

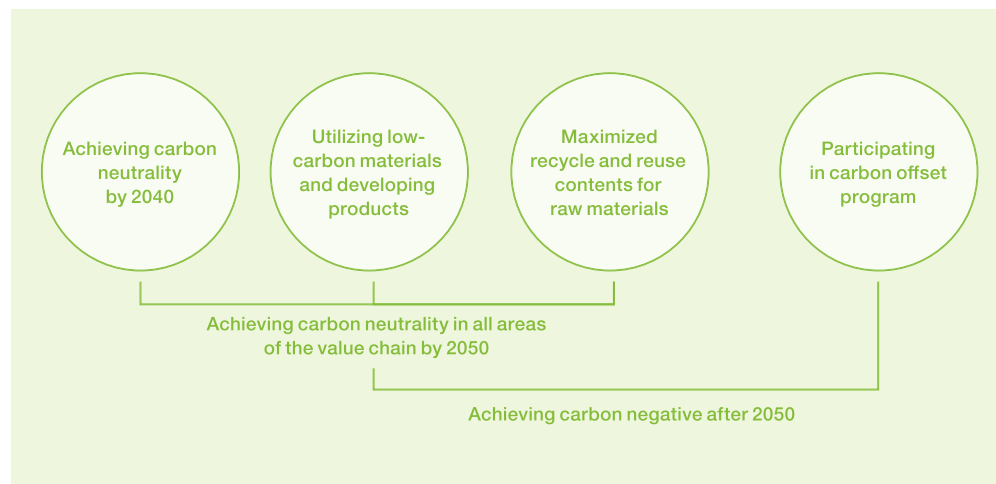
Beyond Carbon Neutrality



Climate change is proceeding at a much faster speed and is more widespread than we think, and it's a time that requiring companies to take immediate and active actions. According to the 6th Climate Change Evaluation Report released in August 2021 by IPCC (Intergovernmental Panel on Climate Change), despite efforts by various countries to curb carbon emissions, the average global temperature is likely to rise by 1.5°C within the year 2040. Maintaining the level of our efforts so far is lacking in terms of climate action. In order to actively respond to global changes, LG Energy Solution has set specific goals and strategies to achieve carbon neutrality. Not only that, but we also think about the goals that follow. In order to achieve carbon negative beyond carbon neutrality through carrying out additional carbon reduction activities beyond the company's business sites boundaries, we will install renewable energy and ESS facilities near our global business sites, and will cooperate with various stakeholders to support the energy welfare in areas that are vulnerable to climate change.

What are the goals of LG Energy Solution in regards to carbon neutrality?

LG Energy Solution has already committed to achieve RE100(Renewable Electricity 100%)/EV100(Electric Vehicle 100%) by 2030 and carbon neutrality of the entire battery value chain by 2050. This is because, as a leading company in the battery industry, we thought it is our duty to deliver a cleaner future to next generations that follow and to maintain sustainable growth around the world. In particular, by minimizing green-house gas emission generated through the battery manufacturing process, EVs being equipped with our batteries and ESSs will accelerate the realization of a carbon neutral society, and we will set further goals and implement intensive tasks to achieve them. First of all, by establishing an intermediate goal to achieve carbon neutrality by 2050, we have increased the level of specificity towards the goal achievement. After achieving RE100/EV100 in 2030, we intend to realize carbon neutrality in battery production scope (Scope 1&2) by 2040 as a mid-process, on the way to achieving carbon neutrality by 2050. In order to achieve this, we plan to consider renewable energy (biogas, hydrogen, etc.) to replace thermal energy (LNG, etc.) used in addition to electricity and developing secure project for carbon offset credit. Additionally, we will develop and participate in the global carbon offset program while achieving the goal of carbon neutrality by 2050. Ultimately, it is to drive the achievement of carbon negative. This is the goal after achieving carbon neutrality in 2050, and LG Energy Solution will increase sustainability by actively responding to climate change along with local communities and stakeholders.



How will LG Energy Solution achieve carbon neutrality?

