Audit Report on Energy Improvement

Name of the organization	Module Business Unit of Foshan NationStar Optoelectronics Co., Ltd.
Address	No.18 Huabao South Road, Chancheng District, Foshan City
Audit standards	1) Requirements for Management system for energy GB/ T23331-2012/ISO 50001:2011 2) Certification requirements for electronic information enterprises RB/T 101-2013 3) Implementation guidance of Energy management systems (GB/T 29456-2012) 4) Energy management system - energy benchmarks and energy performance parameters 5) ISO50006 《Energy management systems —Measuring energy performance using energy baselines (EnB) and energy performance indicators (EnPI) — General principles and guidance》 6) A Management System for Energy （MSE 2000:2005） 7) A Management System for Energy （ANSI/MSE 2000-2008） 8) General principle of energy audit on industrial and commercial enterprise (GB/T17166-1997) 9) General principles for monitoring and testing of energy conservation (GB/T15316-1994) 10) The general principles for calculation of thermal efficiency of equipment (GB/T2588-2000) 11) General principles for calculation of total production energy consumption (GB/T2589-2008) 12) Directives for measuring and testing energy consumption in industrial enterprises (GB/T6422-1986) 13) Calculating methods of energy saved by enterprise (GB/T13234-1991) 14) Guides for energy management in industrial enterprise (GB/T15587-1995) 15) General principle for equipping and managing of the measuring instrument of energy in organization consuming energy (GB17167－2006) 16) Technical guides for evaluating the rationality of heat usage in industrial enterprise (GB/T3486 - 1993) 17) Technical guides for evaluating the rationality of electricity usage in industrial enterprise (GB/T3485-1998) 18) General principles for evaluating the rational utilization of water in enterprises (GB/T7119 -1993) 19) Statistical method of energy balance in enterprises (GB/T16614-1996) 20) Methods of drawing up energy balance table in enterprises (GB/T16615－1996) 21) Methods of drawing energy network diagram in enterprises (GB/T16616-1996) 22) Technical guides for evaluating the rationality of electricity usage in industrial enterprise (GB/T3485-1998) 23) Economical operation for power transformers (GB/T 13462- 2008) 24) Monitoring and testing method for energy saving of power supply distribution system of industrial enterprise (GB/T 16664-1996) 25) Quality of electric energy supply - Harmonics in public supply network (GB/T 14549-93) 26) Quality of electric energy supply - Admissible three-phase voltage unbalance factor GB/T 15543-1995

	27) General principle for equipping and managing of the measuring instrument of energy in organization consuming energy (GB17167-2006) 28) Technical administrative code of electric energy metering (DL/T 448-2000) 29) Economic operation of air conditioning systems (GB/T17981-2007) 30) Economical operation for the fan system (GB/T 13470-2008) 31) Standard for energy efficiency test of public buildings (JGJ.T177-2009) 32) Energy saving directives for heat treatment (GB/Z 18718-2002) 33) Monitoring and testing method for energy saving of air compressor unit and air distribution system (GB/T 16665-1996) 34) Economical operation for displacement air compressor system (GB/T 27883-2011)		
Representative of the organization	Mr. Huang Weijian System Director		
Audit place	Same as the above address of the organization	Audit date	4th~5th July, 2018
Reference period	Year 2015	Audit period	2016~2017
Industry	Electron industry	Product	LED and products on which it's used
Management system	ISO9001, ISO14001, OHSAS18001, IATF16949 , ISO50001 is unavailable for now.		
Total staff of the company	3200 people	Effective number of the company's energy management	960 people
Module Business Unit	810 people	Effective number of people for energy management in Module Business Unit	206
Unified social credit code	914406001935264036	Shift	2
Auditor leader (signature)	Ms. Emily Wang	Qualification and ability	CMVP CCAA registration number: 2017-N1EnMS-2023318
Audit members	Mr. Allen Shi Allen Shi	Qualification and ability	CCAA registration number: 2017-N1EnMS-1223656
Other participants and roles	N/A		
The report is confidential and is only distributed to audit team, customer representatives and SGS offices.			

1. Purpose of the audit

Purpose of the audit:

a) Assess and confirm energy improvements in specific periods of time.
b) Assess and confirm energy performance within a given time of organization
c) Assess and confirm that the energy management is in line with specific laws and regulations within a given time of the organization and abilities required in the contract
d) Assess and confirm the energy management process and method adopted by the organization at a specific time.

2. Audit scope and boundary

Scope: with electricity as the energy source, the energy procurement, reception/storage, process and conversion, transmission and distribution, use and other energy management activities related to manufacturing LED and products on which it was used, and energy saving technologies related to energy procurement.

Boundary: the energy consuming processes of Module Business Unit of Foshan NationStar Optoelectronics Co., Ltd. located at No.18 Huabao South Road, Chancheng District, Foshan City are as follows: manufacturing process covering laser polishing, surface mounting, reflow soldering, plug in, welding, casting die, moisture-proof grease coating, adhesive dispensing, hardening, burn-in test, plate-splitting, check and test, and packaging; auxiliary production processes including power distribution system, air compressor system, air-conditioning system and illumination system.

