Organization Name

Huixian Shanshui Cement Limited company.

Organization Profile & Business Case

Shandong Shanshui Cement Group Co., Ltd. (hereinafter referred to as Shanshui group) is a large-scale enterprise group which takes the production of cement and clinker as the leading industry and integrates the production and sales of commercial mixing, pipeline, plastic knitting and aggregate. It has more than 100 subsidiaries (branches). Shanshui group is one of the 12 national large-scale cement enterprises supported by the state. It was listed in Hong Kong Red Chips in 2008.

Huixian Shanshui Cement Co., Ltd. is a wholly-owned subsidiary of Shanshui Cement Group, with a total investment of 65 million yuan, to build a 4500t / d cement clinker production line with 9mw pure low-temperature waste heat power generation project, adopting the most advanced new dry process cement production technology and advanced technical equipment in China. Huixian Shanshui Cement Co., Ltd. is a secondary enterprise of safety production standardization. It has passed the certification of four systems of environmental protection, energy, safety and quality. It has been rated as a local excellent enterprise for contribution year after year, as a green factory in Henan Province in 2018, and as an excellent unit of green development research in 2019. Huixian Shanshui Cement Co., Ltd. takes reducing energy consumption and improving energy utilization rate as the core objective, and in terms of production technology management and scientific and technological progress, constantly carries out technical transformation, adopts new technology, new technology and new equipment, eliminates high energy consumption technology and equipment, and vigorously promotes technical progress.

Through the introduction of advanced production equipment and technology at home and abroad, to improve the level of equipment and automation of enterprises, to significantly improve product output and quality, optimize product structure, so that the energy consumption index of products continues to decline, but also reduce the energy cost.

Through the investment and development in recent years, Huixian Shanshui Cement Co., Ltd. has achieved remarkable results in energy comprehensive utilization from 2017 to 2019, with each energy index lower than the national advanced value and at the leading level in the industry. Main energy efficiency indicators: from January to December 2017, the comparable comprehensive energy consumption of cement clinker is 101.66kgce/t; from January to December 2018, the comparable comprehensive energy consumption of cement clinker is 96.45kgce/t; from January to December 2019, the comparable comprehensive energy consumption of cement clinker is 94.21kgce/t.

Through the implementation of ISO 50001, the main energy efficiency indicators of Huixian Shanshui Cement Co., Ltd. achieved the goal of continuous improvement...
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of energy performance on the basis of reaching the benchmark and energy consumption quota of unit product.

Business Benefits

一、 Related indicators of energy performance improvement are as follows:

| Serial number | Index name | Company energy consumption | GB16780 Limit value | Advanced value |
|---------------|------------|----------------------------|---------------------|----------------|
| 1             | Comparability clinker coal consumption kgce/t | 89.97 87.78 ≤112 ≤103 |                     |                |
| 2             | Power consumption of comparable clinker kgce/t | 52.73 52.36 ≤112 ≤103 |                     |                |
| 3             | Comparability clinker energy consumption kgce/t | 101.66 94.21 ≤112 ≤103 |                     |                |

二、 Energy and energy savings

2018 technical transformation implementation plan and benefits

Case Study Snapshot

| Industry       | Cement manufacturing |
|----------------|-----------------------|
| Product/Service| Cement clinker       |
| Location       | Chang Cun Zhen Shen Tun Cun, Huixian City, Henan Province |
| Energy management system | ISO 50001 |
| Energy performance improvement period, in years | 2017-2019 |
| Energy Performance Improvement (%) over improvement period | 3.7% |
| Total energy cost savings over improvement period | 726086 |
| Cost to implement EnMS | Convert to $USD |
| Total Energy Savings over improvement period | (247806GJ) |
| Total CO₂-e emission reduction over improvement period | 222207 tonnes |
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### Technical transformation implementation plan and benefits in 2019

| Serial number | Project content | Actual investment and annual efficiency increase | Construction year |
|---------------|----------------|-----------------------------------------------|-------------------|
| 1             | The outlet pipe of the fan in the coal mill system should be properly increased to reduce the system resistance | The fan speed of the system can be reduced by 2R / min, and the comprehensive power consumption of clinker can be reduced by about 0.05 degree / ton. It can save 32500 yuan annually. | 2018 |
| 2             | Transformatio of smoke chamber and decomposing furnace | The annual fuel cost and environmental protection cost can be saved about 3.06 million yuan. | 2018 |