Green-house gases generated during battery manufacturing are caused by energy uses such as thermal and electricity, which is used in the production process. Approximately 70-80% of the total emissions are derived from indirect emissions (Scope2 emission from power generation) from the electricity usage, and the rest is due to the combustion of fuel (Scope1 emission, LNG/Gasoline, etc). Therefore, to achieve carbon neutrality during the battery manufacturing process, it is necessary to convert electricity to renewable energy as much as possible, and to replace fuel with other energy sources along with minimizing energy use.

The Year 2030- RE100/EV100

In April 2021, LG Energy Solution joined RE100 and EV100 at the same time for the first in the battery industry in April 2021. The original goal of RE100 to convert 100% of electricity to renewable energy by 2050 was moved up by 20 years, and the company promised RE100 and EV100 (converting 100% of business vehicles to EVs) by 2030. Putting the goal into practice, LG Energy Solution's plants in Wroclaw, Poland (LGESWA) and Michigan, US (LGESMI) have already converted 100% of the electricity into renewable energy through the Green Pricing system and the REC (Renewable Energy Certificates) system, and the plants in Ochang, Korea and Nanjing, China are also gradually increasing their share of renewable energy usage. Our global production plants are looking to convert 100% of the electricity to renewable energy by 2025, and the non-manufacturing business sites such as R&D centers are preparing to have 100% conversion by 2030. From the time of mass production, it is the principle for new production base and joint venture (JV) to operate 100% of the electricity as renewable energy, and the procurement of renewable energy is considered from the time investment location is reviewed.

The Year 2040- Carbon Neutrality in the Company Areas

In order to achieve carbon neutrality within our battery manufacturing area (Scope 1&2) by 2040, the alternatives of fuel uses aside from electricity are needed. Fuel should be transition to renewable energy sources (biomass, hydrogen, or electricity) as much as possible, and leftover emissions derived other than electricity and fuels are needed to be offset by utilizing external carbon credit. In order to do this, we will promote electrification of facilities task, such as optimizing energy use through energy efficiency, finding alternative green energy sources, and transitioning fuel into electric boilers. In addition, we plan on developing carbon reduction businesses using batteries and reviewing carbon offset businesses like afforestation business.

The Year 2050- Carbon Neutrality in All Value Chain

The key to achieving carbon neutrality in 2050 is reducing carbon emission in the supply chain. According to the Life Cycle Assessment regarding battery, it has confirmed that the most of carbon emission is generated from battery raw materials than during the battery manufacturing process. Therefore, how effectively the carbon emissions of battery raw materials are reduced is expected to be the key to achieving carbon neutrality of battery. In order to do this, LG Energy Solution plans on expanding from "Tier-1" suppliers to "N-Tier," ultimately monitoring carbon emissions from all value chains from mining all the way to battery production stage, and supporting the suppliers' RE100 participation and carbon reduction activities. In addition, instead of raw materials that are directly mined, we will gradually increase the proportion of recycled raw material contents that have less impact on the environment, thereby contributing to the reduction of carbon from battery, and also establish a virtuous cycle system of battery raw material.

ESG by Me

We asked Sung hoon Lee of ESG Impact Team

LG Energy Solution joined RE100 in 2021. What was the reason for that and what are the plans for the future?

We joined RE100 in order to strengthen global leadership and secure ESG competitiveness, and we achieved early transition of 100% renewable electricity by completing the introduction in Poland plant (LGESWA) in 2019 and in the Michigan plant (LGESMI) in 2020. As a battery company, we are the leading promoter of the introduction of renewable energy. From now on, all production sites including the newly built ones will be converted to renewable energy starting 2025, and will expand to non-production sites such as the headquarters, Daejeon, Gwacheon, and Magok to complete the 100% renewable electricity transition starting 2030. We also plan to expand this 100% renewable electricity transition to our partners in the supply chain.

LG Energy Solution was the first among domestic companies to be selected as the Global RE100 Advisory Committee member company, what is the Advisory Committee?

