

3.1 Product Green Design and Management



Vision and commitments

LITE-ON follows SDG12, and promises to practice Responsible Consumption and Production. Take the sustainable sustainability of the earth as the company's sustainable development vision. It is the company's goal to develop green products with low energy consumption and less environment-related substances by improving energy conversion, energy efficiency, and the recycling for products.

Management policy

The LITE-ON CSR code of conduct is based on Life Cycle of Thinking (LCT). The approach to green product design follows the 3R principles (reduce, recycle, and reuse), and adheres to the promise to reduce the impact of raw materials on the environment. LITE-ON keeps environment-related substances under effective control, and develops nontoxic, easy to assemble/disassemble, and environmentally friendly products with extended life and low environmental impact.

Strategy and policy

In addition to complying with international regulations, safety standards, and environmental regulations (e.g. RoHS, REACH, ErP, WEEE), LITE-ON products are designed explicitly to meet the demand for compliance with environmental certification standards (e.g. EPEAT, Blue Angel). This is one of the ways by which LITE-ON conducts green product management.

Results in 2019

Targets for 2019	Progress
Continued effort to make raw materials and other supplies 100% compliant with the EU RoHS and REACH Hazardous Substances Directive	100%
Energy conversion efficiency for power supply products to increase by 2% (SBT) by 2023 compared to 2016	1.80 %
UV-LED energy efficiency to increase by 60% by 2025 compared to 2018 ¹	21.15%
Increased the percentage of PCR resin in enclosure products by 28% or more	35%
Completed development of 1 product made from recycled styrofoam marine waste	2 items
Total prohibition of the use of Diisobutyl phthalate (DIBP)	Completed in January 2019

Setting future targets

Future goals	Completion
Continued 100% compliance with international Hazardous Substances Directive for raw materials	Ongoing maintenance
Improved energy conversion efficiency for power supply products by 2%(SBT) compared to 2016	2023
Improved UV-LED energy efficiency by 60% compared to 2018 ¹	2025
Reduced plastic in packaging by 20% compared to 2018 (1,000 tonnes per year down to 800 tonnes)	2025
Continued development of recycled and reused materials of a circular economy, and completion of three product applications.	2025

Note 1: The existing visible LED technology was close to being fully developed in 2018. Therefore, the market strategy turned to focus on developing ultraviolet (UV) products and on improving energy efficiency for products.

3.1.1 Product Life Cycle Assessment

LITE-ON take inventory for product life cycles by stage through raw materials, production, transportation, use, and disposal according to the ISO 14040/44 standards. Meanwhile, At the same time, LITE-ON is designed according to the environmental consciousness of the IEC 62430 standard, and it is integrated into the product design, and environmental considerations are made for each stage of the product life cycle.