**Total greenhouse gas emissions of enterprises (tCO2)**

| Year | 2017 | 2018 |
|------|------|------|
| Total greenhouse gas emissions of enterprises (tCO2) | 1084727 | 862520 |

### Carbon reduction

According to the requirements of the notice of the general office of the Ministry of ecological environment on preparing the 2018 annual carbon emission report and verification and emission monitoring plan, the Department of ecological environment of Henan Province entrusts Henan Metallurgical Research Institute Co., Ltd. to verify the carbon dioxide emission within the enterprise boundary of Huixian Shanshui Cement Co., Ltd. in 2018. After verification by the third party, Huixian shanshui cement has The company will reduce carbon emission by 222207t in 2018.

四、 Cost and energy cost savings related to the implementation of the energy management system

Compared with 2017, Huixian Shanshui Cement Co., Ltd. reduced the comprehensive coal consumption of comparable clinker by 5.39kge/t and coal saving by 5606.11t; compared with 2018, it reduced the comprehensive coal consumption of comparable clinker by 2.19kge/t and coal saving by 1886.16t in 2019. Compared with 2018, the comprehensive power consumption of comparable clinker in 2019 will be reduced by 0.37kwh/t, saving 318667.16kwh.

五、 Any non energy or other benefits

In 2018, it was rated as the green factory of Henan Province, and in 2019, it may be awarded the excellent unit of green development research.
Plan

1. Senior participation and organization of the company

   The company has set up an energy management leading group, with Zhao Shiliang as the group leader and Xing Lixin as the production manager as the representative of the company’s energy management system with the approval of the general manager. The dispatching and monitoring room is the Department in charge of energy. The management personnel of the quality control room, the procurement and supply management department, the supply workshop, the firing workshop and the electromechanical workshop form an energy management team with sound organization and energy. The management framework is basically reasonable.

2. Energy consumption and use process

   According to the company's main energy use and target requirements, formulate energy management system, formulate process documents and equipment operation procedures for key energy consuming equipment, formulate energy assessment target indicators for each key energy consuming process, monitor energy performance parameters of key energy consuming process, establish production digital system, and achieve real-time monitoring of energy consumption of raw coal, power and other sections, and daily statistics of energy consumption data, weekly comparative analysis of energy consumption data, monthly development of targeted production plans for energy consumption data for improvement.

3. Measures to ensure energy management system strategy and objectives

   According to the improvement of energy consumption management, the company puts forward the goal of continuous reduction of energy consumption every year, focusing on cost management. Through the implementation of technical transformation and public innovation projects, the company continuously upgrades and transforms key energy consumption equipment, and continuously realizes the continuous reduction of main energy consumption indicators.

4. Describe the process of reviewing and analyzing energy applications, centralizing resources and making decisions on prioritized implementation options

   At the end of August 2018, the company hired a third-party organization to review the energy management system. Through real-time monitoring of main energy consuming equipment, data change and analysis of influencing factors, the main reasons of influencing energy consumption data are calculated, and key technical transformation schemes are formulated in combination with domestic and foreign advanced processes and technologies. After discussion and approval by the company’s energy management leading group, the implementation is organized and promoted by the company’s energy management system representative according to the requirements of time nodes to ensure that Technical transformation is required to achieve the goal of continuously reducing energy consumption.

