

# SHE

SK innovation’s goal of becoming a trusted company that grows together with society by achieving zero-accidents and pursuing environment-friendly management is at the heart of its SHE management. To this end, we have set standards and procedures that go beyond legal standards, and develop a management system and corporate culture that enables compliance by every employee. We strive to be a role model for the industry by sharing these results with all stakeholders.

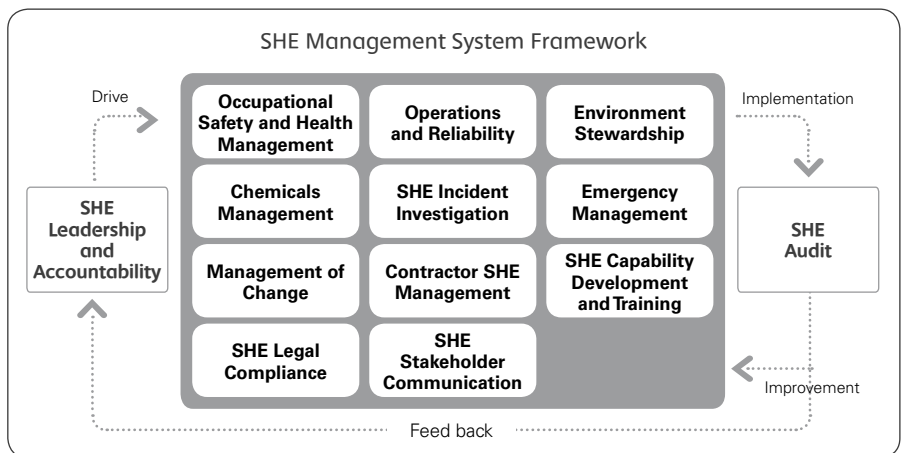
## The Importance of SHE Management

Neglecting Safety, Health, and Environment (SHE) management can lead to major accidents and cause significant damage to business operations. We recognize that effective SHE management is an essential factor for achieving sustainability. As many governments around the world have strengthened SHE related regulations, non-compliance can lead to disadvantages such as sanctions on business activities for offending companies. Therefore, companies must fulfill their social responsibilities and develop and implement standards relating to SHE issues above basic legal standards and disclose the results in a transparent manner in order to gain the trust of stakeholders.

## SHE Management System

SK innovation applies the concept of Creating Shared Value (CSV) as the foundation of its SHE management to gain the trust of the society and promote mutual growth, moving beyond traditional notions of corporate stewardship that focuses on simply minimizing accidents and pollutants. With this principle, SK innovation aims to establish and operate SHE management with global competitiveness in order to achieve the status of a leading global company and become a role model for the industry.

In order to attain this goal, SK innovation analyzed the key factors in safety management of leading global companies and re-established 13 management elements that included these key aspects. To execute these elements, we improved our operation system, which was applied to company policies and procedures. In addition, under the leadership of the CEO, we launched programs to strengthen execution and conducted regular audits to identify any required action, thereby establishing the 「Plan-Do-Check-Action」 cycle.



## Toxic Chemicals Control

SK innovation operates a structured and comprehensive chemical management system to protect its stakeholders' health and safety and safeguard the environment from any harm across the entire life cycle of chemical usage from import to production, transportation and sales.

### Step 1

Hazard Assessment

Confirm and improve safety

Compliance

#### Importing Chemicals from External Sources

Anytime SK innovation purchases new chemicals, a stringent examination process to accurately assess the level of hazard or toxicity must be conducted and conditions for safe storage and use must be assessed prior to import.

First, the Material Safety Data Sheet (MSDS) is studied to confirm basic hazard and toxicity data. Based on this data, a hazard assessment is conducted to evaluate the risk to our stakeholders, our suppliers' employees, our local communities and our production facilities, and a decision is made on whether to import the relevant chemicals. If purchasing the chemicals under current conditions is deemed potentially hazardous, necessary technical and managerial actions are implemented to remove the risk and to secure conditions for safe usage of such chemicals.

In addition, all chemicals are registered in the internal chemical management system linked to the company's procurement system, where data on the chemical's regulatory classification and relevant permits can be accessed. This system ensures that key factors for legal compliance related to the chemicals are not overlooked, and utilized and managed in a timely manner.

### Step 2

Process/Facility Safety Management

MSDS Compilation/ Training

Chemical Materials Inventory

#### Using Chemical Materials in the Production of New Chemical Products

In order to prevent chemical leakage, most of SK innovation's facilities adopt a sealed design. We operate the Leak Detection And Repair (LDAR)<sup>(1)</sup> system to prevent even minor leaks that may occur in vulnerable areas such as the links between different equipment.

