

4.2 Climate Change and Energy Management



4.2.1 Climate Change Policy

LITE-ON includes climate change as one of the major sustainability issues and key risks, and monitors and analyzes developments in these areas on an ongoing basis. Therefore, LITE-ON works hard on climate change mitigation to increase climate resilience and lower the risks from climate change. For climate change mitigation, we continue to follow the SBT approach for carbon reduction and analyze and manage internal energy consumption. Meanwhile, we rely on green design, green factory, energy management, and high performance energy creation, conservation, and conversion products and solutions to meet the aggressive SBT target. For climate change adaptation, we observe the 2 degrees Celsius scenario released by the International Energy Agency, and identify potential short-, medium-, and long-term risks arising from climate change based on international research, industry trends, and results of internal and external studies as well as our own decisions and judgments. We also follow the Task Force on Climate-Related Financial Disclosures (TCFD) framework to disclose climate change information and related risks and opportunities. We make climate-related financial statements one of the means of stakeholder communication.

4.2.2 Overall Impact and Challenges of Climate Change

LITE-ON has a climate change risk task force in place to handle potential physical and transition risks arising from climate change. The task force identifies risks and opportunities, assesses the probability and severity of each risk, and formulates appropriate countermeasures. Main climate change risks listed in LITE-ON's assessment in 2019 came from the requirements of clients, investors and other important stakeholders for GHG reduction as a company and compliance with product energy efficiency standards. Main climate change opportunities are found in the wide range of green products and services in the sustainability trends. LITE-ON's disclosure of climate risks and opportunities follows the TCFD framework as shown in the table below.

Governance	Strategy	Risk anagement	Targets and goals
<ul style="list-style-type: none"> The Climate Change Risk Task Force is an interdepartmental unit created in 2018. The task force is responsible for identifying climate risks, performing assessment within the scope of its responsibilities, and countering the effects of climate change. Results of climate change risks and opportunities identification, impact assessments, and management performance will be reported annually to the board of directors by the Corporate Sustainability Committee. 	<ul style="list-style-type: none"> Future effects of climate change are simulated based on the IEA 2DS. The results are used to set the GHG reduction SBT. Develop a wide range of products in the sustainability trends, to satisfy the market demands for new markets. 	<ul style="list-style-type: none"> Gather information on climate developments and trends in terms of external market, regulatory, technical and physical factors, evaluate the probability and severity of impact, and identify major climate risks and opportunities with potential impact on the business. Follow the PDCA model to refine environmental management systems, and combine the climate change risk management system and the consolidated corporate risk management system. 	<ul style="list-style-type: none"> Having been taking GHG inventory Scope 1 and Scope 2 and obtain ISO14064 certification since 2008. The scope of inventory was expanded to include Scope 3 in 2009. A full inventory of 15 categories in Scope 3 was taken and verified, disclosed on CDP Website in 2018. Work to improve energy efficiency for the company and its clients. Apart from SBT target, waste reduction, water conservation targets were also set to mitigate the environmental impact

4.2.3 Climate Change Response Measures

In terms of its climate change response strategy, LITE-ON continues to follow energy creation, energy conservation, and energy conversion as the means for mitigation, and focuses on renewable energies, energy management systems, process optimization, and plant operation improvement as key strategies. LITE-ON also makes plans for internal carbon pricing to provide a basis for investment strategies and risk management and to make a head start on preparations for potential effects of climate change. Regarding climate change adaptation, LITE-ON starts by identifying climate risks and opportunities, and develops low carbon products and automated energy saving technologies on an ongoing basis to stay alert to climate opportunities arising from global low carbon trends.

Development of renewable energy

LITE-ON supports the development of renewable energies. Going forward, LITE-ON will keep seeking suitable renewable energy suppliers, enter into green power purchase agreements, or promote public providers of renewable energies in order to achieve low carbon manufacturing. With the 1.35MW rooftop solar power system at the LITE-ON (Dongguan) plant completed in 2018, LITE-ON consumed 2,062 MWh of self-generated solar power in 2019. The amount was 42.5% higher than in 2018. The total consumption of renewable energy reached 45,062 MWh, which was 13.08% of total power consumption by the group.

Greenhouse gas emissions reduction measures

LITE-ON continues to work on improving efficiency of energy saving and business equipment in plants and offices. LITE-ON worked on upgrading and improving management of the lighting systems at the plants; improving production processes; upgrading air conditioning units; and improving management systems and other energy saving measures in 2019. In particular, the project to completely overhaul energy efficiency for equipment at the LITE-ON Thai plant made extensive use of the new in-house VFD hydraulic energy saving system, high-performance VFD controller and parallel control mechanisms, and power output monitoring by VFD. It was made possible for a 39 inverter to control a 49 motor, which achieved power efficiency and an expected power saving of 2,170 MWh per year.

