutral processes and technological innovations.

### Lanxess to have reduced GHG by 50% since its establishment

Lanxess has steadily strived to achieve its eco-friendliness goals and shown significant outcomes since its establishment. It reduced GHG emissions from 6.5 million tons in 2004 when it was established to about 3.2 million tons in 2018. The nitrogen oxide reduction facility at its Krefeld-Wuidingen plant in Germany, which has been in operation since 2009, contributed greatly to the effort. The project has received several awards, including the "365 Landmarks in the Land of Ideas" and the "German Nordrhein-Westfalen Responsible Care Award" given by the German Chemical Industry Association (VI). The company has also undertaken many projects to reduce GHG emission at its global sites and supports local climate change initiatives. Moreover, Lanxess reduced carbon dioxide and volatile organic chemical (VOC) emissions by 25% compared to 2015, and has already achieved its energy efficiency improvement target.

Lanxess checks emissions based on GHG as defined in the Kyoto Protocol and calculates the GHG effect by converting them into CO<sub>2</sub>e.

One can learn more about Lanxess's climate neutrality goal at [www.climateneutral2040.com](http://www.climateneutral2040.com).

## Members Focus



### LOTTE CHEMICAL | Lotte Chemical-Lotte Cultureworks

#### Launched the “Resource virtuous cycle created together!” campaign

Lotte Chemical and Lotte Cultureworks disclosed that they had launched the campaign to use reusable cups at Lotte Cinema movie theaters as part of the environmental protection program by reducing the use of disposable products. Lotte Cinema will provide reusable cups instead of disposable cups for beverages, such as beer and coffee, to the customers at its 21 theaters in Seoul and the capital region from November 13 to January next year. The reusable cups made of polypropylene (PP) produced by Lotte Chemical does not contain environmental hormone to ensure the safety of users regardless of the content. It can be reused like a tumbler because it can withstand impact and does not deform in boiling water.



### BASF

#### Application of coastal protection solution to Dadohae Marine National Park

The global chemical company BASF disclosed on August 20 that it is applying its innovative coastal protection solution, Elastocoast, in an area of 820 square meters along the coastline of Gwanmae Island in Dadohae Marine National Park. Elastocoast is used in structures to prevent erosion of natural banks near coasts and rivers.

It uses a relatively small amount of binder compared to conventional concrete or tar-paved coastlines and helps the structures to withstand even high waves with stability and flexibility. It absorbs the impact energy of the waves to prevent the rising of the waves and provides a stable environment for the natural ecosystem. It is considered as a technology alternative that can be easily installed with simple construction equipment and provides economic and environmental benefits. SBB, which manufactures the concrete blocks using raw materials supplied by BASF, executed the coastline protection project for Dadohae Marine National Park. Both companies have been researching ways of preventing coastal flooding and erosion using Elastocoast products since 2010. “We have worked with SBB for more than 30 projects applying Elastocoast in Korea. The product is installed in other parts of Asia, such as Pattaya and Pranburi in Thailand and Daqing River in China, to help to minimize damages caused by high and powerful waves,” said Larson Colberg, Director of Construction Projects at the Functional Materials Division of BASF Asia-Pacific.

### Samnam Petrochemical

#### Samnam Petrochemical’s Hansarang Volunteer Group to cooperate with suppliers to donate gifts worth 14 million won annually and provide voluntary services

On November 22, Samnam Petrochemical’s Hansarang Volunteer Group and the company’s suppliers donated 14 million won to Munsu Welfare Center and conducted briquette sharing activities in Yeosu. The employee voluntary group and suppliers have donated heating fuel and heating supplies, amounting to more than 120 million won, to low-income senior citizens since 2008. Ih Oh-shik, the Plant Manager at Samnam Petrochemical, joined Hansarang Volunteer Group and more than 20 employees of Samnam’s suppliers to deliver 5,400 briquettes, 6,000 liters of heating oil, and Warm Heart boxes containing household goods to senior citizens residing in the highlands. “We delivered briquettes and other materials that represented our true heart and caring. I hope that these items will provide some warmth to our neighbors in difficult situations through the winter,” Ih Oh-shik said after delivering the briquettes and heating supplies.