All chemicals used and manufactured in SK innovation are managed pursuant to the Material Safety Data Sheet (MSDS), which details toxicity, associated risks and emergency safety procedures. The MSDSs are displayed on site for employees and contractors to fully understand the MSDS.

Furthermore, we have established a chemical materials inventory that covers the type and quantity imported and used or newly manufactured in the company, along with the properties of each chemical in order to systematically manage chemical material data.

### Step 3

Examine / confirm regulatory standards

Provide MSDS

#### Transporting Chemicals Off-site or Selling to Customers

Chemicals produced in the manufacturing process or products that contain chemicals must comply with the domestic laws such as the Act on the Registration and Evaluation, etc. of Chemical Substances. They must also comply with the Registration, Evaluation and Authorization of Chemicals (REACH) policy and all relevant international conventions if they are to be exported. SK innovation has established a process to ensure all chemical products manufactured are in compliance with these standards and all necessary permits have been obtained prior to the transportation or sale.

In addition, we supply the MSDS directly to the customer and our stakeholders can easily access this information online through the e-MSDS system.

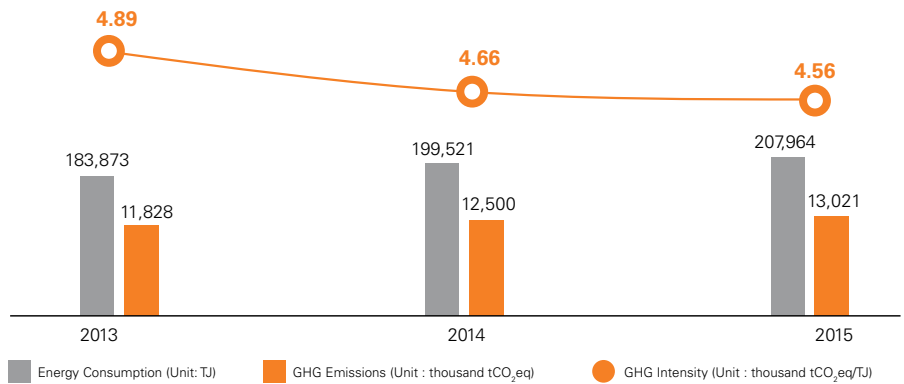
(1) **LDAR System:** Identifies points in equipment that are prone to leaks, regularly measures whether leaks have occurred, and enacts immediate repairs should a leak be detected in order to prevent chemical related accidents.

Climate Change Response

Reducing GHG Emissions from Energy Use

SK innovation and its subsidiaries have managed GHG emissions and energy consumption in accordance with the government’s Guideline for the Greenhouse Gas Target Management System after being designated as a controlled entity subject to the system. In 2007, it became the first company in Korea to operate an in-house emissions trading scheme. Based on this experience, we have set up an implementation system focusing on the Korea Emissions Trading Scheme (ETS) launched in 2015 and established a unique ETS operations manual to comply with the regulations and improve our emissions intensity in relation to energy use.

Energy Consumption, GHG Emissions and GHG Intensity <sup>(1)</sup>



(1) GHG intensity calculation excludes process emissions

Establishment and operation of GHG-Energy Management System

In order to systematically manage data such as energy consumption and GHG emissions related to production, SK innovation launched the GHG & Emission Management System (GEMS) which is linked to the Operation Information System (OIS). The GEMS gathers all the necessary data automatically on a daily basis to calculate GHG emissions from the OIS, allowing us to check GHG emissions levels, the probability to meet annual targets and the appropriate measures to take if necessary.



GEMS

Reducing Indirect Emissions

In addition to reducing production-related emissions, SK innovation is adopting various measures to reduce GHG emissions outside its production lines. For instance, we have adopted electric vehicles and installed charging stations for our business use as well as an ice thermal storage cooling system at our headquarters. In addition, we have participated in community energy systems by utilizing inactive offsite facilities to provide adjacent businesses with a cost-effective and stable supply of steam.



Corporate EV

## Emergency Response Management

### Emergency Response Principles

- 1st Protecting Life
- 2nd Protecting the Environment
- 3rd Protecting Assets and Corporate Image

## Establishing a World-class Emergency Response System

Due to the number of large-scale accidents that have occurred recently both in and outside Korea, demands for companies to establish emergency response systems are increasing. As such, SK innovation has enhanced its emergency response system by benchmarking best practices and targeting on three key areas: improving on-site execution capacity, strengthening management of large-scale emergencies, and strengthening emergency response capacity.

