

Steel & Chemical Company

Energy Management Case Study

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Pingdingshan Coal Group



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- Desheng Company is one of China's largest nickel alloy manufacturers. In addition to its original 920,000-ton-a-year nickel alloy project, the Company has also launched an 600,000-ton-a-year Ni 25 alloy project, a 2-million-ton-a-year hot-rolled medium-width sheet stainless steel project, and a 1-million-ton-a-year precision cold-rolled medium-width sheet stainless steel project.

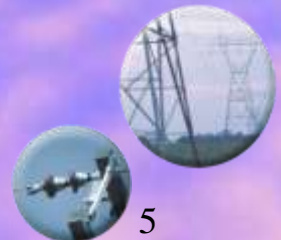
The Company is primarily powered by electrical energy, consuming 348.48 million kWh annually.





Enterprise Energy Management Objectives

- The Company is committed to energy conservation and energy efficiency; it implements an accountability system for energy conservation and vigorously optimizes and renovates equipment performance and process conditions. By examining field production monitoring data and analyzing energy utilization, the Company establishes the level of energy utilization, pinpoint existing problems, identify the potential for saving energy, and work out energy-saving measures and recommendations, thereby improving the standard of enterprise energy management.





Corporate Vision

- In accordance with the energy conservation and emission reduction requirements imposed by authorities, and in light of the industry's characteristics and the Company's actuality, the following integrated energy-saving targets have been set:
 - Overall energy consumption per ton of steel to be reduced to 670kgce/t by 2013;
 - New water consumption per ton of steel to be reduced to 4.0t/t by 2010.

Annual Targets

No	Description	Unit	2007	2008	2009	2010	2013	Remarks
1	Overall energy consumption per ton of steel	Kgce/t	741	710	690	680	670	
2	New water consumption per ton of steel	t/t	4.54	4.5	4.4	4.2	4.0	



