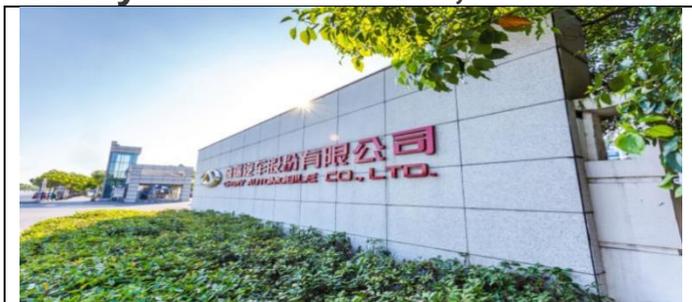


ISO 50001 Energy Management System Case Study

2020

China

Chery Automobile Co.,LTD.



Chery Automobile research institute

Organization Profile & Business Case

Company profile: Chery automobile co., LTD. (hereinafter referred to as the company) was founded in 1997 with a registered capital of 4.46 billion yuan. With the strategic goal of building an "international brand", after more than 20 years of innovation and development, the company has become the largest self-owned brand automobile manufacturing enterprise, integrating R&D, trial produce, production and sales of vehicles, powertrains and key components, as well as the largest passenger car export enterprise in China. The company takes "safety, energy-saving, environmental protection" as its product development goal, and has passed such international system certifications as ISO45001, ISO50001, ISO14001.

“We need to strengthen technological innovation for energy conservation and energy structural adjustment, and pitch in and promote it at the source of process planning and equipment procurement. We need to ensure that the energy system is managed through the whole process, so as to make our energy management the first among the self-owned brand automobile manufacturing enterprises and leading in our industry by 2020.

—Jiufeng Yu. Deputy General Manager, Executive Director of the Manufacturing Center, Representative of the Energy System Management

Case Study Snapshot

Industry	Manufacturing
Product/Service	Machinery Manufacturing
Location	Wuhu, Anhui Province, China
Energy management system	ISO 50001
Energy performance improvement period, in years	1 Years
Energy Performance Improvement (%) over improvement period	3%
Total energy cost savings over improvement period	US \$ 1.455 million
Cost to implement EnMS	US \$ 14580
Total Energy Savings over improvement period	32862(GJ)
Total CO₂-e emission reduction over improvement period	3700.33(Metric tons)

EnMS Drivers: The company regards the construction of energy management system as an important work to reduce cost and increase efficiency and embody corporate social responsibility. We pay close attention to process control, promote energy conservation and improvement, and promote the steady development of green and low-carbon enterprises.

The function of Energy Management in Corporate Strategy: Through constantly improving the construction of energy management system, implementing layered energy management, setting up professional departments and full-time personnel to take charge of energy work, compiling energy quota targets and indicators at the beginning of each year, and conducting regular assessment and evaluation to promote the implementation of energy conservation; At

the same time, CPS(Chery Production System)/TPM(Total Productive Maintenance) activities have been adopted to promote full participation in energy conservation, achieving the leading energy consumption level in the industry and meeting such requirements as relevant energy laws and regulations, so as to achieve effective control.

Business Benefits

Implementation effects: According to the shift and pace of the production plan, the actual consumption of the previous year is used as the benchmark to calculate the production demand of next year; at the same time, in accordance with our company’s cost reduction target, the company takes each opportunity and the annual energy consumption quota index determined by risk into full consideration. The company analyzes the monthly completion, draw lessons as well as the essential reasons for exceeding the standard, sets up measures and follows up their implementation.

Through comparative analysis, the company, in accordance with the characteristics of each energy-using units, makes the Registration Form of Energy Analysis and Evaluation, and ranks the improvement opportunities, so as to make and implement an annual list of the energy cost reduction, for example:

- (1) The coating line 31 air-conditioner fan frequency conversion refit project: using the frequency conversion technology to adjust the fan frequency, reducing the annual consumption of electricity by about 600,000 kWh.



