SUPER ENERGY-EFFICIENT COMPANY

In the wake of the earthquake that struck on March 11, 2011, and the subsequent Tsunami and nuclear accident the cost of electricity in Japan sharply increased. The cost of electricity accounts for a large proportion of overall production costs for companies, which makes it necessary to cut back on energy consumption even more. In the case of KSK, corporate electricity rates from the beginning of 2011 until the end of 2013 increased by 38 percent.

KSK is highly acclaimed as a manufacturer that places the emphasis on its culture of *kaizen*, and it is widely recognized as a top-level supplier. In accordance with the Lean Production concept developed by Toyota, KSK constantly promotes the sustained eradication of waste. Making the best possible use of this tradition, KSK has managed to alleviate the effects of soaring electricity prices. In the aftermath of the Great East Japan Earthquake in 2011, the company placed the focus of its *kaizen* activities on energy saving in order to respond to the conditions created by this disaster. This has enabled it to achieve significant results in saving energy through the various measures it implemented. Some of these measures are extremely simple, while others are refreshingly unique.

LARGE AND SMALL CHANGES AND MODIFICATIONS

Here are a few examples of the initiatives taken by KSK. In the offices, the air-conditioning is switched on in the morning during the summer months in order to remove humidity and lower the temperature by one degree, and then switched off again later. Fans are used during the daytime. The thermostat settings have been raised from 26 to 29 degrees Celsius, but the constantly-moving air makes the offices feel cooler, making the increased heat bearable. The walls have also been insulated to maintain inside temperatures. Insulation foil has been attached to glass windows, and this has resulted in an insulation effect equivalent to between 6 or 7 degrees Celsius. “Mist showers” have been installed above the windows to dampen the surface of the glass and provide a cooling effect when the moisture evaporates. The mist showers were produced in-house, and provide a perfect example of KSK’s unique *kaizen* culture. The company’s *kaizen* initiatives are practical and implemented swiftly and consistently. Importance is not placed on making these measures look attractive. Pipes with tiny holes in them have simply been installed above the office windows. A fine mist is pumped from these holes, the moisture adheres to the window glass and then evaporates. Splashing water on roads in the morning and evening to cool the air is an age-old Japanese custom, and in the same way, the mist showers are used in the morning and evening on hot summer days.

Many other measures have been implemented in the company’s head office. All light fixtures were changed to LEDs, and sensors were installed to automatically switch the lights off. The lobby and other open spaces used to be generously illuminated at all times, but the use of unnecessary lighting is no longer condoned. Heating equipment has been replaced with oil stoves in the winter months, and the use of fan heaters has been abolished. The way in which the staff approaches energy-saving has also changed. Where once computers used to be left in standby mode overnight when work was finished, they are now completely switched off. In that sense, improvements did not merely consist of technological modifications but also involved changes of behaviour.

In KSK’s main plant in Tochigi, installing inverters onto the pumps for the supply of compressed air and in doing so controlling their number of revolutions has resulted in a great reduction in electricity consumption. Supply systems of compressed air often work inefficiently and offer much potential for energy saving.

In the casting plant covers have been installed on the holding furnaces for storing melted aluminum in order to reduce heat discharge. The temperature at which molten aluminum is maintained

“The best results have been achieved by changing the level of awareness.” Measures for this can sometimes be simple: In the offices, employees are reminded to switch off the lamp over their desk before leaving by pulling the cord dangling down from above.

「エネルギー スーパー エフィシェンシー 企業」

Aiming for the
"Super Energy-Efficient Company"

on non-production days has also been reduced. By such measures fixed costs can be drastically reduced. In addition, the casting plant's cleaning tower has been converted to automatic control. In the production lines the washing machines used to clean the parts processed have been insulated.

Also valid for Energy-*Kaizen*:
One improvement leads to another!

Says CEO Tetsuro Komaba: "The best effects have been achieved by changing the level of awareness among all members of KSK." People are now suitably aware of the fact that energy is not a limitless resource, and this has resulted in reductions in energy consumption.

In order to cultivate this level of awareness, KSK started issuing the "Monthly Energy Report" in 2011. This internal newsletter contains various pieces of information, including, for example, the following model calculation: A single hole 1mm in size in a compressed air pipe will result in a loss amounting to 16,000 Yen per year (equivalent to about 115 Euros at the average exchange rate for 2014).

"JUST-IN-TIME ENERGY"

Although the greatest results were obtained during that awful year, KSK has initiated and implemented energy-saving measures since before 2011. Annual power consumption within the Yokohama-based head office was reduced from approximately 60,000 kWh to 26,000 kWh over a period exceeding six years for an effective reduction of more than half. Corporate electricity rates stand at 16 yen per kWh, which means that costs have been reduced by 544,000 yen on an annual basis (equivalent to appr. 4,000 Euros).

