

# Advanced EH&S

LG Energy Solution established a systematic EH&S management system based on ISO14001 and ISO45001, and carries out various related activities.

With stronger environmental regulations and increasing customer demands, mainly in EU, it has become critical to identify and manage chemicals in materials and products and ensure eco-friendliness of a product. Keeping up with global trends, we are establishing in-house product management regulation and a preliminary eco-friendliness review system with the aim of securing 100% eco-friendliness in materials and products by 2023. To provide eco-friendly products and services to customers, we set a vision of 'Eco-Product Solution Partner' and established Chemical Assurance and Regulation Management system (CHARMs 2.0) that encompasses the entire process from raw material purchase to final product sales.

# Product Stewardship

## Building a Product Stewardship System

LG Energy Solution is committed to providing customers with eco-friendly, competitive materials and solutions and contributing to a sustainable future for customers, and thereby creating more customer value. To that end, we have set Eco-Product Solution Partner as our vision, carrying out a variety of activities to provide solutions that are effective and valuable in terms of environment and economy throughout the entire product lifecycle ranging from R&D to disposal.

## Strengthening Product Stewardship

LG Energy Solution aims to secure 100% eco-friendliness in products by 2023 as a key task of ESG strategy. The purpose of securing eco-friendliness in products is to prevent production and sales losses as a result of non-compliance with regulations and customer requirements by reviewing in advance the eco-friendliness of raw materials and products according to product life cycle.

### Monitoring Environmental Regulatory Trends and Establishing Product Stewardship Process

LG Energy Solution examines and monitors environmental laws, regulations, specifications, Voice of Customer (VOC) and accident cases related to our products to determine the direction and level of eco-friendly product design. In particular, we monitor Korean Act on Registration; Evaluation, Etc. of Chemicals; Chemical Substances Control Act; Occupational Safety and Health Act; EU REACH<sup>1)</sup>; SVHC<sup>2)</sup>; RoHS<sup>3)</sup>; SCIP<sup>4)</sup>; US TSCA; CA Proposition 65<sup>5)</sup>; Chinese Chemical Regulation; Conflict Minerals Policy, etc. We have established a database for chemicals used by the company and those regulated at home and abroad in order to prevent any violation of global regulations. We also take preemptive measures to reduce risks related to chemical regulations in global business.

The purchasing department and environmental safety department communicate periodically with suppliers regarding the eco-friendliness management of materials, and the quality department and CS team communicate with clients to guarantee the compliance with chemical regulations required by the relevant country and clients.

Detailed classification of harmful substances in Eco-SCM guidelines		
Level 1 (banned substances)	Level 2 (banned substances)	Level 3 (reduced substances)
<p><b>Substances that are considered harmful to the human body and the environment, which are currently prohibited by law at local and national levels, are prohibited from intentional use on all items traded with LG Energy Solution.</b></p>		
<p>Environmentally harmful substances designated by the RoHS Directive, which are prohibited from use if the content exceeds the maximum allowable concentration of each material determined by LG Energy Solution.</p>	<p>Environmentally harmful substances regulated by national legislation or international agreements other than RoHS Directives, which are prohibited from use if the content exceeds the maximum allowable concentration of each material determined by LG Energy Solution.</p>	<p>Substances suspected to be harmful to the human body and the environment, which are not prohibited at this point, but are planned to be phased out from use in the future.</p>

1) REACH (Registration, Evaluation, Authorization & restriction of Chemicals): European law on registration, evaluation, authorization and restriction of chemicals  
 2) SVHC (Substances of Very High Concern): substances of very high concern, defined by EU REACH  
 3) CA Prop 65: California’s Safe Drinking Water and Toxic Enforcement Act  
 4) RoHS: Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS)  
 5) SCIP (Substance of Concern In Products): A policy that requires a company that launches a completed goods containing SVHC to submit declaration in advance, following a revision to EU WFD (Waste Framework Directive)  
 6) CHARMS: Chemical Assurance and Regulation Management system

### **Strengthening Chemicals Management System**

LG Energy Solution operates the Chemical Assurance and Regulation Management system (CHARMs 2.0) to take legal action and improve product safety throughout all processes from purchase/warehousing to use, shipping and disposal. We are strictly managing environmental hazards from the raw material stage according to the “Eco-SCM.”