Climate change mitigation strategies

Energy creation

- Develop renewable energies and increase the energy use from renewable sources

Energy conservation

- Optimize production processes and improve plant operations to effectively achieve energy and water conservation, waste reduction, and air pollution prevention
- Devote efforts to minimizing the impact of product packaging and business activities on the environment
- Improve energy conservation and environmental protection performance at all plants

Energy conversion

- Implement green design to improve energy efficiency for products and reduce the impact of product use on the environment
- Continue to encourage suppliers to explore innovative means of operation that have less impact on the environment



45,062
Renewable energy
consumption (MWh)



13.08
Percentage of renewable
energy used in worldwide



46,665
Carbon reduction
compared to base year
(tons) CO₂e



6
Acquisition of energy
management certification
for production bases

Climate change adaptation strategies

- Develop and expand the range of low carbon products and services
- Developing automated energy saving technologies and clean energy innovations
- Identification and financialization of climate change risks and opportunities

Identification of climate change risks and opportunities and financization

LITE-ON promises to support the Task Force on Climate-Related Financial Disclosures (TCFD) and follow the TCFD framework to disclose climate change information and related risks and opportunities. In 2019, we gave support for a translation project initiated by Ernst & Young Taiwan by performing translation review in Traditional Chinese for the TCFD. The work was intended to help companies and investors gain a better understanding of climate-related financial disclosures and their applications, thereby facilitating a sustainable banking and governance environment.

Furthermore, LITE-ON continues to follow international carbon trading issues. The company adopts the shadow carbon pricing methodology for key offices in Taiwan and China to determine internal carbon prices and for business units to communicate internally with each other. It is also part of LITE-ON's effort to start early in anticipation of changes in the energy market after new carbon reduction and carbon trading regulations and in mitigation of business risks.

Development of automated energy saving technologies

LITE-ON reconstructs quality manufacturing through automation and digital transformation. In 2015, the company was the first manufacturer in the country to introduce the first unmanned LED lighting production line. In 2017, it started implementing big data and IoT remote monitoring, and installed a large number of smart manufacturing systems. The shift toward use of family materials, family molds, and family jigs in production also helps to reduce the energy and resource input per unit product.

In 2019, for the purpose of accelerating the development of production equipment and recyclability and reusability of key machine parts, LITE-ON implemented standards for equipment design and data collection, including structuration of standard modules, standardization of machine testing procedures, and automated switching. The hard drive tray, for example, can have the hourly production rate raised by 54% and the percentage of automated assembly brought up to 95%.

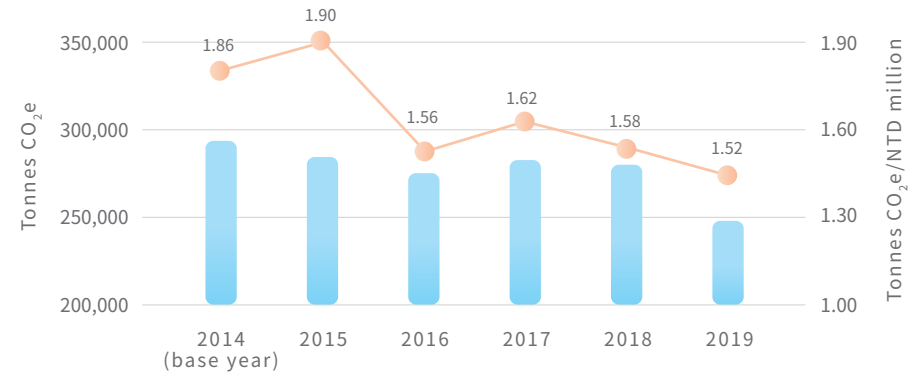
Regarding implementation of automated production processes, LITE-ON is currently capable of simultaneous operation with products, processes and equipment installed on the same platform. The structure is equipped with difficult, high precision automatic assembly, testing, and visual/mechanical inspection for complete control and data collection. The company has developed the capability to create differentiated design and production processes for manufacturing facilities, and will strive to achieve high speed unmanned operations in the future.

4.2.4 Greenhouse Gas Inventory (GHG Scope 1 and Scope 2)

In 2019, LITE-ON removed previously transferred camera modules department and mobile devices department, and added the Kaohsiung Operations Center and LITE-ON (India) to the ISO 14064-1 GHG verification before recalibrating the base year emissions. LITE-ON's Scope 1 and Scope 2 GHG emissions were 245,166.65 tonnes CO₂e (Market-based). The CO₂ emission reduction was 26,986.38 tonnes CO₂e (9.92%) compared to 2018 or 46,665.01 tonnes CO₂e (15.99%) compared to 2014 (base year). The carbon intensity was 1.52 tonnes CO₂e/NTD million, 3.66% lower than in 2018 and 18.32% lower than the base year 2014 that are aligned with reduction pathways, 17.27% reduction in 2019, of our SBT target.