The RE100 Advisory Committee of the corporate member establishes the main strategic direction and mid- to long-term roadmap of the RE100 campaigns, including taking measures to encourage companies to join RE100 to participate in using renewable energy, to procure renewable energy, etc. The Committee also plays an advisory role on policy proposals of each country as 2-year service term. As member of RE100 advisory committee group, we will focus on promoting global leadership of LG Energy Solution, networking, and escalating any useful opinions from the industry to ensure that carbon reduction is easily achieved in the battery industry and supply chains.



How do we manage the carbon footprints of batteries?

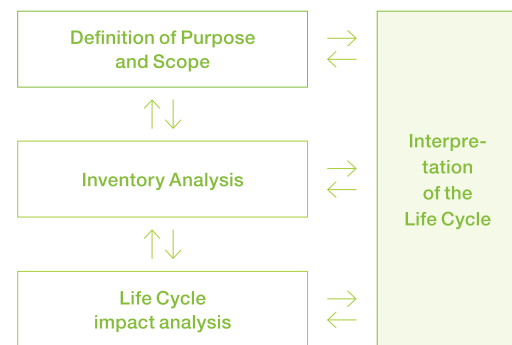
Overview and Status of LCA

LCA, life-cycle assessment is a methodology for assessing environmental impacts associated with all the stages of the life cycle (cradle-to-grave) from raw material acquisition and processing through the product's manufacture, distribution and use, to the recycling or final disposal of the materials composing, and the resulting environmental impacts of emissions into air, water, and soil. LG Energy Solution introduced the life-cycle assessment in 2019. Based on assessment results of the potential impact of our battery products, we communicate with our key stakeholders including the customers, and internally, we use this assessment as an important criterion and tool for drawing carbon intensity data of products identifying a hot-spot of raw material productions in our supply chain and establishing mid- to long-term carbon neutral strategies.

Assessment of Carbon footprint information

As demand for disclosure information of product environmental impact such as strengthening the regulations of battery carbon footprint and recycling in EU and advanced countries have increased, LG Energy Solution is making great efforts to estimate information on battery carbon footprint and to prepare its response to regulations. In particular, in order to carry out LCA that meet international standards, LG Energy Solution has established and operated comprehensive assessment guidelines, which reflect

LCA Process (ISO 14040)



Actions of Each Stage

- 1. Definition of Purpose and Scope**
 - Determining purpose/scope of LCA
 - Determining the target product and system boundary
- 2. Inventory Analysis**
 - Data collection for input and output material
 - Draw Inventory analysis results
- 3. Impact Analysis**
 - Evaluate inventory analysis result to identify impact towards global warming
- 4. Interpretation**
 - Analyzing the list and interpreting the result of the evaluation of the impact to meet the purpose of the research

ESG by Me

We asked Jerry Kim of the Energy Engineering Planning Team

Increasing the energy efficiency of processes and utility facilities is prioritized in order to reduce green-house gases in the business sites. Being in charge of energy, what kind of activities do the team carry out in order to reduce energy/green-house gases at domestic and foreign business sites?

At the Energy Engineering Planning Team, we have established 'Energy Visibility' to check the energy flow used in the business sites and has been using it to strengthen the management of energy-saving activities. We have completed the new certification of ISO 50001, which is the standard of international energy management system, by establishing a systematic energy-saving management process. We are also drawing improvement measures through the analysis of facility efficiency, using energy data from the G-UIS (Global Utility Integrated System). Additionally, we are continuing energy-saving activities, which are targeting production processes that are energy-consuming. Some of the specific activities include establishing



a green resource circulation system that reuses incinerated waste as steam, and introducing a recovery system for exhaust heat from the manufacturing process. Green-house gas reduction through energy efficiency is as necessary as RE100 to achieve our carbon neutrality goal.

What are some of the difficulties in your work?

Due to the high growth of the battery industry, the global production capacity of LG Energy Solution is rapidly increasing every year, and the resulting increase in energy use makes it difficult for us to achieve our carbon neutrality goal. However, LG Energy Solution is continuing energy-saving activities such as the introduction of high efficiency facilities through optimized facility operation, and I would like to take part in the transition of RE100 in all business sites by 2030 and achievement of carbon neutrality by 2050.

various global standard and product category rules for battery products and has established carbon footprint roadmap for individual products, which reflect our long-term carbon reduction strategy.