### Improving On-site Execution Capacity

In order to promote on-site emergency response, we have clearly set our priorities to protect life and environment before our assets and corporate image. All authority related to on-site emergency response activities is granted to the highest decision-maker for each facility and we have enhanced responsiveness by establishing separate protocols for internal and external reporting procedures. In addition, we have improved the emergency response classification system, stipulated the operation of the Combined Crisis Management Committee, and took into considerations of the impact on corporate image as well as the possibility of higher emergency in addition to the existing criteria for emergencies' classification.

### Strengthening Management of Large-scale Emergencies

We have re-established specific emergency response roles and responsibilities between our headquarters and sites to enable rapid response and minimize damage from on-site accidents. Headquarters attempts to support on-site emergency response and assure companywide sustainability. In addition, we have established the Guidelines for Operation of the Emergency Response Committee to enhance our rapid response capacity for large-scale emergencies. Moreover, we have adopted a standard reporting template for emergency response plans which allows for accurate and efficient written communications related to large-scale emergencies.

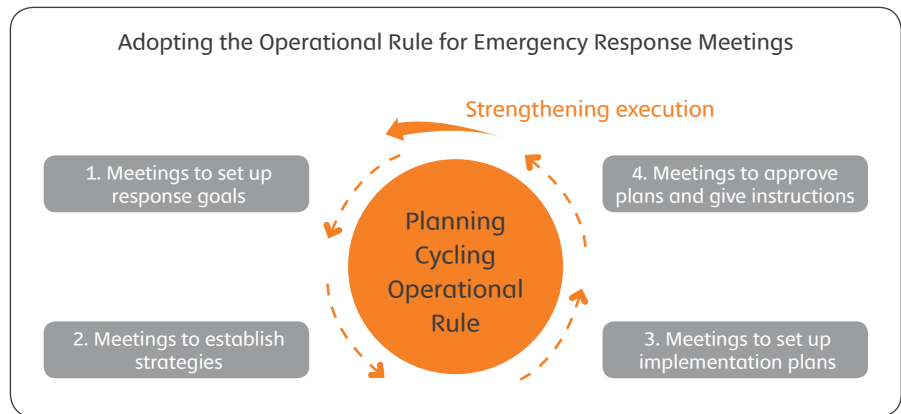
2015 Emergency Response Drill



Joint Emergency Response Drill (Ulsan Complex, Seosan Battery Plant, and others)



Joint emergency drills to respond to marine oil spills



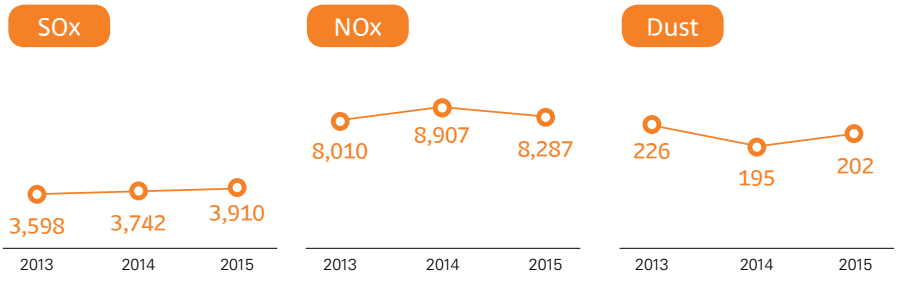
### Strengthening Emergency Response Capacity

We have clarified emergency drill components and frequency, and have made the Emergency Drill Report mandatory as part of our efforts to strengthen emergency response training. We regularly evaluate and improve the emergency response system and frequently assess organizational and personnel changes to enhance management capacity. Furthermore, we hold repeated and periodic drills so all of our employees are able to internalize emergency response procedures, allowing them to respond instinctively in the face of an actual emergency.

### Air Pollutant Control

SK innovation has adopted TMS at key pollutant emitting facilities to constantly monitor emissions and minimize air pollution. In addition, we operate odor prevention facilities to maintain pleasant air quality and operate a VOC (Voice of Customers) channel for reports on environmental issues related to our facilities. Details for each plant are available on page 70.

Air Pollutant Emissions (Based on SK energy, SK global chemical, SK Incheon petrochem) (Unit: Ton)



### Water Pollutant Control

SK innovation operates both a remote water quality monitoring system and a Membrane Bio Reactor (MBR), a high-efficiency biological wastewater treatment system. Additionally, 'Sour Water' which contains corrosives, is treated and reused as desalted feed water to minimize wastewater generation. We reuse some treated wastewater for fire extinguishing or landscaping and continually manage discharge to maintain pollutant concentrations to 10 – 40% below regulatory requirements. In particular, we have installed Wet Air Oxidation (WAO) facilities, an original technology we developed to treat toxic nitrogenous organic pollutants. We enhanced separate operation of high concentration wastewater created during production to manage ecotoxicity in wastewater as of January 2011.