Enterprise Energy Management Organizational Structural, Personnel, and Duties

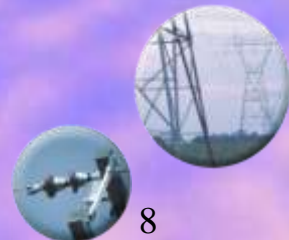
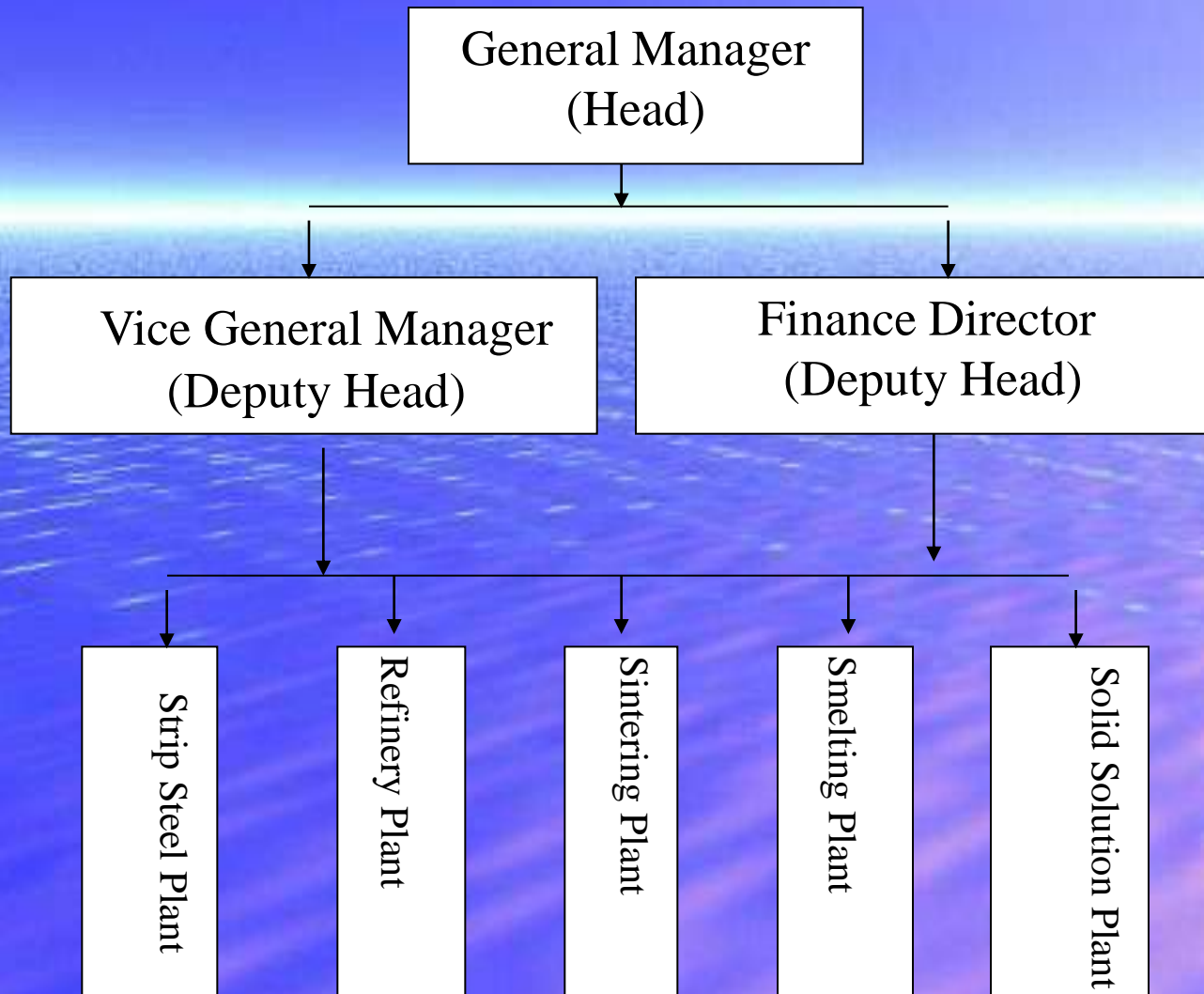
- The Company has an energy management leadership team.

The Company has formed an energy management leadership team which is charged with managing energy efficiency company-wide. The team is headed by the General Manager, with the Vice General Manager and Chief Engineer and the Finance Director acting as deputy heads. Members of the team come from all plants. The Company management is committed to energy efficiency and incorporates energy efficiency into cost accounting.





Enterprise Energy Management Organizational Structural, Personnel, and Duties





Enterprise Energy Management Organizational Structural, Personnel, and Duties

● Energy Efficiency Management Leadership Team

Head: General Manager

Deputy Heads: Vice General Manager, Chief Engineer, Finance Director

Members:

Office Manager, Production Department Management

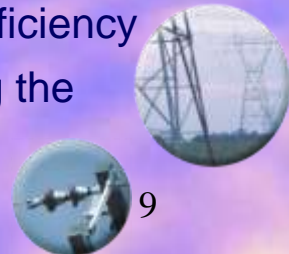
Technical Quality Department Manager, Refinery Plant Manager

Smelting Plant Manager, Sintering Plant Manager

Strip Steel Plant Manager, Solid Solution Plant Manager

Hydropower Supervisor, Statistician

The Leadership Team is responsible for implementing the Energy Efficiency Plan, studying and making decisions for major issues, and reviewing the progress of the work by the Implementation Team.





Enterprise Energy Management Organizational Structural, Personnel, and Duties

● Efficiency Implementation Team

Head: Office Manager

Members: Plant Managers and Team Leaders

As the executive organization of the Leadership Team, the Implementation Team is responsible for carrying out the decisions of the Leadership Team and performing day-to-day management of the Energy Efficiency Plan.

All related units also have their own managing and executive organizations for energy efficiency.