### Sharing of Side Dish with Care campaign

The Hansarang Volunteer Group of Samnam Petrochemical’s Yeosu Plant conducted the Sharing of Side Dish with Care event jointly with Ssangbong Social Welfare Center on November 9. The event included preparing and delivering radish kimchi and other side dishes to senior citizens living alone, disabled people, single-parent families, grandparents raising grandchildren, and other recipients of national basic livelihood guarantees.



### SK Global Chemical

#### Holding Eco-friendliness with Plastic Packing Material Forum

SK Global Chemical held the Eco-friendliness with Plastic Packing Material Forum at Arcadia Room at Grand Walkerhill Seoul hotel on November 1 to discuss solutions to environmental problems related to waste plastic and waste vinyl, which is a national issue. The event is considered a big step forward for making and enforcing eco-friendly policies by expanding the eco-friendly policy implementation from individual entities, such as enterprises and consumer organizations, to the collaboration of the private sector, public sector, and academia. The Forum was held after SK General Chemical, which produces and supplies a wide range of chemical products,

had proposed it after deciding that the environmental problems caused by chemical products, such as waste plastic and waste vinyl, have become an issue that must be solved through the cooperation of stakeholders in the chemical industry's value chain.

Attending this first Forum were more than 170 people from about 60 enterprises, government agencies, and academic associations that agreed on the need for eco-friendly packaging materials.

The companies participating in the Forum included chemical material affiliates of SK Group, such as SK Global Chemical, SKC, and SK Chemical, as well as the manufacturers of finished products using packaging materials and companies manufacturing intermediate packaging materials.

They were joined by the academic associations, such as the Korea Society of Packaging Science & Technology, the officials in charge of resource circulation at the Ministry of Environment, and the social enterprises such as Montsenu, Marine Innovation, and Ushisan. "There was a consensus that the joint response by private sector-public sector-academia, such as R&D by enterprise and policy and technology support by the government and academia, was needed to reduce the use of plastic materials, increase recycling of plastic products, and produce biodegradable materials. It led to the voluntary participation by all sectors," an SK Global Chemical official explained.



## SK Materials

### Launching Happiness Partnership as the standard business site for the disabled

SK Materials held the launch event for "Happiness Partnership," which is the name for its subsidiary-type standard business sites for the disabled, at its head office in Yeongju, Gyeongbuk on November 25. SK Materials established the Happiness Partnership after signing a business agreement for the establishment of the subsidiary-type standard business site with the Korea Employment Agency for Persons with Disabilities in May. The Happiness Partnership has constructed amenities for the disabled, such as inclined paths for wheelchairs, restrooms for the disabled, braille blocks, and parking areas for the disabled, and received the certification for the standard business site for the disabled from the Korea Employment Agency for Persons with Disabilities. Of a total of 29 employees in the Happiness Partnership, 10 persons have disabilities, and seven of them have severe disabilities. The employees with disabilities are in charge of various welfare support jobs, such as beautifying the indoor and outdoor environment, operating the laundry room, and managing the postal service. SK Materials plans to hire more people with disabilities and continue to identify jobs suitable for the disabled. "I hope that the launch of Happiness Partnership would be an opportunity to hope the economic self-sufficiency of the disabled and spread the positive perception of the disabled. I will spare no effort and support so that SK Materials can be a happy workplace for its employees to realize their dreams," SK Materials CEO Chang Yong-ho said.

The subsidiary-type standard business site is a system that certifies a parent company, which is legally obligated to employ persons with disabilities, to employ the disabled if its subsidiary employs a certain percentage of full-time employees as a disabled person. The scheme was established to help the disabled to secure stable jobs and the enterprises to fulfill their obligation to employ the disabled naturally.