Do, Check, Act

In order to carry out the energy management work smoothly and ensure the completion of the energy-saving goal, Huixian Shanshui Cement Co., Ltd. has established a three-level management network of company level energy management, the company has established an energy conservation and consumption reduction management committee, an energy office and a sub item management system to ensure the implementation of various measures. Through the development of energy management system, conscientiously fulfill the responsibilities of personnel at all levels, and smoothly implement various technical transformation and energy efficiency improvement activities. At the same time, in order to effectively implement the national, provincial and municipal
energy policies and rules and regulations, strengthen the on-site basic management, eliminate running, emitting, dripping and leaking, reduce environmental pollution, reduce energy consumption, and improve the economic benefits of the enterprise, according to the actual situation of the company, formulate the on-site energy examination mechanism, deal with illegal energy use and other behaviors, supervise and urge the implementation of effective energy measures. Implementation.

In order to ensure the effective monitoring of energy indicators in the production process, a digital system is equipped to accurately monitor and feedback the coal consumption and power consumption of each section of the system. The dispatching and monitoring room will count and analyze the daily feedback energy consumption indicators and take corresponding measures in time. The mechanical and electrical workshop shall summarize the data of electricity consumption every day and issue the cost analysis report every month. Production statisticians count the raw coal three times a month in the upper, middle and late ten days, and make statistics on coal consumption. Waste heat power generation is responsible for recording the total water consumption every month.

The company pays attention to the training and improvement of professional personnel, and strengthens the study and research of energy legal knowledge. Energy management personnel and key energy use equipment operators are fully equipped, with 41 key energy posts and 5 energy management personnel;

| Serial number | Post name               | Number of persons on duty |
|---------------|-------------------------|---------------------------|
| 1             | Management              | 5                         |
| 2             | Energy statistician     | 4                         |
| 3             | Energy metering personnel | 2                     |
| 4             | Electrical equipment operators | 6                 |
| 5             | Central control operation | 9                     |

Modular management is the unique advanced management mode of Shanshui group. According to the module management, Huixian Shanshui Cement Co., Ltd. divides the clinker cost into six modules: material cost, fuel cost, power cost, environmental protection cost, controllable manufacturing cost and labor cost. It clearly divides the responsibility of enterprise cost control and formulates corresponding examination methods.

In order to better improve the level of enterprise management and energy efficiency, the third-party auditing organization Fangyuan Mark Certification Group will audit the company's energy management system and receive good suggestions, which is more conducive to improving the level of energy management.
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Transparency

According to the actual production and energy efficiency improvement needs of the company, the out of stock technical transformation was implemented in December 2018, with a construction period of 45 days and a total investment of 3.5 million yuan. The technical transformation is mainly to reconstruct the air intake and air inlet of the tertiary air, and add a denitration chamber between the smoke chamber and the cone of the decomposition furnace to form a reduction area in the denitration chamber. After the transformation, the hourly ammonia consumption is saved by 350kg/h, only the annual ammonia cost is about 1083300 yuan; the hourly ammonia consumption per ton of clinker is

Lessons Learned

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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.
saved by 1.4kg/t, after accounting, the actual coal consumption is reduced by 0.45kg/t in theory, and the annual cost is saved by 377600 yuan. In the first half of 2019, compared with the first half of 2018, the emission cost is saved by 1.6 million yuan.

Huixian Shanshui Cement Co., Ltd. continues to implement the operation policy of production benchmarking, public innovation and small-scale reform of Shanshui group. Compared with the industry, the transformation and upgrading continue. At present, the energy consumption index data of the company has been at the advanced level of the domestic cement industry. However, Huixian company continues to strengthen its employees' awareness of energy conservation, encourage them to carry out small changes in energy conservation and technological innovation, formulate corresponding incentive mechanisms, and implement new energy-saving technologies; at the same time, it continues to introduce high-quality talents, absorb more advanced equipment and experience, and continuously improve the level of energy consumption.