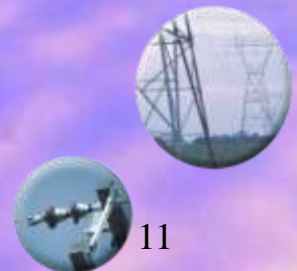




Enterprise Energy Management Organizational Structural, Personnel, and Duties

- The Company implements a three-tiered management system for energy efficiency.

The Production Department is in charge of energy efficiency management. All plants have an energy efficiency team and a dedicated energy efficiency supervisor responsible for the day-to-day energy efficiency management of his plant. All production teams also have an energy efficiency specialist.





Enterprise Energy Management Organizational Structural, Personnel, and Duties

- Energy Management Duties
 - (1) Duties of the Energy Efficiency Office
 - (2) Duties of the Energy Efficiency Teams of the Plants (Departments)
 - (3) Duties of the Energy Efficiency Specialist of the Production Teams





Enterprise Energy Management Organizational Structural, Personnel, and Duties

Duties of the Energy Efficiency Office

1. Communicates and promotes national laws and regulations on energy conservation, as well as the energy conservation directives and messages of government authorities; conducts publicity campaigns to raise employees' energy efficiency awareness, organizes energy efficiency training, and supervising employee energy efficiency efforts;
2. Formulates the Company's long- and medium-term energy efficiency plans and annual energy efficiency implementation plans;
3. Builds the Company's energy management system and energy consumption evaluation system in accordance with national and local energy conservation laws and regulations;
4. Formulates economic indicators for energy consumption evaluation and revising such indicators from time to time;
5. Assesses the energy efficiency of new projects, expansion projects, technical renovation projects, and equipment;
6. Establishes, analyzes and evaluates energy consumption quotas;
7. Formulates and finalizes methods and schemes for the distribution of the Company's energy efficiency bonuses;
8. Solicits and reviews rationalization suggestions for energy efficiency;
9. Organizes tests of the energy efficiency of the Company's major energy-consuming equipment, energy balance, and energy audits;
10. Performs data collection, balancing and statistic work for energy metering at the plants, and processes energy consumption data for submission;
11. Submits regular energy statistical reports to statistical authorities, analyzing energy consumption, and preparing regular energy consumption summarization reports;
12. Checks field energy soundness within the Company;
13. Procures and manages the Company's energy metering devices; ensures compliance with national and governmental regulations and codes on the selection, precision, measuring scope and quantity of energy metering devices to satisfy energy quota management needs; and builds calibration, application and maintenance systems;
14. Convenes monthly energy efficiency analysis meetings; performs systematic evaluation of monthly energy-efficiency economic indicators and fulfillment of energy efficiency tasks; prepares analytical reports; identifies existing problems, proposes improvement measures, and carries out related appraisal and assessment.



Enterprise Energy Management Organizational Structural, Personnel, and Duties

- **Duties of Energy Efficiency Teams of Plants (Departments)**
 1. Assists the Company's Energy Efficiency Office in communicating and promoting national laws and regulations on energy efficiency, as well as the energy conservation directives and messages of government authorities;
 2. Guides the energy efficiency efforts the energy efficiency administrators of the production teams;
 3. Formulates the department's energy efficiency management methods, energy consumption evaluation schemes, and bonus distribution schemes;
 4. Formulates economic indicators for the department's energy consumption evaluation and revising such indicators from time to time
 5. Assists the Company's Energy Efficiency Office in assessing the energy efficiency of the department's new projects, expansion projects, technical renovation projects, and equipment;
 6. Analyzes energy consumption and ensuring fulfillment of energy indicators;
 7. Performs data collection and statistic work for energy metering at the department, and submits statistic reports to the Company's Energy Efficiency Office; where metering deviation is detected, notifies the Production Department, so that automation management personnel can take corrective measures;
 8. Inspects the soundness of field energy at the department;
 9. Convenes fortnightly energy efficiency analytical meetings, and analyzes and evaluates fortnightly energy-efficiency indicators and energy-efficiency task fulfillment;
 10. Completes other energy management tasks as instructed by the Company's Energy Efficiency Office.