We block all potential risk in advance using CHARMs 2.0 by acquiring chemical component information and compliance assurance from suppliers and reviewing harmfulness and legal response information before ordering raw materials. Such raw material information is combined with Bill of Material (BOM) information and regulation information of products. We are utilizing CHARMs 2.0 as a platform to identify eco-friendliness of our products and issue sustainable product certificate.

In addition, we are sharing the information required with quality management staff by providing up-to-date information on global product eco-friendliness, safety, and harmful chemicals regulations. In particular, we post legal regulations by nation and mandatory items to be observed in order to prevent violations of the law during business. In 2021, by improving the chemicals process and applying CHARMs 2.0 throughout the production bases in China, we will further strengthen the foundation for applying CHARMs 2.0 to all overseas business sites.

### **Building Capacity of Employees and Suppliers**

LG Energy Solution provides training so that employees are aware of the importance of product stewardship and carry out their environmental and social responsibility to the fullest in business activities, in accordance with relevant regulations. We provide working-level staff of the relevant departments, including procurement, development, and quality, with a variety of training programs, and respond effectively to requirements of countries and customers. Training programs include global trends of product-related environmental regulations, registration process of chemical substances of EU REACH and Act on the Registration, Evaluation, Etc. of Chemicals, preparation and management of Material Safety Data Sheets (MSDS).

To facilitate the compliance of suppliers with the relevant chemicals regulations, we organize an eco-friendly partnership conference every year. In 2020, it was held virtually due to the impacts of COVID-19. In this conference, We shared the information on domestic chemicals laws, the need for suppliers to respond to the Act on Registration, Evaluation, Etc. of Chemicals and Occupational Safety and Health Act, FAQs on chemical integrated management system, and support activities for energy accompanying businesses. LG Energy Solution will continue to communicate with suppliers so that they can properly respond to global chemical regulations.

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## Securing Product Stability

LG Energy Solution takes safety and quality as a top priority for all decision-making, develops fire prevention technology to make safe batteries that can withstand any danger, and applies such technology to batteries to build high-intensity comprehensive safety measures against fire.

### Special Fire-Extinguishing System

LG Energy Solution applies a special fire-extinguishing system that directly injects water into the grid module. The fire-extinguishing system LG Energy Solution developed for improved safety directly injects water into the battery module to put out fire when fire is detected from the smoke detector installed on top of the battery rack in the ESS system. This allows immediate response of the battery cell at an early hour of fire occurrence, thereby putting out fire quickly and preventing further spread.

This fire-extinguishing system, having recently passing the UL9540A Unit level test for ESS thermal runaway fire transfer by UL (Under Writers Laboratories), a global safety certification company, acquired a New Excellent Technology (NET) certificate from Korean Agency for Technology and Standards, is recognized as the most effective way to put out lithium-ion battery fires.

### Establishment and Implementation of Comprehensive Fire Prevention Safety Measures

LG Energy Solution secures battery safety by adopting triple safety devices, such as module fuses, rack fuses, and surge protectors, to protect the battery from external shock from the initial phase of battery design. In addition, the ground-fault detection device monitors insulation state of the battery in real-time and blocks battery power in case of abnormality to prevent fire.

Moreover, LG Energy Solution is continuously strengthening safety measures through periodic battery software updates and monitoring of installation sites.

## Product Labeling

LG Energy Solution labels products with a barcode that contains production area, production date, and model information. Such labels not only improve production management efficiency, but also facilitate tracking and management of which cells, modules and packs have been used in a particular vehicle. Along with labeling to provide product information, we also strictly comply with internationally required labeling regulations. For instance, we acquired UN 38.3 certification, air shipping standard for batteries, and GB/T certification, a Chinese battery safety testing standard that are marked on battery cells and models as barcode.