3. The audit result

One-year energy performance accounting and confirmation:
The annual output of 2016 is 49.7383 million pieces, the comprehensive energy consumption is 732.19tce,
The unit product comprehensive energy consumption = comprehensive energy consumption÷standard output = 732.19÷4973.83*1000 = 147.21(kgce/10000 pieces)
The annual standard output of 2017 is 68.8377 million pieces, the comprehensive energy consumption is 904.01tce,
The unit product comprehensive energy consumption = comprehensive energy consumption÷standard output = 904.01÷6883.77*1000 = 131.32(kgce/10000 pieces)
One-year energy performance increment was: （147.21-131.32）*6883.77÷1000 = 109.38tce
One year's energy performance improvement rate was: (147.21-131.32) ÷ 147.21 * 100%= 10.79%

Two-year energy performance accounting and confirmation:
The annual output of 2015 is 44.7099 million sets, the comprehensive energy consumption is 626.24tce,
The unit product comprehensive energy consumption = comprehensive energy consumption÷standard output = 626.24÷4470.99*1000 = 140.07(kgce/10000 pieces)
The annual standard output of 2017 is 68.8377 million pieces, the comprehensive energy consumption is 904.01tce,
The unit product comprehensive energy consumption = comprehensive energy consumption÷standard output = 904.01÷6883.77*1000 = 131.32(kgce/10000 pieces)
Two-year energy performance increment was:(140.07-131.32)* 6883.77÷1000=60.18Tce
Two-year energy performance increasing rate was:(140.07-131.32)÷140.07 * 100%=6.24%

Notes: (1) Module Business Unit was set up in 2014. For 2014, data is incomplete and the product types are inconsistent with that of from 2015 to 2017. Therefore, the three-year energy performance can't be assessed; (2) for evidential material for relevant data, refer to the annex.

Number of the identified non-conformities: 0 Serious 0 Slight

According to the development and maturity state shown in this audit results and the system, the results of the audit team are as follows:

☐Energy improvement is effective, and energy performance has been improved by at least 5% in the last three years (calendar or fiscal year)
☒Energy efficiency is effective, and energy performance has improved by at least 1.67% in the last year.
☐Energy improvement is not obvious
☐Energy improvement is invalid. There is energy waste, illegal energy use and other non-conformance items

4. Results of last audit

The last audit result has been reviewed, especially that corrective actions have already been taken for the non-conformance items put forward in last audit. The review conclusions are as follows:
Note: This is the first review

☐ The non-conformance items of the previous audit have been corrected and the corrective actions are continuous and effective. (See Part VI for the detailed information)

☐ The non-conformance items, which were put forward in the previous audit and haven't been solved completely, have been raised again in this audit report.

5. Audit findings

The audit team completed the process-based audit and attention has been paid to the important factors / risks / objectives required by the audit standards. The audit methods used include interviews, observation activities, and review of documents and records.

The energy management system, specification and other documents are shown to be consistent with the audit standards, and provide a sufficient framework to support the implementation and maintenance of energy management.	☒ Yes ☐ No
The energy management of the organization has been effectively implemented, maintained and improved, and its energy goals have been achieved.	☒ Yes ☐ No
The organization has established and tracked appropriate key performance goals and indexes, and monitored the achievement situation.	☒ Yes ☐ No
Routine inspection, point inspection, internal audit and other inspection activities have been fully implemented and become an effective tool for energy management maintaining and improving.	☒ Yes ☐ No
There are meeting on energy management organized and supported by the high-level management, the process is effective and the results are recorded.	☒ Yes ☐ No
The entire audit process shows that the energy management of the organization is generally in line with the requirements of audit standards.	☒ Yes ☐ No

6. Main audit ideas

In this audit, various audit ideas and throughout methods have been adopted, including the main audit points listed below.

6.0 The technological process of producingproducts within the scope of audit:
Production process of light bar:
Production process of direct backlight light bar: surface mounting of device--burn-in test--UV adhesive dispensing--lens mounting--alignment of lens--hardening of UV adhesive--visual inspection of finished products--plate-splitting--comprehensive test of finished product--packaging;
Producdtion process of side backlight light bar (wire type): laser grinding of mark--surface mounting--bonding wire--adhesive dispensing &hardening--burn-in test--plate-splitting--visual inspection of finished products--comprehensive test--attaching heat-conducting double-side adhesive tape--packaging;
Production process of side backlight light bar (terminal type): laser polishing of mark--surface mounting--burn-in test--plate-splitting--visual inspection of finished products--comprehensive test--attaching heat-conducting double-side adhesive tape--packaging;
Production process of side backlight light bar (axe type): laser grinding of mark--surface mounting of device--burn-in test--plate-splitting--visual inspection of finished products--comprehensive test--attaching heat-conducting double-side adhesive tape--packaging;
Production process of display module:
Punch-pin welding--surface mounting--SMT inspection--plug-in, welding, & casting die--moisture-proof grease coating & adhesive solidifying--inspection of front and back sides--ICT machine test/FPC examination--painting--plate-splitting--dedusting of reflection cavity & jet printing--attaching silicone pad, scattering film & FPC--through the tunnel furnace & hot test--hot-pressing/injecting glue/assembling--final test--packaging;
LAMP LED production process: placement of tube core--adhesive hardening--gold wire bonding--sealing--resin hardening--dimension inspection--dam-bar cutting--lighting visual inspection--foot cutting--feature test--putting on foorstraps--packaging--out-going inspection;