FIG.1 Air conditioning inverter system

- (2) The reconstruction of the lighting of regional plants and stations in three plant sites, such as welding line 24 and coating line 21 through contract energy, with a total of 6344 lamps and 38,100 tubes reconstructed, and an annual electricity saving of about 4.2 million kWh .



FIG.2 LED lighting system

- (3) The implementation of the roof/carpport photovoltaic power generation project, which has been connected to the grid by the end of 2019, generating 62 megawatts of electricity and 61.8 million kWh annually.



FIG.3 Photovoltaic system

Through the comparison of energy performance before and after the implementation of energy saving measures, the energy consumption per unit product of the company was reduced by 3% (115.43kgce/ unit in 2018 and 112.46kgce/ unit in 2019) to save energy 32862(GJ) and reduce carbon dioxide 3,700.33 (metric tons) annually, achieving the annual energy saving target (target 31327 GJ) and showing a declining trend year by year.

Input cost: Do a better good job of saving energy and reducing consumption, continuously enhance the

energy management, reduce the energy consumption, and improve the energy efficiency, the company has put 25 pieces of equipment into use for the version change training of the energy management system and internal auditor training, the accreditation of the system version change, as well as the measurement equipment improvement, and spent 1.455 million \$USD on energy management personnel fees, air-conditioner frequency conversion system, as well as energy saving facilities/equipment renovation. There are 45 professional and part-time staff, implementation time of one year.

Plan

Organization: The company energy management policy: in compliance with laws and regulations, and a reasonable use of energy; according to the rule of the industry, constantly improve the management and technical energy conservation, pursue the synchronous development of energy efficiency and energy conservation & environmental protection; with the strive for the energy management benchmarking enterprise in the industry as the goal, form an energy conservation culture atmosphere of full participation .

The company implements three-level energy management system for company, workshop and team. There is a leading organization for energy conservation, with a leading group and a working group. The leading group is headed by the general manager of the company, and each director is the group member, mainly responsible for the decision-making of the company's energy conservation policies, energy supply and demand planning and other major issues related to energy conservation. Under the leading group, there is a working group headed by the director, with deputy directors as the team members. Under the guidance of the leading group, the working group is in full charge of the energy conservation management of the company, organizing all units to implement the energy conservation plan, and ensuring the realization of the energy conservation target. The energy and environmental protection section of the equipment and power department is the competent department of energy management, responsible for the organization and implementation of specific affairs of the energy conservation group, and the guidance and supervision

of various energy consumption indicators. Each energy-using unit has an energy administrator responsible for process energy management.

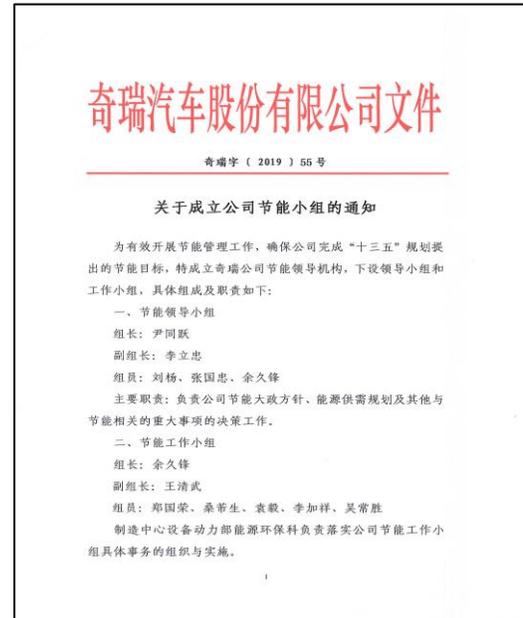


FIG.4 Leading group on energy conservation

Energy review and planning: At the end of each year, the company organizes energy review, and formulate the annual energy review report; the company, through the collected documents/information/data, interviews, field investigation, data analysis and other methods, reviews the management process and present energy consumption to seek flaws and weaknesses, and find out the opportunities for energy use and improvement; the company, through the system planning, goal set-up, index and energy management implementation program, puts the main energy use and improvement opportunities into effect, so as to provide the basis for the energy consumption quota targets and indicators next year.