## EH&S Policy

ISO 14001 certified business sites  
Ochang, Daejeon, LGESNJ,  
LGESNA, LGESNB, LGESWA,  
LGESMI

ISO 45001 certified business sites  
Ochang, Daejeon, LGESNJ,  
LGESNA, LGESNB, LGESWA

## Environment, Health, and Safety System

LG Energy solution has established a systematic EH&S management system based on ISO 14001 (environment management system), and ISO 45001 (safety and health management system). We also established an environment, health, and safety policy to declare our consistent commitment to environment, health, and safety management. We have in-house safety and environment regulations and work guidelines for each business site to practice safety and environment management. Leaders engage in on-site management activities, with each organization conducting its unique activities to prevent accidents. When an environment or a safety accident occurs, it is managed systematically and employees are evaluated based on the severity of the accident to apply practical preventive measures.

## EH&S Policy

LG Energy Solution acknowledges that environment, health, and safety are the fundamental elements for securing competitive edge, and will faithfully practice the following principles for the continuous improvement of EH&S performance based on clear goals and bold actions.

### EH & S Policy

**LG Energy Solution acknowledges that environment, health, and safety are the fundamental factors for securing competitive edge, and thereby declares to faithfully practice the following principles for the continuous improvement of environment, health, and safety performance based on clear goals and bold actions.**

- We comply with laws and regulations, and establish and operate environmental safety regulations that lead the industry at home and abroad.
- We pursue continuous innovation throughout the entire production process to provide eco-friendly products and services.
- We create a safe and clean working environment and build a corporate culture in strict compliance with fundamental principles.
- We proactively support our suppliers and local communities to improve the safety and environment based on their social responsibility.
- We disclose information transparently and communicate sincerely with our stakeholders.

In order to comply with this policy, we put environment, health and safety first in all business activities.

CEO Kim Jong-hyun



## Environment, Health, and Safety Governance

The EH&S Committee of LG Energy Solution is a body that makes major decisions related to safety and environment. The Committee consists of senior managers in charge of EH&S of the headquarters and business sites. The Committee convenes each year to discuss the major EH&S issues of the company, outcomes of actions implemented, and future plans. The Committee sets the direction for leading the EH&S policy and reinforces responsible management. LG Energy Solution has in place an Occupational Safety and Health Committee at each business site consisting of the same number of labor representatives and management representatives to deliberate and resolve primary EH&S issues. The Committee prevents any risks that can occur at business sites and manages the health of employees. In addition, LG Energy Solution discusses measures to improve EH&S and shares exemplary case from a business site through EH&S internal consultation channels, team leads' meetings, and workshops.

## Activities to Prevent Critical Disaster

The EH&S management in business sites is gaining more importance than ever. With the growing demand to impose heavy criminal and administrative liability on companies, serious workplace accidents and man-made disasters could result in not only undermined reputation but also significant financial losses. In this regard, in-depth discussions on industrial safety and health, including the development of international standards for EH&S management systems and the enactment of the Serious Accidents Punishment Act are continuously taking place at home and abroad. As a global company, LG Energy Solution strives to embed a high-quality EH&S management system.

For example, a TFT was set up to eradicate serious fatal accidents, carry out intensive inspection of the the serious accidents occurring production process (May–June), list the hazards discovered in the inspection, and continuously monitor their improvement. We will continue to make efforts to ensure zero serious accidents and man-made disasters by establishing safety facilities/systems (e.g., hazardous areas/facility blocking devices) to prevent and mitigate potential risks and by establishing a corporate culture of complying with EH&S regulations.

