

CONTENTS

Energy Saving II • Carbon Neutral

-
- 1 Activities of Energy-Conservation at Kumagaya Mill.....Tatsuya Miyazaki
 - 6 Introduction of Linear Turbine Vacuum Pumps in Jiangmen Xinghui Paper Mill (China)Noriyuki Fujita
 - 12 Energy Saving of Compressor Equipment.....Hiroaki Fujita
 - 18 Energy Saving by Adopting High-Efficiency Motor.....Hiroomi Ohtajima
 - 22 Introduction of Energy Saving Cases for Paper Production Part at Sendai MillYuki Iwao
 - 26 Demand-Side Optimization and Cost Reduction Utilizing the Wholesale Electricity Market.....Kenjiro Yagi
 - 31 Development of Gas Combustion Technology for Lime Kiln Toward Realization of a Carbon-Neutral Society.....Hitoshi Inoue

Topics & Information

- 35 Energy Saving and Operational Improvement for Kraft Pulp Process
—Approach Focusing on Processes Involving Black Liquor—.....Satoshi Wada

Introduction of Research Laboratories(157)

- 40 Laboratory of Microbial Metabolic Engineering, Department of Materials Science and Bioengineering, Nagaoka University of Technology

-
- 03 Committee report
 - 42 Papyrus

 - 48 Industry News (Domestic and International)
 - 51 List of Patents issued and Laid-open Publication
 - 58 Price list of Domestic Logs and Wood Chips by District
 - 59 Other Monthly Statistics
 - 61 News from the Association
-

Activities of energy-conservation at Kumagaya Mill

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It is supposed that greenhouse gas causes various kind of climate change such as increasing global average temperature. Currently, reducing the amount of greenhouse gas emission is one of the significant issues around the world since greenhouse gas causes sea level rise, acidification, drought and flood.

New international framework "Paris Agreement" was adopted in the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21). Japan set a goal of greenhouse gas reduction 46% by FY 2030 compared to FY 2013, and companies are taking actions to achieve the goal.

As Energy Saving Act calls for an effort to decrease annual average energy consumption intensity more than 1%, companies must struggle with energy conservation and CO₂ reduction activities.

In above circumstances, this paper introduces a case of contributing to energy saving and CO₂ reduction by the CO₂ Hot Air Supply Heat Pump Unit, effect of gas turbine CGS installation with energy service contract and optimized boiler operation.

Introduction of Linear Turbine Vacuum Pumps in Jiangmen Xinghui Paper Mill (China)

Noriyuki Fujita
Kanto Mill (Katsuta), Hokuetsu Corporation

Jiangmen Xinghui Paper Mill Co., Ltd. was launched in June 2011 in Jiangmen City, Guangdong Province, China, as the first greenfield project among the overseas investments made by Hokuetsu Corporation. Figure 1 shows the location of the mill. It is a whiteboard paper mill using recycled paper with annual production capacity of 300,000 tons, that started commercial operation in January 2015. In the construction of the mill, we adopted the latest equipment with automatic control technology at the time, and since then we have continuously improved the equipment and production technology to stabilize the operation and improve the product quality and reduce the costs.

China is promoting energy conservation as a national policy, and the government sets energy reduction targets in every five years and each company is required to achieve them, so that we tried various energy-saving projects in the mill.

In this report, we introduce an example of the introduction of linear turbine vacuum pumps that have achieved great results among them.

Energy saving of compressor equipment

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IHI Rotating Machinery Engineering Co.,Ltd.*2

In the industrial field, compressed air is widely used as a convenient power source. Compressor equipment is what produces the compressed air, but the users who operate it have a wide range of needs and concerns, such as reducing CO₂ emissions and rising electricity costs.

Compressed air trends are constantly changing, and there are many cases where there are times when the basic unit (power consumption per unit amount of air) deteriorates due to the inability to operate with the appropriate model or number of units. For this reason, it is ideal for compressor equipment to be one that does not deteriorate (or change) its basic unit no matter what the trend situation is, as it is the ultimate energy-saving equipment.

However, given the ever-changing trends in compressed air trends, it is realistically impossible to operate at the same basic unit throughout the day or throughout the year, but it is possible to approach the "ultimate energy-saving equipment." be.

First, it is important to know the operating status of the compressor through trend analysis and to confirm whether the compressor's characteristics are being utilized. In addition, we recommend planning from a broad perspective, including investigating the Control device, piping equipment, air leaks, maintenance status, etc. There are always hidden hints for improvement.