Energy consumption at production plants greatly surpasses the one at the company's head office, and so the potential for substantial energy savings is also much bigger. KSK has involved itself in the development of "Just-in-Time energy" for production lines since 2009. The Lehman Shock in 2008 and the economic crisis that followed on from it resulted in a rapid reduction in production volume, KSK realized however that production costs and energy consumption did not fall to the same extent. Leading to the situation that unit costs even increased throughout this difficult period. This provided the trigger for KSK to apply the Just-in-Time concept to the field of energy consumption. It requires all facilities and equipment to consume energy only when adding value to the parts processed, and only consume the amount of electricity required for this. Although this may appear to be a natural method of running operations, it is not always the case from a practical point of view. It enables individual costs to be kept at a minimum regardless of fluctuations in production volumes.

The Just-in-Time viewpoint requires attention to be paid to reducing energy consumption when equipment is on stand-by. This means that processing machinery, including all peripheral equipment, is to be switched off when the machine is not being used during production (when idling). Although main shaft motors, coolant pumps and other mechanical components are commonly left running under normal loads after they have completed their processing tasks, switching them off does not affect labor safety or product quality, so nowadays they are switched off when idle. Because starting up oil pump motors and other such equipment consumes more energy than when operating under normal circumstances, they are not completely halted, but their revolutions are controlled with inverters. Initiatives such as this have drastically reduced the amount of electricity used on production lines.

SOURCES OF ENERGY WASTE: PRESSURE, HEAT AND LIGHT

Other measures that were implemented to great effect include decommissioning the compressors that supply high-pressure air and

preventing heat discharge. The high-pressure air compressors were decommissioned because the compressors supplying air used by the Technical Department were abolished, and instead of this, low-pressure air is now supplied by an air-conduit loop from the production plant building, which is then converted to high-pressure with an air booster.

With regard to preventing heat discharge, a variety of modifications were made to minimize the amount of heat discharged from the supply outlet of the holding furnace that melts the aluminum at a temperature of 700 degrees Celsius. Also, in the Hokkaido Plant, which gets very cold in winter, measures were implemented to prevent warm air inside the plant from escaping together with the smoke that rises from the diecast facilities. Heat loss was minimized by regulating the air-circulation fan installed on the ceiling.

An initiative to replace all lighting fixtures in the Tochigi Plant with LED lamps was started in 2014. This was implemented not only because the amount of electricity consumed by LED lamps is vastly smaller than the electricity consumed by conventional mercury-vapor lamps and fluorescent lamps, but also because it is possible to control the level of light emitted by LEDs. This enables electricity consumption to be reduced automatically once a specific level of consumption has been reached. The effects of this have resulted in electricity consumed by lighting within the factory being reduced down to almost one-third of the level prior to this. The implementation of these and other Energy-*Kaizen* initiatives in the Tochigi Plant and Hokkaido Plant have achieved a reduction in electricity consumption amounting to 11 percent. With corporate electricity rates standing at 12 yen per kWh and 10 yen per kWh respectively, this amounts to a reduction in annual electricity costs of approximately 27.5 million yen within the factories (equivalent to about 200,000 Euros).

Still cutting back on costs even at this level doesn't cover the souring rates of electricity and gas. After all, from the beginning of 2011 until the end of 2013 corporate electricity rates increased by 38 percent. Energy costs will therefore continue to compact profits, and there is an urgent need to implement additional Energy-*Kaizen* activities.

However, the effects of energy-saving measures are not only measured in terms of cost reductions. KSK's hard work in this area is also apparent from the point of view of conserving the environment and halting global warming, and CO2 emissions have been reduced by 606 tons per year. Acknowledging this, the local government awarded KSK's Tochigi Plant with the highest-ranked "Eco-Keeper Award".

Despite all of the achievements made, CEO Tetsuro Komaba, is convinced that there is still much potential for improvement, and states, "In the same way as with our other *kaizen* activities, one improvement in the field of energy-saving leads onto another." CEO Tetsuro Komaba's vision and target for KSK in the future is for the company to become a "Super Energy-Efficient Company". He is convinced energy costs can be reduced by an additional 15 to 20 percent. ■

38% up

Corporate electricity rates increased by 38 percent between the beginning of 2011 and the end of 2013.

50% down

Annual power consumption within the head office was reduced from appr. 60,000 kWh to 26,000 kWh.

27.5 m. ¥

In the factories KSK achieved electricity cost reductions by appr. 27.5 million yen per year (equivalent to about 200,000 Euros).