6.1 Energy management philosophy or energy policy made by senior management:
The company and the Module Business Unit have no energy policy for now. Management ideas related to energy mainly include: improving product quality and qualified rate; enhancing employees' energy-saving awareness and professional skills; strengthening the maintenance and operation control of manufacturing facility and auxiliary manufacturing equipment, so as to reduce leakage and venting and realize continuous improvement.
Personnel responsible for energy management: Song Daihui, company-level deputy general manager; Yu Xingping, deputy general manager of the Module Business Unit

6.2 Energy laws and regulations and identification and complication required by the relevant parties
Laws and regulations on energy are collected by the Department of Systems, see the List and Compliance Assessment Form of Laws, Regulations and Other Requirements, and collect and assess laws and regulations on environment, safety and energy, including 22 energy laws and regulations. The collection, updating and assessment of laws and regulations shall be strengthened.
Requirements of relevant parties:
Local government: greenhouse gas emission, there is no specific management requirement of energy
Customer: requires the energy conservation, such as this energy-saving improvement audit
Group: requirements for energy saving, but there is no specific data requirement

Compliance situation: the enterprises have not yet been found to be using high-energy equipment that has been officially phased out by the state, and no violation of the national energy conservation management requirement has been found.

6.3 Audit the activities like energy diagnosis, energy review and energy assessment within the specific period

The company established its plant in 2007 and set up the Module Business Unit in 2014. Main products of the Module Business Unit are LAMP LED, display module and light bar while the Unit mainly consumed electricity. The company's Equipment Department provides compressed air, electricity and cool air for Module Business Unit. The Equipment Department is in charge of the operation control and maintenance of central air-conditioning system, air compression system and power distribution system. During the recent years, the government has put forward specific energy requirements for the company. The company made its energy saving plan for the period of the 13th FYP and compiled its annual self-inspection report in September 2016. Greenhouse gas emissions inspections and energy improvement audit will be kicked off in 2018.

The energy management of the Module Business Unit is mainly carried out according to the requirement of ISO14001 environment management system, and has not introduced ISO50001 energy management system.

Member list of energy management group in Module Business Unit is as follows:

S/N	Name	Department/Position	Panel position	Responsibility
1	Yu Xingping	Deputy general manager of the Module Business Unit	Group leader	Lead the energy conservation group to carry out various work, urge and plan the implementation of energy conservation projects in the Module Business Unit
2	Yao Xiaoyan	Head of Department of Quality Management	Deputy group leader	Be responsible for management of product quality and energy conservation of all departments, and setting objectives and making energy conservation plans;
3	Liang Guanjun	Head of Manufacturing Department I	Group member	Be responsible for management of production and energy in Manufacturing Department I; the statistics of monthly statements related to energy consumption, providing and analyzing relevant data; announcing energy conservation of last month on a monthly basis; urging every group member to perform energy-saving work
4	Zhao Weilin	Head of Manufacturing Department II	Group member	Be responsible for the management of production and energy consumed in Manufacturing Department II; statistics of monthly statements related to energy consumption, providing and analyzing relevant data; announcing energy conservation of last month on a monthly basis; urging every group member to perform energy-saving work
5	Fan Hua	Head of Manufacturing Department III	Group member	Be responsible for the management of production and energy consumed in Manufacturing Department III; statistics of monthly statements related to energy consumption, providing and analyzing relevant data; announcing energy conservation of last month on a monthly basis;

6	Lu Ruizhan	Department of Production Management	Group member	Be responsible for making production plan; providing statistics analysis of output; considering the influence of production scheduling on energy consumption; energy management of this department and assisting in energy management of business units;

Energy performance level of Module Business Unit:

S/N	Level	Energy performance parameters	Unit	Year 2015	Year 2016	Year 2017
1	Department level (Module Business Unit)	Electricity consumption per unit product	kWh/10000 pieces	1139.68	1197.8	1068.55
2	Department level (Module Business Unit)	Water consumption per unit product	M^3/10000 pieces	5.11	5.45	4.97

Notes: given that Manufacturing Departments I, II and III under Module Business Unit have no independent electricity meters or compressed air flow meters, there are no accurate statistics of energy consumption of these departments. Therefore, the assessment of their energy performance level is unavailable;