Note: The camera modules SBG and the mobile device SBG were sold in 2018. For consistency in the calculation, the camera modules SBG and the mobile device SBG were removed from the 2014 and 2018 data, which were then recompiled accordingly.

2019 LITE-ON GHG emission inventories



GHG emissions in 2019

	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Total
Volume of Scope 1 and Scope 2 emissions - by gas type	238,774.07	5823.42	5.26	2,077.89	0.00	0.00	0.00	245,166.65

GHG emissions 2014-2019¹

	2014(base year)	2015	2016	2017	2018	2019
Greenhouse gas emission (Scope 1), Tonnes of CO ₂ e ²	11,321.17	14,929	14,297	13,578	11,771	10,135.79
Greenhouse gas emission (Scope 2), Tonnes of CO ₂ e ³	280,510.49	263,451	251,473	262,239	260,382	235,030.85
Greenhouse gas emission (Scope 1+Scope 2), Tonnes of CO ₂ e	291,831.65	278,380.45	265,769.83	275,817.23	272,153.03	245,166.65
Greenhouse gas emission intensity, Tonnes of CO ₂ e /NTD million	1.86	1.90	1.56	1.62	1.58	1.52

Note 1: The camera modules SBG and the mobile device SBG were sold in 2018. For consistency in the calculation, the camera modules SBG and the mobile device SBG were removed from the 2014-2018 data, which were then recompiled accordingly.

Note 2: Direct greenhouse gas emissions (Scope 1): fuel combustion in fixed equipment, production activities, fuel combustion in transportation equipment, and diffusion (e.g. fire extinguishers and refrigerants).

Note 3: Direct greenhouse gas emissions from energy use (Scope 2): purchased electricity and steam.

4.2.5 Greenhouse Gas Value Chain Inventory (GHG Scope 3)

To maximize the value of the LITE-ON value chain and to identify key factors in slowing down climate change, LITE-ON takes inventories of emissions from its own business activities as well as those from its entire GHG value chain. LITE-ON adopted the GHG Protocol Scope 3 Evaluator Tool to identify Scope 3 emissions in 2017. The company also followed the GHG Protocol Scope 3 Standard to establish related inventory methodologies. In 2018, LITE-ON completed a full inventory, verification, and disclosure of 15 categories in Scope 3. LITE-ON also followed emission hot spots along the value chain and extended carbon management over the entire value chain. In 2019, LITE-ON continues to work with value chain partners to combat climate change and global warming together and select 2018 as the base year to set a new target to reduce total value chain GHG emissions (Scope 3) by 2 million tonnes by 2030.

Scope 3 Categories	Category	Source identification	Scope of verification	Emission (Tonnes CO ₂ e)
01	Purchased goods and services	✓	Carbon emissions from raw materials purchased by the Power Division and the Imaging Division	3,139,061.61
02	Capital goods	✓	Office computer equipment purchased for the LITE-ON Building in Neihu	6.60
03	Excluding Scope 1 or 2 fuel- and energy-related activities	✓	Fuels burned by contractors at key offices around the world	5,025.07
04	Upstream transportation and distribution	✓	Miles in upstream transportation and distribution of raw materials for LITE-ON (Guangzhou) - Enclosure Division	51.43
05	Waste generated in operations	✓	Carbon emissions from processing waste generated in operations at key offices around the world	9,502.22
06	Business travel	✓	Miles flown on business trips taken by employees at LITE-ON's Taiwan offices in a year	3,252.89
07	Employee commuting	✓	Miles of commuting by all employees at key offices around the world in a year	4,478.56
08	Upstream leased assets	-	All fuel consumption and emissions by leased facilities and vehicles	Note 1
09	Downstream transportation and distribution	✓	Carbon emissions from miles of transportation and distribution of products for LITE-ON (Guangzhou) - Enclosure Division	33,699.50
10	Processing of sold products:	✓	Carbon emissions from power consumed by outsourced processing service providers of LITE-ON Li Shin (Huizhou)	776.44
11	Use of sold products:	✓	Server power supply, power supply units (laptop power)	3,294,129.45
12	End-of-life treatment of sold products	✓	Server power supply products, power supply units, chargers	196.09
13	Downstream leased assets	✓	Carbon emissions from power consumed by tenants in the LITE-ON Building	1,085.77
14	Franchises	-	LITE-ON Group	Note 2
15	Investments	✓	Carbon emissions from subsidiaries beyond LITE-ON's operational control	3,515.56
Total				6,494,781.18

Note 1: Included in Scope 1 and Scope 2 emissions.