Each month, through the energy workshops, the completion of targets and indicators is evaluated, and energy consumption per unit by energy-using units is statistically analyzed, so as to promote energy-using units to pay attention to and manage their own energy consumption. Energy-using units conduct monthly statistical analysis of energy to ensure that targets are achieved.



FIG.5 Objective evaluation session

Through CPS(Chery Production System)/TPM(Total Productive Maintenance) activities, the company stimulates the enthusiasm of all the employees for energy conservation, and rewards participants in proportion to the benefits of projects which feature greater energy conservation benefits and promotional significance, so as to promote full participation in the energy conservation in their own positions.

“EnMS provides an effective management tool for enterprises to reduce energy consumption.”

—Jiufeng Yu. Deputy General Manager, Executive Director of the Manufacturing Center, Representative of the Energy System Management

Do, Check, Act

Operation control and continuous improvement:

Energy management standardization is an important part of the company's continuous improvement. Energy-using units, according to their energy-using situations, equipment and the process characteristics, constantly update and optimize the operating practice, provide qualified operators, regularly carry out energy-saving awareness education and operating training; energy-using units, in compliance with the energy-using area and main types of energy consumption, review the production system, the auxiliary production system and ancillary production system, establish the energy benchmark and energy performance parameters, look for energy use and improvement opportunities and control measures, and formulate and carry out energy targets, indicators and the energy management implementation program, all of which is the focus of the operation and control of the company's energy management system.

Energy performance evaluation: In accordance with the provisions of the Determination and Control Procedures of the Target and Indicators of the Benchmark Quota Performance Parameters, the company systematically identifies and formulates the annual energy performance parameters at the company, plant and team levels for both management and operating use, and compiles the Energy Data Monitoring Plan to track the changes of energy performance parameters. The Summary of the Energy Performance Parameters stipulates "the names of the energy performance parameters", "the benchmark value" and "the target value". The Evaluation and Control Procedures of the Energy Management Performance stipulates "the evaluation criteria" and "assessment methods, which meet the requirements of system standards and cover the key parameters that affect energy consumption factors.

Energy performance improvement: Through the implementation of control measures and process monitoring evaluation, the actual energy performance of each unit is compared with the energy benchmark and historical data in the monthly energy workshop of the company to check whether the expectations are met. Through comparative analysis and in line with the characteristics of each energy-using unit, the Analysis and Evaluation of Energy Use Registration Form is formulated, and the improvement opportunities are ranked, so as to make and implement an annual list of energy cost reduction. The comprehensive energy consumption per unit was 115.43kgce/ unit in 2018 and 112.46kgce/ unit in 2019, showing a declining trend year by year.

Professional staff and information exchange: The company has established a sound energy management organization and been equipped with full-time and part-time energy management personnel at all levels, with personnel matching job responsibilities and regular organization of internal and external trainings and assessment held. In May 2019, in cooperation with Chery university, the company organized internal auditors of the energy system to attend the course "Energy System Version Change and Internal Auditors Training" taught by Mr. Liu jingyu from Cesi Certification Company in Beijing; In April, May and August of 2019, the energy administrator of each workshop was

organized to participate in a series training of “the Required Courses of Energy Management”; in November, the company participated in the specific training organized by the energy conservation association of the auto industry. Through the above-mentioned training, the energy management personnel improved their competence and obtained the relevant qualifications.



FIG.6 Training for ISO50001

The company keeps regular communication and exchange with the government, industry associations and related energy-using units, obtain relevant national laws and regulations in time, and vigorously publicize energy conservation guidelines and policies.