Enterprise Energy Management Organizational Structural, Personnel, and Duties

- Duties of Production Team Energy Efficiency Administrators
 - 1) Performs data collection and statistic work for the production team and calculates the indicators of the team's energy consumption;
 - 2) Inspects the production team's field energy soundness;
 - 3) Analyzes the production team's energy consumption;
 - 4) Completes other tasks as instructed by management.





Enterprise Energy Management Rules and Regulations



The Energy Efficiency Office of the Production Department is responsible for managing the Company's energy management rules and regulations and for energy metering management (as opposed to energy metering equipment management). It supervises energy consumption quotas by production. To request energy supply, external departments must submit an application; if such application is granted, a meter will be installed and the energy consumption will be charged. The office also manages wind, power, electricity and gas load modification procedures and other routine energy consumption.

The Company currently implements the following energy management regulations:

1. Scheme on the Improvement the Energy Metering Management System and Foundation work;
2. Energy Management Rules;
3. Energy Metering Management Rules;
4. Gas Media Usage Management Regulations;
5. Provisions on the Management and Evaluation of Energy Efficiency Measures for Major Energy Consuming Processes;
6. Provisions on the Evaluation and Rewarding of Technical Personnel for Major Energy Consuming Processes;
7. Regulations on Strengthening Energy Inspection Work;
8. Regulations on the Management of Charges on Secondary Energy Medium
9. Regulations on Strengthening Regular Inspection and Calibration of Metering Devices;
10. Provisions on the Management of Metering Apparatuses and Instruments.





Energy Metering Equipment and Management

The Energy Efficiency Office of the Production

- Department is responsible for managing energy metering; it has part-time metering specialists.





Frequency-varying Energy-saving Technical Renovation for Selected Motors

- Frequency-varying energy-saving technical renovation has been carried out for the Company's thirty one 10KV high-voltage motors, high-pressure water pumps and air blowers who working conditions vary considerably; they have a combined total installed capacity of 29,440 KW.

- Energy Saving Method: By cooperating with EMC Company





Renovation Scheme

- As the water pumps and air blowers generally have a constant-torque load, by regulating the motor's rotating speed, the pressure of water supply and the amount of air delivered can be regulated. Through speed control by frequency variation, the external load can be regulated to achieve a largely proportional relationship between the motor's output power and rotating speed, thereby obtaining remarkable energy-saving results.

When the equipment is starting, accelerating or decelerating, the frequency changer must act rapidly. Thus, the frequency changer used has closed-loop automatic regulation; through the pressure sensor, the control system detects the pressure signal value of the equipment outlet. After signal conversion by the A/D analogue-digital conversion unit, the PLC and the frequency changer can regulate individual motors' rotating speed to ensure that the motor outputs at the minimum power. At precisely controlling the pressure, soft start can be implemented for the motors to prolong the equipment's service life. If the frequency changer or the PLC malfunctions, the system will automatically switch to the frequency power supply of the original soft-start cabinet to ensure the equipment's normal operation.

In a word, by adopting the frequency-varying intelligent control system, electric power costs by be reduced by 30 to 40 percent, the equipment's service life can be extended, and productivity and product quality can be improved.



Post-renovation Equipment Statistics Table

No.	Equipment	Unit	Qty.	Unit Power	Total Power	Energy Consumption before Renovation (KWh)	Equivalent Coal before Renovation (ton)	Electrical Power Saved (KWH)	Equivalent Coal (ton)	Electricity Saving Rate
1	Induced draft fan	pcs	4	1800	7200	45619200	15966.72	12474000	4365.9	0.27
2	Primary air fan	pcs	4	1120	4480	28385280	9934.84	8796480	3078.76	0.31
3	Fair feeder	pcs	4	710	2840	17994240	6297.98	3373920	1180.88	0.19
4	Condensate pump	pcs	2	1000	2000	12672000	4435.2	2904000	1016.4	0.23
5	Circulating water pump	pcs	2	1800	3600	22809600	7983.36	6474600	2266.11	0.28
6	Air compressor	pcs	6	350	2100	13305600	4656.96	3326400	1164.24	0.25
7	Booster pump	pcs	4	280	1120	7096320	2483.71	1774080	620.93	0.25
8	Booster fan	pcs	2	1700	3400	21542400	7539.84	5553900	1943.87	0.26
9	Circulating pump	pcs	6	450	2700	17107200	5987.52	3920400	1372.14	0.23
10	Total		34		29440	186531840	65286.13	48597780	17009.23	0.26