6.4 Energy benchmarks, objective indicators, statistical analysis and implementation plan

Module Business Unit organized the statistics analysis of energy objective of business units. The overall objective of business units are as follows: the monthly consumption of water and electricity per unit of product in 2017 shall be reduced by 3% on a year-on-year basis. Objectives of 2017 were set against that in the same month of 2016 as the benchmarks, including:

1、 Consumption of energy (resource) in Module Business Unit in the past three years is as follows:

Year	Year 2015		Year 2016		Year 2017	
Month	Water (ton)	Electricity (kWh)	Water (ton)	Electricity (kWh)	Water (ton)	Electricity (kWh)
Jan.	1642	394518	1821	450474	1275	361662
Feb.	999	235382	844	183176	1621	434176
Mar.	1845	402789	2448	457125	2351	604532
Apr.	1896	425126	1612	440524	2698	577484
May	2168	482876	2822	450491	3285	612962
Jun.	1998	482105	3031	424779	3646	628298
Jul.	1995	513190	2764	507424	3262	641105
Aug.	2212	470646	3191	657963	3605	833485
Sept.	1765	382652	2363	605963	4335	758426
Oct.	1779	479342	2331	604697	3081	686591

Nov.	2230	440127	1911	639215	2641	627023
Dec.	2328	386761	1978	535794	2433	589922
Total	22857	5095514	27116	5957625	34233	7355666

2、 Outputs of Module Business Unit in the past three years are as follows:

Types of Product	Unit	Year 2015	Year 2016	Year 2017
Nixie tube	10000 pieces	83.29	49.99	111.74
Display module:	10000 pieces	605.68	721.73	824.27
Light source module (Including LB)	10000 pieces	1887.80	1637.75	2684.72
Backlight	10000 pieces	4.57	1211.12	1904.16
LAMP	10000 pieces	15173.43	15444.52	15794.61
Total	10000 pieces	17754.77	19065.11	21319.50

3、 Converted standard output

Types of Product	Unit	Year 2015	Year 2016	Year 2017
Nixie tube (Standard output)	10000 pieces	4470.99	4973.83	6883.77

Notes: given the relatively large variety of products, great difference in energy consumption per unit product among types of products and varying structural proportion of products, based on the difference in unit consumption among different kinds of products, the nixie tube was taken as the standard product while other products were converted into standard product through correction factors: the correction factors for nixie tube, display module, light source module, backlight and lamp are 1, 3, 1.2, 0.4, and 0.02, respectively;

4、 Energy benchmarks, achievements of energy objectives and targets are as follows:

S/N	Level	Energy performance parameters	Unit	Energy benchmark	Objective	Actual performance	Whether or not achieved
				Year 2016		Year 2017	
1	Department level (Module Business Unit)	Electricity consumption per unit product	kWh/10000 pieces	1197.8	1078.45	1068.55	Yes

2	Department level（Module Business Unit）	Water consumption per unit product	M^3/10000 pieces	5.45	5.14	4.97	Yes

The Module Business Unit takes a targeted statistical analysis every month, marks the gap unachieved and finds out the reasons. As shown by the data, the target of 2017 has been achieved.

Supporting plans for the implementation of the target:

1) The implementation plans and measures of 2017:

S/N	Project name	Actual situation	Objective of improvement	Person in charge	Date of completion
1	The gland to be placed by mechanical hand	Personnel is unnecessary there since the work is simple.	No more personnel for placing the gland.	Zhao Weilin	8/8/2017
2	Apply ERP to systematically manage information	The management of information is tedious and mistakes could be easily made	Use scanning gun for automatic management of information	Mei Yunfei	9/30/2017
3	Clapping apparatus and transport units were added to the production line	There were too many clapping apparatuses on the production line, which reduced the efficiency	Automatic transfer	Mei Yunfei	8/27/2017
4	Automatic vibration disc feeder	Feed in material every half an hour	Only feed in material once with rotary table feeder	Chen Jintu	3/31/2017
5	Production line of thermosetting adhesive	Technical problems existed in matching UV adhesive with some lenses	Introduce production line of thermosetting adhesive	Su Shunjin	10/31/2017
6	Apply glue-spreading machine for spreading the adhesive	Personnel is unnecessary for spreading the adhesive	Automatic equipment for spreading the adhesive	Zhao Weilin	8/15/2017

7	Automatic wire bonding machine	With manual wire bonding, the efficiency was low while the quantity was increased slowly	Use automatic equipment for wire bonding	Cai Zhurong	11/15/2017
8	Automatic glue-injection machine	Efficiency of factitial glue-injection is low,	Improve production efficiency and qualified rate	Zhao Weilin, Chen Jintu, Cai Zhurong	12/15/2017
9	Universal vibration disc for new lenses	The vibration disc was inapplicable for new lenses	Use bulk to reduce cost	Chen Jintu	9/1/2017