Energy Saving by Adopting High-Efficiency Motor

Hiroomi Ohtajima
Tokai Mill, Oji F-Text Co. Ltd.

In September 2020, the Oji Group formulated an Environmental Action Program 2030 with fiscal year 2030 being the target achievement year and Environmental Vision 2050, a 30-year long-term vision from now. In Tokai Mill as well, to achieve the target, we are working to improve our energy efficiency with a target reduction in energy consumption intensity of at least 1% per year, averaged over five years. In this paper, we focus on the fact that many motors on operating in plant are standard-efficiency induction motors and introduce an example of replacing them with high-efficiency motors.

Introduction of energy saving cases for paper production part at Sendai mill

Yuki Iwao
Sendai Mill, Chuetsu Pulp & Paper Co.Ltd

Carbon neutrality trials are currently being actively carried out around the world, and our mill has been engaged in energy-saving activities for long term. The present trends are also reflected to quality demands, and many variations are also required to the operations of the papermaking process.

Changes in operations are bringing companies the opportunity to achieve improvements to previously common operating patterns and get energy-saving without affecting the quality.

This paper introduces trials of energy-saving case implemented in the papermaking process at our mill.

Demand-side optimization and cost reduction utilizing the wholesale electricity market

Kenjiro Yagi
Tokushu Tokai Paper Co., Ltd.

TOKUSHU TOKAI PAPER CO., LTD.'s Mishima Plant participated in the wholesale electricity market and began adjusting the operation of its own power generation facilities according to market prices and power supply and demand conditions. In addition to achieving cost reductions by purchasing electricity at low prices and selling electricity at high prices, it has also achieved "optimization of electricity demand" through upward and low DR. It is considered to be an initiative that will contribute to the elimination of the duck curve phenomenon, which has become a global issue due to the expansion of renewable energy.

Development of Gas combustion technology for Lime Kiln toward realization of a Carbon-neutral society

Hitoshi Inoue

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Efforts to reduce CO₂ emissions are accelerating toward the realization of a carbon-neutral society by 2050, but fuel oil C and other fuel oils are mainly used for Lime Kiln in the paper industry in Japan. These emit more CO₂ per calorific value than Natural gas, but they are generally cheaper. Therefore, simple fuel conversion to Natural gas has been a challenging situation. In this problem, we've been working to improve our customers' specific energy consumption and reduce CO₂ emissions by advancing our existing technologies including energy-saving and others.

Gas atomizing combustion is one of the mixed combustion technologies of fuel oil and Natural gas without changing the existing burner. By designing the nozzle and optimizing the flame shape according to the customer's facility, we have succeeded in improving the Lime firing rate, lowering NO_x emissions and so on. Our gas atomizing combustion technologies are already adopted in four Kilns at two customers, and that contributes to approximately 20% CO₂ emission reduction compared to fuel oil combustion.

Regarding the gas firing burner technology, we have developed a new gas burner with a high-brightness flame for Lime Kiln. We can optimize the flame shape and temperature distribution by introducing main gas burner and auxiliary burners around the main burner and adjusting each input balance and gas jet velocity. We plan to conduct combustion tests of gas firing burners in our customer's furnace during 2023 and to promote their introduction.

It is important to steadily promote low carbon emissions by converting fuels to Natural gas through the introduction of gas atomizing and gas combustion technologies. In addition, carbon neutrality can be achieved in the future by methanation to customers that already use natural gas. With these technologies, we'd like to contribute to the realization of a carbon-neutral society in 2050.

Energy saving and operational improvement for kraft pulp process - processes involving black liquor-

Satoshi Wada

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At pulp and paper mills, the demand for improved production efficiency and energy conservation continues to increase due to various factors such as fluctuations in raw material prices and soaring fuel prices in recent years.

Here, the cooking process and the evaporator are processes that use a lot of energy in the KP process, and stable operation and productivity maintenance are very important processes.

In these processes, the adhesion of deposits causes a decrease in productivity and energy loss.

As a countermeasure against deposits, as a countermeasure using water treatment chemicals, it is ideal to wash with a cleaning agent and maintain a clean state with a preventive agent.

Since deposits have different components depending on where they are generated, it is necessary to use appropriate chemicals according to the components and where they are generated.

This report introduces the theory and application of detergents and scale inhibitors to improve scale and organic matter adhering to digesters and evaporators as methods of improving operations and reducing energy loss related to deposits.