Energy Saving Results

- The frequency-varying renovation of selected motors produces remarkable energy-saving results, with 17,009.23 tons of standard coal saved. Moreover, the implementation of the project can significantly reduce coal consumption, decreasing annual emissions of dust by 4,276.58 tons, SO₂ by 301.3 tons, and CO₂ by 42,766.1 tons.





- Energy consumption is a major part of production costs, and the ability to reduce energy consumption has a direct bearing on the enterprise's profitability. At present, the enterprise endeavors to improve energy efficiency, reduce energy consumption, decrease wastage, cut back on costs, and improve profitability, thereby boosting its growth prospects and market competitiveness.



Chemical Company Case Study

Blue Sky(LanTian) Chemical Industry Co., Ltd. ,

Pingdingshan Coal Group



Company Brief Introduction

The Pingmei and Lantian Chemical Industry Co., Ltd. (hereinafter referred to as Pingmei and Lantian) It is China's coal kamiuma the energy and chemical group or state-holding enterprises. Its large state-sized group enterprise with total assets of more than 3.1 billion RMB. Pingmei and Lantian form part of The Zhongping Energy Chemical Group, and it is located in Henan Province in China.

The current annual production capacity of the company is as follows:

Methanol - 800,000 tons/year

DME - 200,000 tons/year.



Measures and Experiences of our Energy Conservation and Emission Reduction

1. National policy support, and energetically boost energy conservation and technical reformation.

In recent years, we have installed: the micro-eddy current water treatment system, the pollutants online monitoring system, the variable frequency energy conservation reforming system, the alcohol ammonia energy conservation reforming system, the three wastes multi fuel burner etc. energy conservation and environmental protection projects. The systems and projects both significantly save energy consumption and production cost, whilst achieving environmental protection standards.



Measures and Experiences of our Energy Conservation and Emission Reduction

2 . Our efforts to construct environmentally friendly and resource saving enterprises.

(1) Multi Purpose Utilization of Various Cinder and Coal Ash

Coal ash and slag are utilized in multi purpose roles for two coal-based chemical plants in order to save energy, and reduce both consumption and emissions.

- ① Recovery and Utilization of Slag
- ② Utilization of Ash
- ③ Utilization of Coal Slime

(2) The Reformation and Multi Purpose Utilization of Raw Material Route



Measures and Experiences of our Energy Conservation and Emission Reduction

3 . Scientific and technological progress to improve the efficiency of resources utilization.

- (1) Large sized high efficiency centrifugal turbo
- (2) CO₂ Multi Purpose Utilization
- (3) Remarkable energy saving by four gas blowing boilers
- (4) The back pressure turbine generator sets of the two coal-based chemical plants



Measures and Experiences of our Energy Conservation and Emission Reduction

4 . With safety management as a link to prompt energy conservation and emission reduction

Our company focuses on safety of production as an essential factor. We institute various rules and regulations to prompt enterprise management, and operation safety in the elaborate control of our facilities. We are committed to applying scientific and technical methods to our production facilities, installing new advanced equipment/instrument, detecting the operation conditions of equipment, reducing mishandling and operation accidents, and increasing the comprehensive level of energy conservation and emission reduction.





One dime of Suiping chemical factory in Pingmei lantian chemical industry Co.Ltd.



Methyl alcohol at the central plains of Pingmei lantian chemical industry Co.Ltd..



Consideration on air conditioning system for central control room of Pingmei lantian chemical industry Co.Ltd.