6.5 The organization's energy performance

Period	Product output (10000 pieces)	Comprehensive energy consumption (tce)	Comprehensive energy consumption per unit product (kgce/10000 pieces)	Two-year improvement in energy performance (tce)	Two-year rate of decline in energy consumption per unit product(%)	One-year energy performance increment (tce)	One-year unit product energy consumption decrease rate (%)
Year 2015	4,471	626.24	140.07	60.18	6.24%	109.38	10.79%
Year 2016	4,974	732.19	147.21				
Year 2017	6,884	904.01	131.32				

Notes: the Module Business Unit was established in 2014 and data of 2014 was incomplete. Besides, products of 2014 were inconsistent with that of from 2015 to 2017; two-year improvement in energy performance compares energy performance in 2017 with that in 2015; one-year energy performance increment compares energy performance in 2017 with that in 2016;
Analysis: the two-year energy performance increasing rate is 6.24%, and the one-year energy performance increasing rate is 10.79%.

Period	Output value (10000 Yuan)	Comprehensive energy consumption (tce)	Comprehensive energy consumption of 10000 Yuan output value	The decrease rate of energy consumption	The decrease rate of energy

			(kgce/10000 pieces)	per 10000 yuan output value for two years	consumption per 10000 yuan output value for one year
Year 2015	58200	626.24	10.76	-34.21% (increased)	-11.83% (increased)
Year 2016	56700	732.19	12.91		
Year 2017	62600	904.01	14.44		

Analysis: the comprehensive energy consumption of ten thousand Yuan output value was on the rise in these three years, which was mainly due to fluctuation of product price;

6.6 The main energy consumption (production) process and the application of energy-saving technology, determination of energy performance parameters and the investigation situation, completion of energy targets, energy consumption control situation or the performance improvement situation of energy are as follows:

Manufacturing Department

Energy-related responsibilities: management of energy consumption involved in manufacturing process of display module, nixie tube, light source module (including LB), LAMP LED, and backlight

Number of employees: 120

Organizational structure: three subordinate departments: Manufacturing Departments I, II, and III

Functional division:

Manufacturing Department I: processing and manufacturing display module and backlight products

Manufacturing Departments II: processing and manufacturing light bar products

Manufacturing Departments III: processing and manufacturing LAMP LED

Energy type: electricity, compressed air

Energy-using equipment: screen printer, chip mounter, reflow oven, blender, high-temperature drying oven, UV hardening machine, leak detector, dispenser, plate splitter, plug-in machine, labeling machines, testers, air compressors, dryers;

Energy objective: the Module Business Unit carried out the statistics analysis of energy consumption per unit product of the Manufacturing Department, set the annual target of this department as reducing the unit consumption of water and electricity by more than 3% on a year-on-year basis in 2017;

The Department has only set up energy targets of the Module Business Unit, and has not yet conducted statistical analysis of unit consumption of major production lines due to incomplete energy measuring devices of the lines.

Energy performance parameters: comprehensive energy consumption per unit product (kgce/10000 pieces) water consumption per unit product(m^3/10000 pieces)

Influencing variables: orders, production, air temperature, raw materials, operating time, motor power, power factor; Compressed air pressure, flow; air conditioning temperature, maintenance structure, staff operation capability, production line automation, etc.

Implementation scheme:

1. Publicity and education in morning conferences. The company carries out training about energy conservation from time to time, including conservation of energy and resources, etc;

2. Specialist for energy conservation is set for production lines every day and is responsible for patrol inspection of energy consumption and leakage;
3. Replace daylight lamp with LED lamps;
4. Use automatic glue-spreading machine to replace human, so as to improve production efficiency and qualified products rate, and reduce labor cost;
5. Apply ERP system to realize automatic management of information; reduce complicated procedures and mistakes;

Operation control:

1、 The company's Equipment Department provides the Module Business Unit with power and compressed air. Although the Module Business Unit doesn't participate in management, it puts forward requirements to Equipment Department, for instance, pressure of compressed air shall not be too high so as to reduce wasted energy; start a reasonable number of air compressors to avoid simultaneous running under-loaded machines; regular maintenance; enhance spot inspection of data and operation control of machine set to ensure steady power provision;
2、 Set the month of June as the month for energy conservation; make and implement energy conservation plan;
3、 The workshop has specific requirements for temperature and moisture. Conduct spot inspection of the workshop once per day and take records. Timely adjustment is required in case of any abnormalities. Temperature shall be 20℃ to 30℃， moisture shall be 40%-70%;
4、 Ventilate the workshop area by pumping out air once every month. Test the exhaust pumping pipe of machines in terms of air speed once every month. Monitor and control regularly to prevent either too high or too low air speed;
5、 Compressed air for running ICT circuit board tester is 4-6 bar. The actual pressure is 5 bar. Regular spot inspection is required for the machine with maintenance record for tracking management;
6、 Workshop uses power saving fluorescent lamps: three-primary-color T5 lamp, LED lamp, and the lamps are off in unmanned area. With sufficient natural light, independently controlled lamps are off;
7、 The temperature required for producing products of batch No.901S by drying oven in Manufacturing Department II is 80℃. Regular spot inspection is required in manufacturing. And the requirements of drying oven towards temperature could vary among different products;

Training: publicity and education through morning conference. No systematic energy conservation training has been carried out yet.