Note 2: No relevant business.

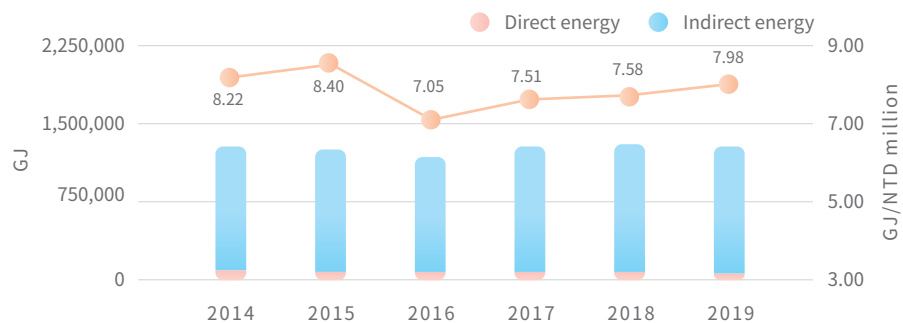
4.2.6 DIRECT AND INDIRECT ENERGY CONSUMPTION

95% or more of the total energy consumption at LITE-ON was indirect energy consumption that was primarily provided by purchased electricity, and followed by steam. Fossil fuels under direct energy consumption include diesel, petrol, natural gas, LPG, acetylene, and alcohol liquids were used mainly in emergency power generators, forklifts, company cars, restaurants, and boilers in dormitories. In 2019, LITE-ON consumed a total of 1,288,405 GJ in energy that was 20,215 GJ lower than in 2018. The consumption intensity was 7.98 GJ/NTD million, 5.29% lower than in 2018 or 2.93% lower than in 2014 (base year).

	2014		2015		2016		2017		2018		2019	
	GJ	MWh	GJ	MWh	GJ	MWh	GJ	MWh	GJ	MWh	GJ	MWh
Diesel	9,193	2,553	7,310	2,030	4,529	1,258	4,568	1,269	5,361	1,489	3,210	891
Petrol	14,949	4,151	15,533	4,314	13,355	3,709	13,396	3,720	11,165	3,101	11,535	3,203
Natural gas	36,170	10,044	22,606	6,278	22,235	6,175	26,353	7,318	23,533	6,535	19,398	5,387
Liquefied petroleum gas (LPG)	653	181	527	146	521	145	730	203	369	103	300	83
Acetylene	1	0	1	0	2	1	14	4	1	0	2	0
Alcohol liquids	1,985	551	2,822	784	4,572	1,270	4,266	1,185	3,798	1,055	1,776	493
Total direct energy consumption	62,951	17,481	48,800	13,552	45,215	12,556	49,327	13,698	44,227	12,282	36,220	10,058
Purchased electricity	1,212,236	336,723	1,163,899	323,296	1,137,935	316,084	1,213,069	336,954	1,251,097	347,517	1,240,318	344,523
Purchased steam	15,243	4,233	20,667	5,739	16,157	4,487	15,172	4,213	13,295	3,692	11,868	3,296
Total indirect energy consumption	1,227,480	340,956	1,184,566	329,035	1,154,092	320,571	1,228,240	341,167	1,264,392	351,209	1,252,186	347,819
Total energy consumption	1,290,431	358,437	1,233,365	342,587	1,199,308	333,127	1,277,568	354,865	1,308,620	363,491	1,288,405	357,877
Total energy consumption intensity (GJ/million revenue)	8.22		8.40		7.05		7.51		7.58		7.98	

Note: The camera modules SBG and the mobile device SBG were sold in 2018. For consistency in the calculation, the camera modules SBG and the mobile device SBG were removed from the 2014-2018 data, which were then recompiled accordingly.

Energy consumption and intensity 2014-2019



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4.2.7 Air Pollution Prevention

LITE-ON continues to take preventive measures through different management means, procedure improvement, and training in order to manage effectively volatile organic compound (VOC) emissions. Furthermore, LITE-ON has started implementing stronger outdoor air pollution emission controls at its plants in China since 2017. Inspection data from the plants, actual factory conditions and local environmental policies were taken into account in the design of two levels or more of comprehensive and reasonable emission treatment systems. LITE-ON made significant upgrades to air pollution prevention equipment in 6 plants in Changzhou in 2019. For example, the Human Input Solution plant, adopts a three level control system with precipitators, UV photocatalysis, and activated carbon based absorption. The system works with an electronically controlled emission treatment system to perform inspection, control, optimization, management, and decision making in the emission management process. The approach satisfies a range of requirements, including removal of VOC pollutants, optimized control, reduced consumption, and safety. NOx and SOx emissions from generators used for emergency or for testing in the plants and from hot water boilers in the living area were considered trace amounts.