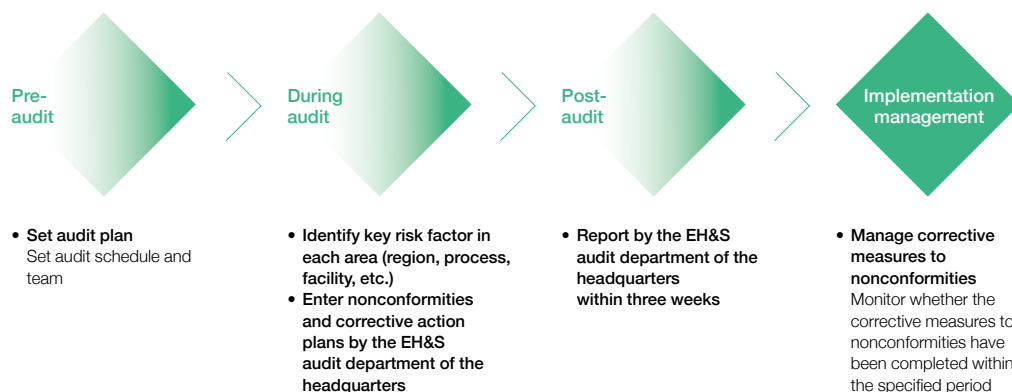
### EH&S Audit and Technical Service

The EH&S audit system at LG Energy Solution is subdivided into periodic audit, planned audit, and special audit. audit encompasses the EH&S management system, process safety, facility and workplace safety, firefighting, dangerous articles, and environmental impact assessment, and is conducted on business sites once every three years. The planned audit focuses on selected topics, such as safety audit on suppliers, facility safety management, emergency response system, and fulfillment inspection, and is conducted once a year. The special audit is conducted on business sites where serious accidents have occurred, or there is a likelihood of such, to prevent them.

In 2020, LG Energy Solution carried out 22 EH&S audits, including 8 periodic audits, 3 planned audits, and 11 special audits. We also conduct EH&S audits before operation at new establishments and extensions and continuous emergency response audits and training for early settlement of emergency response systems.

### Types and Process of EH&S Audit

<b>Periodic Audit</b>	<p><b>Regular audit of EH&amp;S weaknesses throughout all business sites</b></p> <ul style="list-style-type: none"> <li>• Target: Domestic business sites and overseas production sites (once every three years at each site)</li> <li>• Area: Environmental safety leadership, planning, support, operation, performance, improvement, etc.</li> </ul>
<b>Planned Audit</b>	<p><b>Audit carried out on the selected theme each year for managing EH&amp;S issue</b></p> <ul style="list-style-type: none"> <li>• Target: Domestic business sites and overseas production sites (once a year at each site)</li> <li>• Area: Safety audit of suppliers, facility safety management, emergency response system, etc.</li> </ul>
<b>Special Audit</b>	<p><b>Audit carried out at business sites where serious accident has occurred to prevent from recurrence</b></p> <ul style="list-style-type: none"> <li>• Target: Business sites where serious accident or man-made disaster has occurred or there is a likelihood of such</li> <li>• Area: Cause of serious accident, process with possibility of recurrence, etc.</li> </ul>



**Zero Waste to Landfill**

LG Energy Solution is proactively recycling wastes discarded from business sites to achieve zero waste to landfill. In the case of LGESMI in the U.S., it has recycled more than 90% of the waste discharged from business site and acquired the Landfill Zero certification from the NSF International, a global EH&S certification company, in 2018.

LG Energy Solution aims to acquire zero waste to landfill certification at all business sites to minimize the impact of waste disposal on the ecosystem.

**Health & Safety Program**

**Strengthening EH&S Competence**

Each business site of LG Energy Solution establishes and operates an annual education and training plan for working-level staff of EH&S-related departments to secure the safety of employees and improve the level of EH&S management.

Diversifying the programs by rank and duty	Education targeting all business sites and employees	Education targeting new employees and employees with change of duty	Education targeting special task workers	Education targeting suppliers
Elementary / Basic / Professional course	Education to empower EH&S mindset among employees	Education on EH&S precautions before starting service	Specialized education for employees at high-risk workplaces	Education to empower EH&S management of suppliers
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

**Improving EH&S Management Competence Through Performance Sharing Meetings**

LG Energy Solution hosts annual performance sharing meetings at domestic and overseas business sites to share the activities conducted to prevent EH&S accidents so that employees can enhance their work competence. The 2020 EH&S Performance Sharing Meeting was held virtually due to the impacts of COVID-19. The outcome of the meeting, including the selected exemplary theme of EH&S management, was video-recorded to share across global business sites.