Refer to "Sheet of Daily Spot Inspection of Workshop Temperature", "Sheet of Drying Oven Temperature Records", "Running Status Table of Machines", "Instruction for Safe Operation of Drying Oven", "2018 Training Plan of the Module Business Unit", etc.;

Personnel to be audited: Su Shunjin, Zeng Lingyong, Chen Jintu, Zeng Bo, Ling Qiuping, Zhang Jianyun and Chen Cheng;

Department of Production Management/Department of Production Management/Sales Department

Energy-related responsibilities: make production plan, supervise production and management of products and warehouse; manage product quality so as to meet customers' requirements; be responsible for sales of products and customer care;

Number of employees: 80

Energy-using equipment: test machine, air-conditioner, escalator, water dispenser, illumination, computers, printers， forklift, etc.;

Energy objective: defect rate in the process of mounting chips is less than 0.008%, defect rate in the process of mounting lenses is less than 3.5%;

Monitoring, metering and analysis: take monthly statistical analysis, and release monthly electricity analysis report

Energy performance parameters: defect rates in the process of mounting chips, mounting lenses, and reflow soldering, qualified rate of products and custom satisfaction;
Implementation scheme: 1. Publicity and instruction, and perfection of the awards & punishment mechanism;
Operation control:
1. Reasonably arrange the orders, reduce supply delay time and the frequency of switching machines and centralize production as much as possible;
2. Take into account the impacts of peak-valley-flat power tariff on cost of energy and reasonably arrange production scheme;
3. daily inspection and maintenance;
4. Publicity and instruction on energy conservation; comfortable temperature of air conditioning shall be set as no less than 26℃; turn off lights when leaving;
5. Conduct survey of customer satisfaction regularly and from time to time; feedbacks are required
Look over: "Statistics Table of Defect Rate of Chip Mounting Process"; "Statistics Table of Defect Rate of Lenses Mounting Process", "Table of Production Records", "Statement of Qualified Product Rate", "Customer Satisfaction Survey", etc.
Persons to be audited: Luo Wentao, Huang Weijian, Fan Hua;

6.7 Energy utilization status report and submission situation:
The company submits the report by quarter on energy consumption according to relevant requirements in a timely manner. The latest submitted data is the data of Q1 2018; submitted reports on energy consumption in 2017 were approved as up to standard;
6.8 The management status of energy measurement statistics:
The company's energy measuring instruments are fully equipped, with the energy measuring instrument equipping and managing strengthened according to the requirements of GB17167-2006 General principle for equipping and managing of the measuring instrument of energy in organization consuming energy. 75 meters have been installed within the factory, including 22 water meters, 28 electricity meters, 23 compressed air flowmeters and 2 natural gas meters. See table below:

Table for Allocation Ratios of Energy Meters within the Factory:

Energy Measurement Category	Level I				Level II				Level III			
	Number of required installations	Number of actual installations	Allocation ratios	Service ability rate	Number of required installations	Number of actual installations	Allocation ratios	Service ability rate	Number of required installations	Number of actual installations	Allocation ratios	Service ability rate
	Set	Set	%	%	Set	Set	%	%	Set	Set	%	%
Electricity	1	1	200	100	4	4	100	100	23	23	100	100
Compressed air	3	3	100	100	20	20	100	100	0	0	100	100
Natural gas	1	1	100	100	1	1	100	100	0	0	100	100
Water	2	2	100	100	8	8	100	100	12	12	100	100

Total	7	7	100	100	33	33	100	100	35	35	100	100

Allocation Ratio of Energy Meters in Module Business Unit:

Energy Measurement Category	Level I				Level II				Level III			
	Number of required installations	Number of actual installations	Allocation ratios	Service ability rate	Number of required installations	Number of actual installations	Allocation ratios	Service ability rate	Number of required installations	Number of actual installations	Allocation ratios	Service ability rate
	Set	Set	%	%	Set	Set	%	%	Set	Set	%	%
Electricity	1	1	100	100	7	7	100	100	7	7	100	100
Water	1	1	100	100	7	7	100	100	0	0	100	100
Compressed air	1	1	100	100	0	0	100	100	0	0	100	100
Total	3	3	100	100	14	14	100	100	7	7	100	100

The electric meter,water meter and natural gas meter are calibrated on time by the power supply bureau, the water plant and gas plant respectively for trade settlement. The secondary and tertiary electric meters and water meters are not calibrated at ordinary times;
Check the List of Meters, Primary Equipment List, and Reading List of Water Meters;

6.9 Energy management and energy performance associated with the procurement and design process

R&D Department

Electrical equipment: power meters, signal generators, test computers, constant current sources, optical instruments, lighting, air conditioning;
Energy: electricity, compressed air;
Operation control: 1. Ensure that quality and selected materials meet requirements; use panelization for LED production to reduce leftover material and improve production efficiency;