Supply Chain Suppliers' Reduction of Green-house Gas Emissions

According to the Hot-spot analysis through the performance of LCA, we have confirmed that our batteries generate about 20-30% of green-house gases during cell production and about 70-80% of green-house gases in raw material productions from supply chain, and especially, more than 50% of carbon emissions is generated from the 4 major battery raw materials such as cathode and anode active materials, separators, and electrolytes. LG Energy Solution identifies the environmental impact through Hot-spot analysis of the supply chain and established a supply chain strategy that mandates Tier-1 suppliers of the raw material suppliers to use 100% renewable electricity by 2025, in order to reduce Scope3 carbon emissions of the supply chain. In the future, we plan on upgrading accuracy on Hot-spot analysis and expanding the application of 100% renewable electricity to N-Tier suppliers.

Internal and External Activities and Future Plans

In order to respond to the strengthening of global regulations on green-house gas reduction and the mandatory disclosure of carbon emission, LG Energy Solution will consider introducing system that assessing immediate product environment impact results, and is planning to use the results could be in conjunction with 3rd party certified systems like European PEF and domestic EPD. Also, we are planning to participate in global initiatives such as RECHARGE (The Advanced Rechargeable & Lithium Battery Association) and GBA (Global Battery Alliance), thereby carrying out activities to enhance leadership by expressing opinions on the establishment of LCA assessment guidelines for new batteries.

Risk and opportunity analysis arising out of climate change

Category	Issue	Risk Factor	Opportunity Factor
Transition	Green-house Gas Emissions Trading System	<ul style="list-style-type: none"> • Increasing expense of purchasing Certificated Emissions Reduction (CER) due to the rising price of CER and the tightening of regulations regarding emissions 	<ul style="list-style-type: none"> • Selling surplus emission rights through activities to reduce green-house gas emissions • Acquiring additional emission rights through external carbon reduction business
	New Regulations Regarding Carbon Footprints (EU Battery Regulation, CBAM, etc.)	<ul style="list-style-type: none"> • Increasing costs due to new and strengthened carbon-related regulations (expenses for verification/examination and compliance) 	<ul style="list-style-type: none"> • Improving the mid- to long-term sustainability of the battery industry ecosystem
	Introduction of High Efficiency/Carbon Reduction Technology	<ul style="list-style-type: none"> • Increasing costs due to renovation of highly efficient facilities and new investment costs • Increasing R&D costs due to high efficiency/carbon reduction technology 	<ul style="list-style-type: none"> • Reducing green-house gas emissions in business sites and reducing energy costs • Expanding business opportunities through energy/carbon reduction technology
	Changes in Consumer Behavior	<ul style="list-style-type: none"> • Incurring expenses needed to establish and maintain various communication channels with consumers/stakeholders • Increasing R&D costs of developing high efficiency/low carbon products 	<ul style="list-style-type: none"> • Expanding the front industry market, such as that of EVs and ESS for home use, etc. • Improving company awareness as the leading company of climate action
	Increasing Renewable Energy Use	<ul style="list-style-type: none"> • Increasing costs due to renewable energy procurement • Increasing costs due to investment in renewable energy and expansion of infrastructures 	<ul style="list-style-type: none"> • Expanding ESS business opportunities to supplement intermittent nature of renewable energy • Cost reduction through long-term PPA contract for renewable electricity and power generation businesses
Physical	Typhoon. Flood. Drought. Rising Temperatures, which are Natural Disasters	<ul style="list-style-type: none"> • Having supply disruption of water and other utility in the business sites • Increasing investment in disaster prevention/prevention facilities • Incurring expenses regarding recovery and loss of business opportunities in the event of a disaster • Increasing operating costs for business site utilities, such as air-conditioning, heating, and dehumidification 	<ul style="list-style-type: none"> • Reducing utility consumption by improving the equipment and processes • Enhancing efficiency of the energy usage by adapting to utility recycling (waste heat/waste water) technology