Stage in the product life cycle	Standards and guidelines	Results and benefits
Raw material stage	<ul style="list-style-type: none"> · IECQ QC 080000 · LITE-ON Product Green Design Criterion · LITE-ON environmental control and standards on hazardous substances (LS301) · LITE-ON management procedures for restricted substances · LITE-ON management procedures for design development · LITE-ON green procurement guidelines 	<p>Reduce :</p> <ul style="list-style-type: none"> · For power supply products for laptop computers, LITE-ON works with upstream IC suppliers to develop a new generation of synchronous rectification IC. It combines components including resistors, multilayer ceramic capacitors, and metal-oxide-semiconductor field-effect transistors in one unit to cut 33 million or more pieces of active and passive components and reduce carbon emissions from raw materials by 1,000 tonnes CO₂e or more at the same time. · LED products use adhesion promoters developed in-house instead of traditional adhesion promoters. The approach not only increases yield to 11.79%, but saved the use of silica gel by 2.38 tonnes in a total of 13.3 million pieces Shipment quantity in 2019. It also reduces carbon emissions by 293 tonnes CO₂e. · Office machines are made more compact and their frames made thinner by removing the control panel and LED screen module. The material reducing design not only cuts the volume and weight of a product, but also saves the use of packaging materials by 140 grams. With the compact design, the carbon emission from each machine is reduced by 7.82 kg CO₂e. Based on the production volume in 2019, the total carbon emission can be cut by 735.3 tonnes CO₂e. · Optical disc drives relies on FW design to control spindle brakes. Removing foam padding for spindles creates a material saving of 0.65 tonnes and carbon reduction of 101.7 tonnes CO₂e. <p>Recycle :</p> <ul style="list-style-type: none"> · Up to 35% of the materials in product casing is PCR plastics. It helps reduce the use of virgin plastics by 12.36 tonnes or more (carbon reduction by 38.7 tonnes CO₂e). In addition, a number of products have helped brand name clients become EPEAT registered. · Cardboard boxes for street lighting products are made of recycled pulp. In 2019, it reduced the use of virgin pulp by a total of 32 tonnes or more and carbon emissions by 169.6 tonnes CO₂e. · The process of turning styrofoam marine waste into recycled plastics has been fully developed and certified with 76% PCR. If it for every 100 tonnes in production volume per year, The carbon emissions from raw materials can be reduced by 327.8 tonnes CO₂e.
Production	<ul style="list-style-type: none"> · LITE-ON green product design guidelines 	<p>Reduce :</p> <ul style="list-style-type: none"> · The compact design in smart office machines reduces material use and structural complexity and cuts production hours by 7.3%, which translates to a power saving of 108MWh and carbon reduction of 108 tonnes CO₂e. · The use of adhesion promoters developed in-house for LED products instead of traditional adhesion promoters not only increases yield, but makes the Encapsulation process more efficient. The improvement translates to a power saving of 159MWh and carbon reduction of 158 tonnes CO₂e.
Shipping and distribution	<ul style="list-style-type: none"> · LITE-ON green product design guidelines · Pallet standards (GB/T) · Container standards (GB/T) · Packaging standards (GB/T) · Loading, unloading and handling standards (SJ/T, JT/T, TB) 	<p>Reduce :</p> <ul style="list-style-type: none"> · The MFG Portal system are combined with shipping documents system of SAP to effectively manage logistics The Increase the loading rate of trucks or containers from the original 20% to 50% to more than 90%. It helps reduce energy consumption and carbon emissions during distribution and shipping. · The design of packaging materials for street lighting, enclosures, and optical disc drives products are improved to reduced the amount of cardboard boxes, cushioning materials, plastic bags and other materials used in packaging. The improvement also reduces carbon emissions. The reduction, based on the shipments in 2019, can be as high as 7,774 tonnes CO₂e.

Stage in the product life cycle	Standards and guidelines	Results and benefits
Product application	<ul style="list-style-type: none"> · IEC 62430 · ErP · LITE-ON green product design guidelines 	<p>Reduce :</p> <p>I. Products energy efficiency:</p> <ul style="list-style-type: none"> · Energy conversion efficiency for power supply products increased by 1.8% compared to 2016. The improvement, based on the shipments in 2019, can help users worldwide save close to 466 GWh in electricity and reduce carbon emissions by 248,000 tonnes CO₂e per year. · UV-LED energy efficiency improved by 21.15% compared to 2018. The improvement, based on the useful life of a product and application scenarios, is the equivalent of 7 GWh in power saving and 3,800 tonnes CO₂e in carbon reduction. · Smart shutter: With the following energy efficiency designs, carbon reduction can reach 3,480 tonnes CO₂e over the product lifespan. <ul style="list-style-type: none"> ■ The combination of AI learning algorithms and smart daylight control effectively reduces the room temperature by 10% to 20%, which cuts the user's cost of air conditioning in the summer by close to 2.1 MWh. ■ Meanwhile, the product is recharged by solar power. Charging can take place with as little sunlight as 300 lux. Compared to other similar products, the product can save 18 kWh in power consumption before becoming fully charged. ■ In the absence of the mobile app, the product does not require a network gateway to control, and saves gateway power consumption by 260 kWh. ■ In addition, the energy saving design in the remote control extends the battery life by three times compared to other similar products. This is equivalent to a saving of 90 CR2032 batteries. · Smart office machine: The two energy saving designs below, based on the shipments in 2019, saved a total of 19.06 GWh in power consumption during product use, and reduced carbon emissions by 18,980 tonnes CO₂e. <ul style="list-style-type: none"> ■ The product, while in operation, consumes less energy than China's Grade 2 requirement. Each unit of the product saves 29.59 kWh in power consumption per year. ■ The design of remote operation via a virtual panel on a computer or mobile phone enables setup to be completed without waking up the machine. The approach reduces energy consumption during operation by 173.18 kWh. · Energy efficient LED streetlights: Provided luminous flux is identical, LED lighting is used to replace traditional high-pressure sodium (HPS) lamps in streetlights. Energy efficiency is improved significantly by 75% or more, and the product lifespan is 5 times that of an HPS streetlight. The energy saving, based on a total shipment of 40,000 units in 2019, is 52.6 GWh and the carbon reduction is 28,000 tonnes CO₂e per year. <p>II. Consumable reduction</p> <p>Optimized product design enables fewer batteries to be used for wireless mice. A user can save at least 4 batteries over a period of three years. The carbon reduction, based on a total shipment of 24 million units over three years, is 10,200 tonnes CO₂e.</p>
Disposal & recycling	<ul style="list-style-type: none"> · Waste Electrical and Electronic Equipment Directive (WEEE) · LITE-ON green product design guidelines 	<p>Recycle :</p> <ul style="list-style-type: none"> · Given LITE-ON manufactures primarily optoelectronics and key electronic components and some ODM/OEM terminal systems, 95% or more LITE-ON products have to rely on brand name clients for recycling and reuse. Therefore, LITE-ON's approach to green design is to make its products easy to assemble and disassemble and made of recycled materials. The goal is to help customers recycle more effectively as end users. · The recycling rate for power supply products (currently 95% or above) are above the standard under the WEEE Directive, which requires the recycling rate be 85% or above. The success makes it easier for brand name clients to recycle system products.