Procurement Department

The Module Business Unit does not have an independent procurement department and the procurement center at headquarter is in charge of purchasing. The Module Business Unit would put forward its purchasing requirements and request the headquarter to conduct assessment on energy conservation when the any purchase would greatly influence energy performance;
Procurement process: purchase from outside according to the procurement application, model and specifications, and procurement requirements submitted by the Module Business Unit; departments in need are responsible for model selection and submitting the application to the Procurement Department after being approved by relevant leaders.
Latest procurements:

1、 A new film-sticking machine was bought, improving productivity and efficiency, reducing labor cost, guaranteeing product quality and meeting requirements for shipped goods;
2、 An automatic coating line has been newly added and connected to the automatic production line of the workshop, which improves the automatic production process and reduces unnecessary auxiliary processes;
3、 A new high-temperature, vacuum and mixing all-in-one machine was bought to improve the efficiency of mixing resin and reducing labor cost;

Personnel to be audited: Huang Weijian

6.10 Energy management and energy operator capacity, awareness training, and information exchange mechanism

The Module Business Unit has identified posts that could influence the use of important energy, has defined the prerequisites and abilities required by those posts, and has made and implemented training plans. Yet the training on energy saving shall be enhanced. Improve external and internal communication mechanisms. Plan of training on energy, identification of staff's qualifications and energy-related key posts. Refer to the company-level training programs and departments' training records in 2018.

Internal training in 2016 and 2017:

Time	The number of participants	Theme and Content	Organizer
2/17/2016	20	Staff SHE Training	Module Business Unit
7/17/2016	12	PDCA cycle work method	Module Business Unit
9/20/2016	18	Save water, electricity and production materials; improve awareness of environmental protection	Module Business Unit
5/8/2017	9	Methods of data statistics and analysis, data management	Module Business Unit
9/12/2017	16	How to improve production efficiency	Module Business Unit
7/20/2017	16	Save water, electricity and production materials; improve awareness of environmental protection	Module Business Unit

6.11 Energy management system, specifications, regulations, documents and records control

The company's energy management is mainly implemented in accordance with the requirements of the environmental management system. The company has compiled the "Energy Conservation Control

Procedures," "List of Laws and Regulations," "Compliance Assessment Form of Laws and Regulations", "List of Meters", "Primary Equipment List", as well as operation instructions for major energy-using equipment, such as the "Operation Instruction for Drying Oven", and the operation instructions of the production equipment.

Daily patrol inspection and spot inspection are conducted by all posts with relevant records being kept, for instance, "Table of Workshop Temperature and Moisture Records", "Sheet of Drying Oven Temperature Records", "Table of Reflow Soldering Operation Records", etc.

6.12 Whether the cause analysis has been carried out and corresponding improvement measures have been taken when there is significant deviation in energy performance, as well as verification of the improvement effect:

No significant deviations have been found.

7. Non-conformance items

The measures recommended by the client for the non-conformance items of this audit are:
Explanation: No non-conformity

The non-conformance items described in detail here shall be solved according to the requirements for the corrective actions in the audit standards through the corrective action process of the organization, including analyzing the reasons for the non-conformance items and the measures to prevent the re-occurrence, and a complete record shall be kept.

☐ The organization shall take corrective actions immediately for the identified major non-compliance items, including cause analysis; the SGS shall be informed of actions taken within 30 days. SGS will arrange the auditor to conduct a **follow-up audit** within 90 days to confirm the actions and evaluate the effectiveness of the actions.

☐ The organization shall take corrective actions immediately for the identified major non-compliance items, including cause analysis; the actions shall be recorded and transferred to the SGS auditor together with supporting evidence so that they can be closed within 90 days.

☐ For minor non-compliance items identified, the organization shall take corrective actions within 90 days, including cause analysis, which shall be transferred to the auditor. If the actions are confirmed to meet the requirements, they will be followed up in the next scheduled visit.

☐ Actions taken towards the minor non-compliance items identified, including cause analysis, are described in the action plan in details. The actions to be taken have already been reviewed by the auditor and are confirmed to meet the requirements, and they will be followed up in the next scheduled visit.

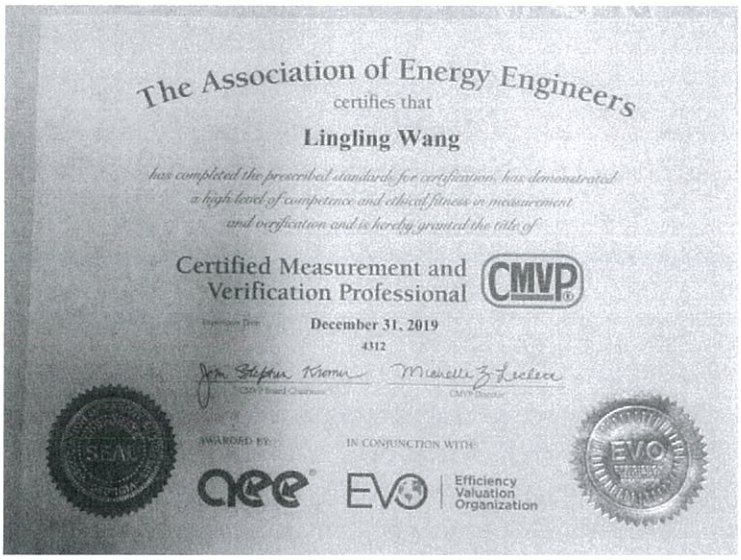
☐ Proper cause analysis has been conducted. Immediate rectification and prevention measure have been taken for every slight discrepancy.