## GS Caltex

### Issuance of a green bond worth 100 billion won to accelerate the investment in the environment

GS Caltex plans to issue a green bond worth 100 billion won to strengthen the investment in environmental facilities. A green bond is a special purpose bond specifically earmarked to be used for climate and environmental projects. It is the first time that GS Caltex has issued a green bond. The specific issuance conditions will be finalized after the demand forecast, and the size of the issuance will start at 100 billion won and can increase according to the result of the demand forecast. GS Caltex plans to use the capital raised by the green fund for expanding the environmental facilities at its Yeosu Plant. In particular, the company will invest heavily in facilities to reduce pollutant emissions, such as the install atmospheric pollutant reduction system and the odor reduction system. GS Caltex explained that the issuance of the green bond was initiated by the commitment to active, eco-friendly management.

GS Caltex expects that the facility investment with the fund raised by the issuance of the green bond will contribute to reducing the emissions of atmospheric pollutants, such as fine dust. "This issuance of the green bond is part of the management decision to build the foundation for future growth, such as improving energy efficiency and sustaining the production of environmentally certified products. We plan to establish the sustainable management system based on the fulfillment of social responsibilities by thoroughly managing the environmental management process," a GS Caltex official said.

## Hanwha Chemical

### Standing tall as the powerhouse in eco-friendly plasticizers

Hanwha Chemical stood tall as the powerhouse in eco-friendly plasticizers. The company announced on October 30 that its researcher Cheong Ki-taek received the Industrial Award at "2019 Material and Part Technology Development Awards," which was sponsored by the Minister of Trade, Industry and Energy and managed by the Korea Institute for Advancement of Technology, in recognition of his development of the eco-friendly plasticizer. Cheong Ki-taek was the leader for the development and commercialization of an eco-friendly plasticizer, named Eco-DEHCH, without phthalate. The eco-friendly plasticizer developed after 8 years of R&D passed various international safety tests conducted by the U.S. FDA and SGS (Societe Generale de Surveillance).

The eco-friendly plasticizer has become one of the specialty products of Hanwha Chemical. The company produces high-performance products, such as wallpaper, film, sheet, food packaging, flooring, and toys, without environmental hormones.

It has also acquired more than 10 domestic and foreign patents. Hanwha Chemical has registered the material in Europe, China, and Japan, and is accelerating the entry into the global market.

Its Ulsan plant is currently producing 15,000 tons annually, and the product has replaced more than 90% of the domestic market, which depended on imports. An official from Hanwha Chemical said, "We expect the eco-friendly plasticizer to replace the existing products in the plasticizer market as the phthalate content is designated as hazardous substances internationally, and its use is restricted," a Hanwha Chemical spokesperson said. 🌱

# RC Activity

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# NEWS



● Workshop for Improving Safety leadership in the chemical industry in 2019

The KRCC held a workshop for improving safety leadership in the chemical industry in collaboration with the DuPont Safety Consulting Division (DSS) on June 12 (Wed) at Yeosu, Mvle Hotel. The presentations were, about the importance of partners' safety, process of safety management, core elements of safety management, made by Consultant Chang-du Park, Jung-hwan Kim, Ba-wool Go Consultant of DuPont Safety Consulting Division. KRCC will hold seminars for executives continuously to prevent serious industrial accidents and establish advanced safety culture in the chemical industry in Korea by this event.



● Holding of the 2nd Implementation Committee in 2019

The RCRC held the 2nd Executive Committee on July 9 (Tue) at the meeting room of the Secretariat of the KRCC, with 16 members from nine companies including executive committee members. In the committee this day, the executive committee reported the results of application, as a trial, of RC checklist and future plans, and the results of participation in the RC leadership group in the first half of 2019. In addition, general manager of Samnam Petrochemical Gil-ho Jung presented 'the case of environmental safety management during maintenance and repair'. The RC checklist has been promoted since 2013 to prepare for the third party verification through the development of the RC code evaluation tool. In April this year, a trial application was conducted for LG Chemical's subsidiaries.