Tools and resources: In order to manage energy purchase, conversion and use in a scientific and standardized way, the company, with the equipment power department as the competent department, unites the energy administrators of other departments to introduce the intelligent power management system and establish the intelligent power monitoring system and the photovoltaic power station. In the aspect of equipment, the company installs the intelligent monitoring platform, which can not only manage the electricity usage of the plant, but also regulate the instantaneous consumption trend of high energy consumption equipment; meanwhile, the company combines the power generation system of the photovoltaic power station with the water consumption system and the compressed air system, and integrates the company’s electric power dispatch resource with water and compressed air resources, so as to achieve the scientific and reasonable utilization of electricity. As for the use of natural gas, the management department mainly uses real-time meter reading and data analysis

to find and solve problems and reduce the use of natural gas.

In terms of measuring instruments, a total of 37 meters have been provided to the major units that use energy, including 13 natural gas flowmeters, 3 steam flowmeters, 6 electricity meters and 15 water electromagnetic flowmeters. A total of 327 meters are provided to the main secondary energy using units, including 12 steam flowmeters, 215 electricity meters, 59 water meters and 41 compressed air meters. The company has been equipped with 54 pieces of the main energy-using equipment, including 1 electronic belt scale, 1 natural gas flowmeter, 9 steam flowmeters, 25 electricity meters and 18 water meters. The equipping rate of meters at the major and secondary energy-using units levels has achieved 100%. The energy plant has been equipped with 45 portable infrared thermometers. The energy and environmental protection section has been equipped with a set of tap water pipe network leak detector to test the leakage of tap water pipe network.



FIG.7 Energy Monitoring Center

Through the above-mentioned measures, the company improves the energy management, enhances the production efficiency of the factory, promotes the development of intelligent manufacturing, and reduces the consumption of energy resources per unit.

In September 2019, the company passed the ISO 50001:2018 version of energy management requirements version change certification issued by China Classification Society Certification company, and continued to carry out energy management in strict accordance with system requirements.

Transparency

Greenhouse gas emission verification report: In accordance with GHG Emission Accounting Methods and the Report Guidance of Mechanical Manufacturing Enterprises (Trial), the company has carried out the quantification and verification of the product carbon footprint, and put the product carbon footprint verification report on the company's official website for public notification.

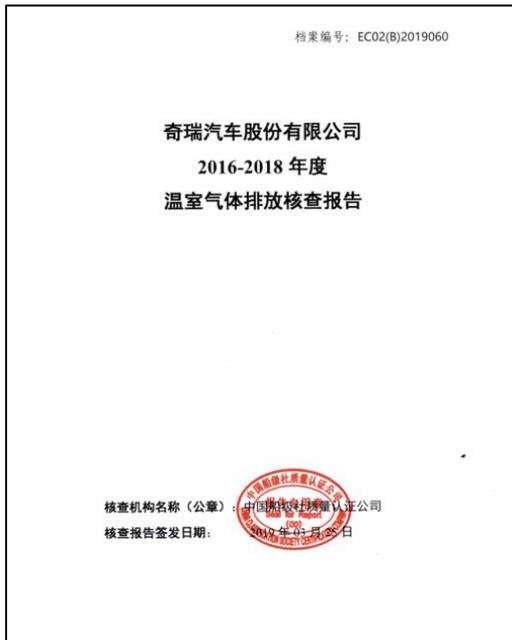


FIG.8 Carbon verification report

Through the construction of Iso50001:2018 energy management system, effectively reduce the use of the company's energy quality, indirectly reduce carbon dioxide emissions, contribute to the implementation of emission reduction activities.

In addition, the company will also report the

certification information to the anhui provincial development and reform commission and the anhui provincial energy conservation supervision center for their approval.

Lessons Learned

The company's energy consumption index has been in the advanced level of the industry, energy saving space is getting smaller and smaller. However, some new energy-saving technologies require large investment and long return cycle, which need to be implemented in stages or promoted by EPC(Energy Performance Contracting).

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit www.cleanenergyministerial.org/energymanagement.