8. General observation terms and opportunities for improvement

1. It is recommended to establish channels to designate dedicated persons to regularly collect relevant laws and regulations on energy;
2. It is recommended that the manufacturing department perfect installation of energy meters in major production lines (Manufacturing Departments I, II and III) and establish statistical analysis of the unit consumption;
3. The auto-door of drying oven area in Manufacturing Department III is normally open, allowing warm air into the cold production workshop, which increases workload on air-conditioning and results in wasted energy. It is recommended to restore automatic settings;
4. It is recommended to conduct spot inspection on surface temperature of drying oven in Manufacturing Department III. Some machine units have been used too long with aging insulation cotton and poor insulation effect. Regular monitoring of insulation effect of machines units could help with energy management of drying machine;
5. The air-pumping ventilation for the soldering process in Manufacturing Department II is still on under unmanned condition, which causes waste of cooling capacity and increases energy consumption of air-conditioning. It is recommended to strengthen training and monitoring of energy-saving awareness;
6. Exhaust-pumping pipes for several machines including curing machine in Manufacturing Department II have no valve switches. The air-pumping pipes lines such as curing machine (L4/L4/L6) kept pumping out the cool air despite the machine halt for one month, which increases energy consumption of air-conditioning. It is recommended to have valve switch set and consider installation of frequency conversion control onto the draught fan of head air-pumping pipe, so as to reduce energy waste and consumption;
7. In the welding workshop on 3rd floor of Building B, many windows are open in the cooling area where the temperature and moisture is specifically required, which allows fresh air in and increases energy consumption of air-conditioning. It is recommended to strengthen training of energy saving awareness and monitoring;
8. Air speed of the exhaust pumping pipes for machines in Manufacturing Department II hasn't been inspected and monitored. It is recommended to conduct regular inspection and assess whether the air speed is too high or low according to relevant standards;
9. It is suggested that the company annually organizes some special trainings for energy conservation such as trainings for energy conservation awareness, energy conservation technology application, ISO50001 energy management system standard, etc.;
10. It is recommended that the electric meters, water meters and compressed air flow meters be calibrated in accordance with the standard requirements;

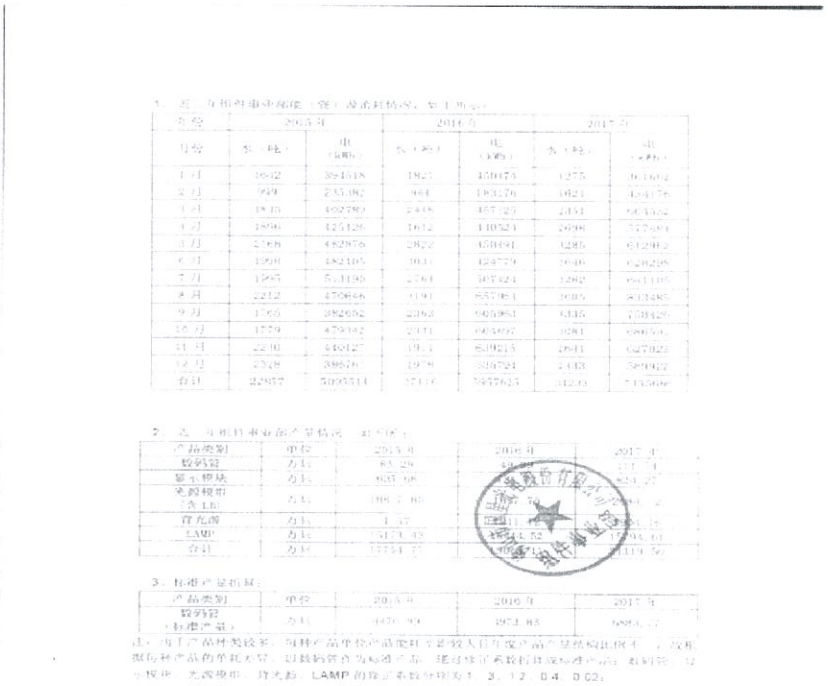
Annexes:

I. Qualification certificate of the leader of the audit group



II. Evincive documents for energy consumption and output of the enterprise

1. Sheets of Water and Electricity Consumption Data and Production Data in 2015, 2016 and 2017.



3. Plant layout