The executive committee reported, "The trial application of the checklist needs the company's willingness to grasp and improve the current situation. And we need more discussion for applying a big check-list." The Secretariat will apply the improvements derived from the trial application and review them by the next year's Executive Committee.



● Hosting 2019 Come! Fun World of Chemistry

'Come! Fun World of Chemistry' was held in Seosan (August 31), Yeosu (September 21), and Ulsan (September 28) for 4th and 5th grade students. The event has been held since 2003 to provide students with the opportunity to participate in easy and fun chemistry experiments through chemistry 'experience activities' and 'playing ground' programs

and to build a relationship of between communities and the chemical industry.

Based on the topic, "Clean Environment, Promise of Chemical Industry!" an event was held with participation of 830 students from about 146 elementary schools in Seosan, Ulsan, and Yeosu area. In particular, 47 member companies participated as volunteers for lead group of children and made parents and students increase interest in chemistry. The event began with a sand art performance to give an extraordinary way for understanding of how necessary and important the chemical industry is in our lives. And, the chemistry experience activities for each topic organized and joined by the teachers were followed. Participants were able to understand the chemical industry closely related to our lives, and the knowledge they learned in school through creative experiments.

Come! Fun World of Chemistry is an annual event, and it has improved on last year. KRCC adjusted the number of participants from each region so that children could experience chemical experiments in a better environment. In addition, we installed a photo zone to make parents and students use it freely, which was expecting the publicity effect through fun factors and social media. Furthermore, the company promoted spontaneous activities of environmental safety and health, and sponsors of the chemical industry to local residents through photo exhibitions, banners for advertisements of sponsors.

In the future, we hope that the experience booth will be connected to the actual cases of chemical companies, or that the program will be organized to help children learn the principles of chemistry and understand the information related to the chemical industry.



The industry circle (KRCC 19 members)

- Platinum.** Dongseo Petrochemical Co., Ltd. Lotte Chemical, SK Global Chemical Co., Ltd., LG Chemistry, Yeocheon NCC, Hanwha Total
- Gold.** Kumho Petrochemical Co., Ltd., Daelim Industrial, Korea Petrochemical Ind. Co., Ltd., DuPont Korea, Dongwoo Fine Chem, Lotte Advanced Materials
- Silver.** Lotte MCC, Evonik Korea, Air Liquid Korea, SKC, LG MMA, Covestro Korea, Kolon Industry

Government/Organizations

- Ministry of Trade, Industry and Energy / Jeonnam yeosu city / Chungnam seosan city / Ulsan Metropolitan office of education / Jeollanamdo office of education / Chungcheongnamdo seosan office of education / Korea Petrochemical Industry Association / Korea Chemical Industry Association

Academic circle (Teachers' group from 3 areas)

- Jeonnam area (Chemistry Lovers' group) / Chungnam area (Seosan science information education supporting group) / Ulsan area (Science education research association of Ulsan)

RC Activity

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## NEWS



- Chemical Industry Sustainable Development Forum held in 2019

KRCC, in collaboration with the Korea Chemical Industry Association, held the 2nd Sustainable Development Forum in chemical industry on Wednesday, September 4 at Korcham. Director of the Sustainability Strategy Department from the Ministry of Environment Hak-kyun Mang, Vice-president Seung-Yoon Lim, the Secretary General of the Global Compact Korea Association Seok-bum Park. There were 61 people from the chemical industry and related organizations in attendance. This event consisted of two sections: the implementation of the SDGs and consensus with the local community. Followed by presentations by each department, and panel discussion among stakeholders was followed to discuss the role and expectations of the chemical industry and make stakeholders united in harmony. Vice-chairman Seung-yoon Lim said that "Chemical products are used as basic materials for necessities of life, and the total output of Korean chemical industry reaches about 403 trillion won, which is closely related to various aspects such as economy and society. Sustainable development growth and performance should be pursued with the external growth and status of the chemical industry. In addition, the chemical industry aims for sustainable development to become a trial for other industries by taking the lead in spontaneous implement. Secretary General of the UN Global Compact Korea Association Seok-beom Park, said "The chemical industry, called 'the industry of industries,' implements the leading SDGs in the chemical industry, which will have a positive impact and will be a big acceleration the implementation of SDGs by Korean companies. I invited the chemical industry to lead the implementation of domestic SDGs with cooperation among each other. The Chemical Industry Sustainable Development Forum, which marks its second, is the first formal event held on the subject of sustainable development, and it will be expected to play a major role in filling the gap among interested parties by providing a place for dialogue between the fields.



