

# ISO 50001 Energy Management System Case Study

2020

Add Country Name(s)

## Organization Name

*Huixian Shanshui Cement Limited company.*



Include caption

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.

## 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

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

of energy performance on the basis of reaching the benchmark and energy consumption quota of unit product.

**Case Study Snapshot**

<b>Industry</b>	Cement manufacturing
<b>Product/Service</b>	Cement clinker
<b>Location</b>	Chang Cun Zhen Shen Tun Cun, Huixian City, Henan Province
<b>Energy management system</b>	ISO 50001
<b>Energy performance improvement period, in years</b>	2017-2019
<b>Energy Performance Improvement (%) over improvement period</b>	3.7%
<b>Total energy cost savings over improvement period</b>	726086
<b>Cost to implement EnMS</b>	Convert to \$USD
<b>Total Energy Savings over improvement period</b>	(247806GJ)
<b>Total CO<sub>2</sub>-e emission reduction over improvement period</b>	222207 tonnes

**Business Benefits**

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

Serial number	Index name	Company	Actual energy consumption		GB16780	
			2018	2019	Limit value	Advanced value
1	Comparable 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	Comparable clinker energy consumption	kgce/t	101.66	94.21	≤112	≤103

二、 Energy and energy savings

2018 technical transformation implementation plan and benefits

Serial number	entry name	Project content	Actual investment and annual efficiency increase	Construction year
1	Transformation of coal mill fan pipe line	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	Denitrification transformation	Transformation of smoke chamber and decomposing furnace	The annual fuel cost and environmental protection cost can be saved about 3.06 million yuan.	2018

Technical transformation implementation plan and benefits in 2019

number	entry name	Project content	Actual investment and annual efficiency increase	Construction year
1	Transformation of primary fan at kiln head	Replace with air suspension centrifugal blower	After the transformation, the power saving rate of the fan is 24.15%, and the annual power saving is 87400 yuan; the field noise is reduced..	2019

三、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.

year	2017	2018
Total greenhouse gas emissions of enterprises (tCO2)	1084727	862520

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 5.39kgce/t and coal saving by 5606.11t; compared with 2018, it reduced the comprehensive coal consumption of comparable clinker by 2.19kgce/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;

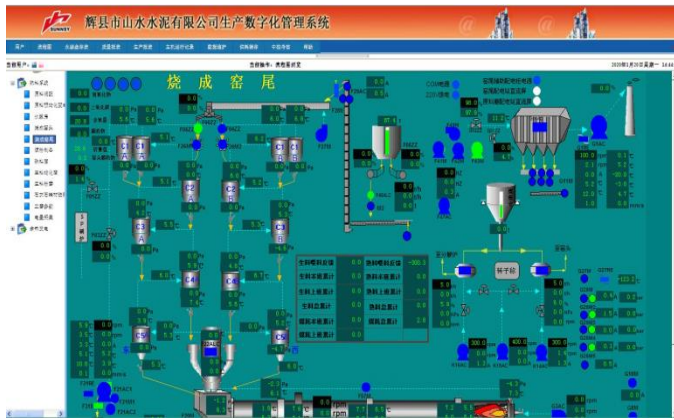
6	Boiler operation	3
7	quality control officer	12

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.

Serial numbe	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

Transparency



辉县市山水水泥有限公司综合日报表

项目名称	产量 (t)		运转时间 (h)		月累计 运转时间	运转率		台时 (A/A)		系统名称	电耗 (kWh/t)		单位电耗 (kWh/A)	
	本日	月累计	本日	月累计		本日	月累计	本日	月平均		本日	月累计	本日	月累计
矿山破碎	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	矿山破碎	296	9823	0.00	0.00
生料磨	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料磨	375	11699	0.00	0.00
煤磨	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	煤磨系统	114	3022	0.00	0.00
回转窑	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	472	11577	0.00	0.00
余热发电	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	煤磨系统	175	5214	0.00	0.00
综合电耗	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	811	27874	0.00	0.00
电耗	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	97	1562	0.00	0.00
材料消耗	0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	1073	32229	0.00	0.00
石灰石	49101.24	0.87%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
熟料	13727.11	4.57%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
石膏	800.30	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
煤	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
电	8171.72	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
柴油	18624.14	22.03%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
润滑油	11205.30	12.31%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
合计	101629.81	100.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
水	822.77	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
电	6697.73	14.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
煤	78.70	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00
柴油	60185.30	59.19%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	生料窑系统	0.00	0.00%	0.00	0.00



河南省工业和信息化委员会文件

豫工信节〔2018〕204号

河南省工业和信息化委员会  
关于公布河南省第三批国家级绿色制造名单和  
2018年省级绿色制造名单的通知

各省政府、省直管县（市）工业和信息化主管部门，有关第三方服务机构：  
按照《工业和信息化部办公厅关于推荐第二批绿色制造名单的通知》（工信部办公厅〔2018〕257号）《河南省工业和信息化委员会办公室关于推荐第二批绿色制造名单的通知》（豫工信节〔2018〕151号）要求，2018年8月6日—9月10日，我委组织开展了第三批绿色制造名单推荐工作。经机构评价、初审推荐、

附件2 河南省2018年省级绿色制造名单

省级绿色工厂名单		
序号	工厂名称	第三方评价机构名称
1	河南华洋发动机制造有限公司	宁夏清洁发展机械环保服务中心
2	新乡市万和过滤技术股份有限公司	机械工业第六设计研究院有限公司
3	新乡市长城机械有限公司	河南省煤炭科学研究院有限公司
4	河南宝钢制罐有限公司	河南省基本建设科学实验研究院有限公司
5	中牛集团有限公司	中国皮革制鞋研究院有限公司
6	河南富银丰塑料有限公司	河南省基本建设科学实验研究院有限公司
7	河南平棉纺织集团股份有限公司	宁夏清洁发展机械环保服务中心
8	仲景食品股份有限公司	海油总局节能减排中心有限公司
9	蒙牛乳业（焦作）有限公司	宁夏清洁发展机械环保服务中心
10	郑州加加味业有限公司	中国联合（北京）认证中心有限公司
11	河南尚德制药有限公司	河南省基本建设科学实验研究院有限公司
12	河南福仁林医药有限公司	河南省基本建设科学实验研究院有限公司
13	河南利源燃气有限公司	河南省冶金研究所有限责任公司
14	河南开祥精细化工有限公司	河南省冶金研究所有限责任公司
15	河南富大地水泥有限公司	南阳太阳能技术有限公司
16	辉县市山水水泥有限公司	河南省冶金研究所有限责任公司
17	天瑞集团郑州水泥有限公司	北京建筑材料科学研究总院有限公司
18	河南永盛铝业集团有限公司	河南省基本建设科学实验研究院有限公司
19	河南龙鼎铝业集团有限公司	河南省基本建设科学实验研究院有限公司
20	河南凤宝特钢有限公司	机械工业第六设计研究院有限公司

Lessons Learned

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

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](http://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.