The performance sharing meeting presented best practices of new EH&S technologies, exemplary cases of proactive health management, and suppliers that implemented an excellent EH&S management system. Also shared at the meeting are field-driven themes and poster sessions of each business site introducing major activities. These meetings contribute to the settlement of the EH&S-first culture by enhancing our pride in EH&S duties and offering a benchmarking opportunity among business sites.

**Reinforcing the Health Management of Employees**

LG Energy Solution measures the harmful factors in the work environment through an external agency every year to remove any health hazards at business sites. We try to ensure that all employees can work in a pleasant environment by establishing in-house standards that are stricter than the legal standards, conducting activities to prevent musculoskeletal diseases, and inspecting local ventilation systems.

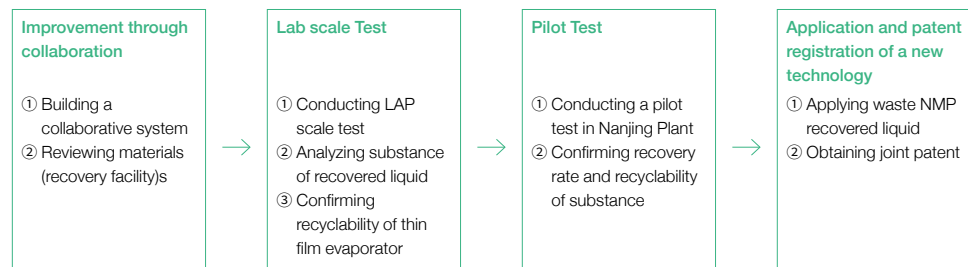
In addition, LG Energy Solution is operating a health care office at each business site to provide personalized medical services to employees. We provide personal health counseling and information by implementing a general health checkup on employees older than 35 years and those who have worked for five years or longer. Each business site has a variety of health promotion programs to minimize the latent health risks of employees and create a sound health management culture. A process is in place to provide employees with physical and psychological health care by undertaking periodic occupational stress evaluation and management and connecting high-risk group with in-house psychotherapist and/or professional hospitals.



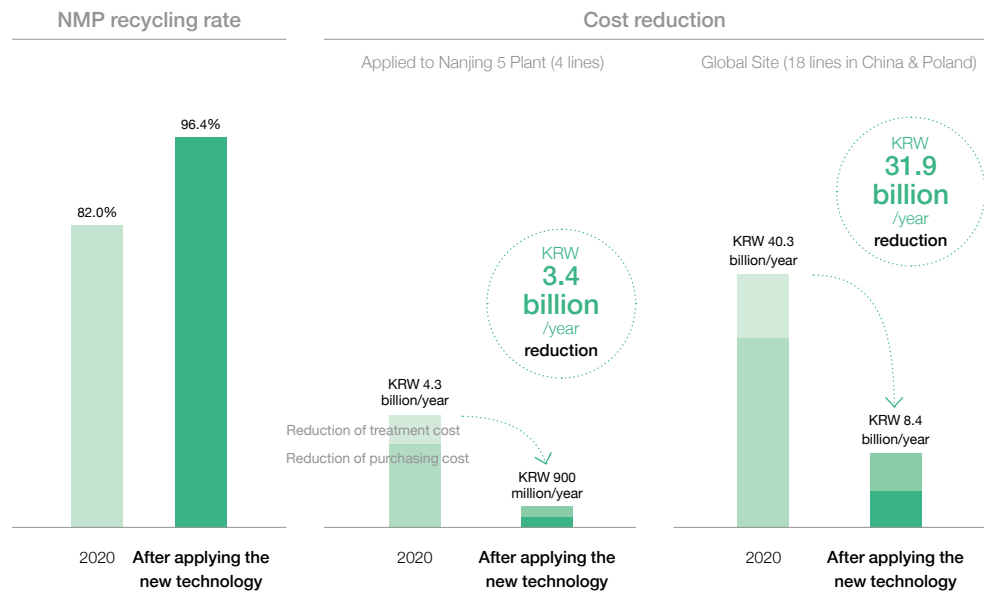
**Exemplary Case 1. Increased Recycling Rate of NMP (N-Methyl-2-pyrrolidone) by Applying New Environmental Technology (Nanjing, China)**