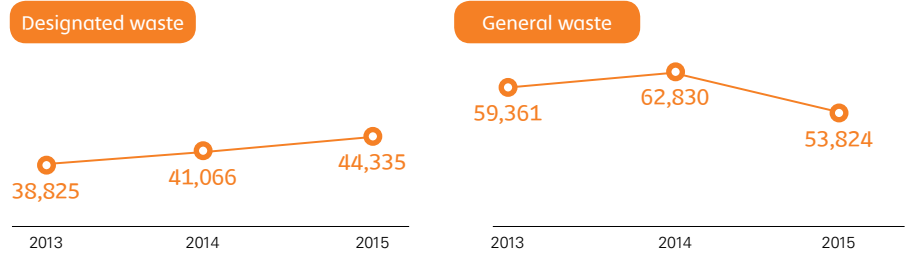
### Wastewater Treatment

Worksite	Wastewater Treatment Facility	Treatment method	Destination
SK energy (Ulsan)	Ulsan Complex Wastewater treatment plant	Biological & Advanced treatment	Public bodies of water (East Sea)
	No.2 FCC Wastewater treatment plant	Physiochemical	Yongyeon Wastewater Treatment Plant
SK global chemical (Ulsan)	PE/PP Wastewater treatment plant	Biological & Advanced treatment	Yongam Wastewater Treatment Plant
	EPDM Wastewater treatment plant	Biological	Yongam Wastewater Treatment Plant
SK incheon petrochem (Incheon)	SK incheon petrochem Wastewater treatment plant	Biological & Advanced treatment	Gajwa Wastewater Treatment Plant

## Waste Control

Our waste management system guides waste management, with waste either incinerated or sent to a landfill by a verified and specialized waste management company. Among designated waste, waste oil is sent to reused fuel plant to be turned into reused fuel. Metals are extracted from waste containing metals and turned into a resource to minimize waste generation. Please refer to page 72 for details on waste production by plant.

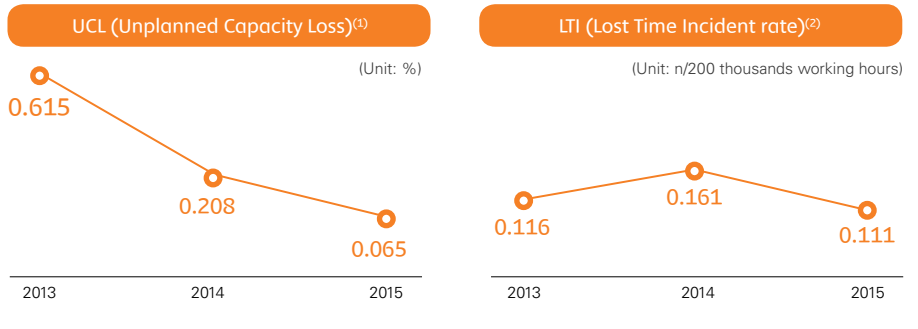
**Volume of Waste** (Based on SK innovation, SK energy, SK global chemical, SK lubricants, SK incheon petrochem) (Unit: Ton)



## Safety and Health Management at Worksites

We work to prevent on-site accidents and provide a healthy workplace. SK innovation has adopted the Process Safety Management (PSM) program made by the Ministry of Employment and Labor's and implemented regular monitoring and safety inspections to manage safety throughout all production processes. We also provide various facilities and programs to promote employees' healthy lifestyle. By continuing to offer diverse safety training, we solidify employees' SHE capacity and a culture of workplace safety. Through the Workplace Health Center in Ulsan Complex, on-site clinics, physical therapy room, fitness assessment & diagnosis center, health classes, and health management area in the R&D Center, we promote the health of our employees and their families.

## Safety and Health Indicators



(1) Time lost due to accidents as a percentage of the annual planned hours of operation

(2) Percentage of injuries for every 100 persons working 1 year (2,000 hrs)

## Future Plans

To achieve our vision of 'top global energy and chemical company' and secure the commensurate SHE competitiveness, SK innovation will enhance SHE execution capacity at each site and minimize SHE risks. We will perform regular SHE audits and provide training to reinforce employees' SHE awareness and implementation abilities, and also establish SHE management systems for our suppliers. Moreover, we continually analyze SHE regulations and enhance the hazard assessment systems to minimize SHE risks, and strengthen emergency response capabilities to prevent accidents. We will also actively promote stakeholder engagement and cooperation to enhance SHE capacity.