- Holding the 5<sup>th</sup> Steering committee in 2019

KRCC held the 5th operating committee in 2019 with seven participants from the committee members on Wednesday, Dec 4, 2019 at the main meeting room of the KRCC Secretariat. In the committee, the result of APRCC 2019 was reported and settlement of accounts report in 2019, business and budget plan in 2020 were deliberated and were decided in its original form by the committee. 🌱

## KRCC's Major Events in 2020

- The 1<sup>st</sup> Board of Directors and the 21<sup>st</sup> Ordinary general meeting in 2020

Date: Tuesday, February 18, 2020

Place: Westin Chosun Hotel

- RCLG(RC Leadership Group) Meeting in the first half of 2020

Date: Thursday, April 20~21, 2020

Place: Washington D.C., USA.

- 2020 Come! Fun World of Chemistry

Sat, September 5,

2020 Sincheon Elementary School in Ulsan

Sat, September 12,

2020 Seoryeong High School in Seosan

Sat, September 19,

2020 Petrochemistry High School in Yeosu

- Chemical Industry Sustainable Development Forum

Date : In the middle of Sep~Oct, 2020

Place : Seoul(Up in the air)





# Members

## Regular Members

Air Liquid Korea  
 AK Petrochemical  
 ARKEMA  
 Axalta Coating Systems Korea  
 BASF Korea  
 Capro  
 Conell Bros  
 Covestro Korea  
 Daelim Industrial  
 Daesung Industrial Gases  
 Dongwoo Fine Chem  
 Dow Chemical Korea  
 Dow Corning Korea  
 Dupont Korea  
 Eastman Fiber Korea  
 Evonik Korea  
 GS Caltex  
 Hanhwa Chemical  
 Hanhwa Total  
 Hanju  
 Hansu  
 Hyosung Chemical  
 Ineos Styrolution Korea  
 ISU chemical  
 Kolon Industries

Korea Alcohol Industrial  
 Korea ASK Chemical  
 Korea Petrochemical  
 KPX Chemical  
 Kumho P&B Chem  
 Kumho Petrochemical  
 Lanxess Korea  
 LG Chem  
 LG MMA  
 Lotte Advanced Materials  
 Lotte BP Chem  
 Lotte Chem  
 Lotte Fine Chem  
 Lotte MCC  
 Merck  
 OCI  
 Polymirae  
 Samnam Petrochemical  
 SH Energy Chemicals  
 SK Global Chemical  
 SKC  
 SK Materials

Taekwang  
 Tongsoh Petrochemical  
 TRINSEO KOREA  
 Yeochun NCC  
 Yongsan Chemical

## 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  
 Metropolitan Process  
 Safety Council

The details of this event will be announced later, please show your interest and participate in the event.

Information on holding the 1<sup>st</sup> Board of Directors meeting and the 21<sup>st</sup> Ordinary general meeting in 2020

The 1<sup>st</sup> Board of Directors and the 21<sup>st</sup> Ordinary general meeting in 2020 are held for reporting and discussing business performance in 2019, business and budget plan and in 2020. The details will be released soon. Please join us and share some information and advice for Responsible Care promotion of chemical industry.

\* The dates will be announced later.

**Date.** Tuesday, February 18, 2020

**Place.** Westin Chosun Hotel

**Participants.** CEO, staffs of members, coordinators