With continuous extensions, following business growth, Nanjing Plant saw continuous increase in the amount of hazardous wastes. Among them, NMP solvent waste accounted for about 85% of the total. Developing a new technology for recycling NMP has been thus important to reduce the risk of waste transport and consignment costs. To develop the technology, we established a cooperation system for technological convergence with Daejeon Institute of Technology, TFT of Separation Refining Technology, and Company M and verified the potential of introducing thin film evaporator technology through undergoing numerous experiments. Through additional experiments, the effectiveness of thin film evaporation technology for NMP recycling was verified and the final patent was registered. If applied to other processes in addition to Nanjing Plant, we can save additional costs for hazardous waste discharge and disposal consignment.

**Development Process**



**Quantitative Performance**



**Qualitative Performance**

- Jointly promoted patent registration with the holder of design technology to reduce development costs, and promoted early commercialization of the patent technology and secured intellectual property right
- Improved efficiency of process operation and reduced hazardous waste disposal

## COVID-19 Responses



Supports to overseas corporations  
341,750 masks, 17,072 hand sanitizers,  
600 thermometers supported



The prolonged COVID-19 is having a huge impact on the economy, society, and personal life worldwide. To overcome such challenges and crisis, LG Energy Solution is continuously providing various means of support to employees, suppliers and local communities.

### Strengthening Health Management in Domestic and Overseas Business Sites

LG Energy Solution puts employees' safety first and strengthens the health management of domestic and overseas business sites while taking safety measures of employees and suppliers in accordance with guidelines of the respective national health authority.

In order to prevent infection and spread among employees, the Global Environmental Safety Department under the Chief Risk Management Officer (CRO) regularly publishes preemptive quarantine guidelines on company bulletin boards, recommends to follow them, and communicates in a transparent and timely manner countermeasures and status of spread in case of in-house confirmed cases.

To prevent the inflow of viruses and manage health at domestic and overseas business sites, all employees are required to wear masks, and AI thermal imaging CCTV is in operation at the entrance of each office to monitor any fever cases.

We also conduct daily quarantine of common areas such as conference rooms and commuting buses and thoroughly follow the social distancing guidelines when using the cafeteria and smoking zones on the premises. Partitions are installed at the cafeteria to minimize contact between employees; employees can even order and pick up lunch boxes through mobile applications.

In order to ensure a safe working environment for employees, we continuously secure essential items such as masks, thermometers, and disinfectants, as well as support for COVID-19 PCR (Polymerase Chain Reaction) tests and vaccination leave. Anyone willing to be checked can test on the premises using the COVID-19 self-diagnosis kit at any time.

In particular, overseas employees who have difficulty accessing quarantine supplies are also provided with personal hygiene products such as masks, hand sanitizers, and thermometers to create an environment where all employees can work safely.

### Creating Non-Face-to-Face Business Culture

In order to prevent the spread of infectious diseases by minimizing employees' face-to-face contact, LG Energy Solution has prepared various policies to minimize infectious diseases by introducing telecommuting, adjusting commuting hours, and operating Smart Working Centers in various sites including the headquarters, Gwacheon and Magok R&D campuses.

We provide various tools to facilitate remote working such as WebX video conference system and Microsoft Teams. We create an environment where our suppliers, as well as LG Energy Solution, can be to be immersed in work and increase productivity.

### Strengthening Supports to Suppliers and Community

In order to support suppliers that are suffering from prolonged COVID-19, LG Energy Solution and LG Group affiliates provided a fund amounted to KRW 1.25 trillion in February 2021. We also help them secure funds at low interest rates through funds linked to Shared Growth Programs.

With the surge in confirmed cases, the hospital beds are running low for milder cases. To deal with this issue, we have offered LG Academy (Inhwawon) as residential treatment center since 2020. Further, we are conducting various activities to help the local medical system to recover by holding a blood donation campaign in collaboration with local governments.

In addition, with the aim of revitalizing local economy, Ochang Plant is striving to fulfill its social responsibility by conducting a "Companion Plant Movement" to support local flower farms.