LITE-ON offers a wide range of products, including power supply, optoelectronics parts, automotive electronics, computer peripherals, network communication, and industrial automation equipment. To make products more energy efficient and reduce their impact on the environment, LITE-ON makes decisions taking account into the entire life cycle. The decision making process may involve assessing environment-related substances in the raw material stage and evaluating environmental benefits through production, transportation, use, and disposal. Meanwhile, measures are taken to reduce the space and materials used in products and increase reuse in order to achieve the targets of zero toxins, zero waste, and zero carbon footprint.

3.1.2 Product Environmental Labeling and Declaration

Environmental product labeling

Environmental labels¹, according to ISO14024, are awarded by governments to products that, categorized under the existing system, have been certified by third parties to be compliant with or exceed the regulatory requirements. For example, Taiwan's Green Mark, it is awarded to quality products ranked in the top 20% to 30% among their peers in terms of environmental performance. Other environmental labels follow similar rules. Given most LITE-ON products are not used by end consumers, most Type I label applications are made on behalf of customers. Applications made by LITE-ON itself are listed as follows.

Name	Product type and quantity
Taiwan energy efficiency label 	4 products, including street lighting equipment, received Taiwan's Green Mark.
Energy Star 	<ul style="list-style-type: none"> · A category of products, such as scanner, received the ENERGY STAR label. · In addition, LED packaging arrays or modules have been certified by the US EPA Energy Star program.
Electrical safety regulations 	<ul style="list-style-type: none"> · Two categories of products, such as storage product and inverter, received product certification labels in Taiwan. · Two categories of products, such as scanner, MBdP, and inverter, received the China CCC label. · Two categories of products, such as projector, MBdP, and inverter, received the European Union CE marking.
China Ten-Ring Certification 	Scanners are certified by China Ten-Ring Certification.

Note 1: Environmental product labels are Type I under the international labeling system according to the ISO 14020 standards.

Environmental product declaration

An environmental product declaration², according to ISO14025, requires the completion of a full life cycle assessment (LCA) and quantification. It is unlike environmental labels and claims (ISO14021) ³, which makes only qualitative representations or consider only one stage in the life cycle. LITE-ON, in fulfillment of its green product commitment, provides customers the most detailed environmental information on its products. For key products, LITE-ON has been completing environmental declarations and devising rules for related products. The results are described as follows.

Type III EPD product	LITE-ON led product category rules (PCR)
Power supply units PA-1600-5A Series 	Power Supply - EPD PCR 2019:2.0 Disclosed at the Taiwan Electrical and Electronic Manufacturers' Association HTTP://WWW.TEEMA.ORG.TW/NEW-ACTIVITY-DETAIL.ASPX?INFOID=30298

Furthermore, all LITE-ON products comply with their directive of respective information and labeling requirements. In 2019, LITE-ON did not violate any product or service information or labeling regulations or receive any customer complaint regarding health and safety regulations for products and services.

Note 2: Environmental product declarations are Type III under the international labeling system according to the ISO 14020 standards.

Note 3: Environmental product claims are Type II under the international labeling system according to the ISO 14020 standards.