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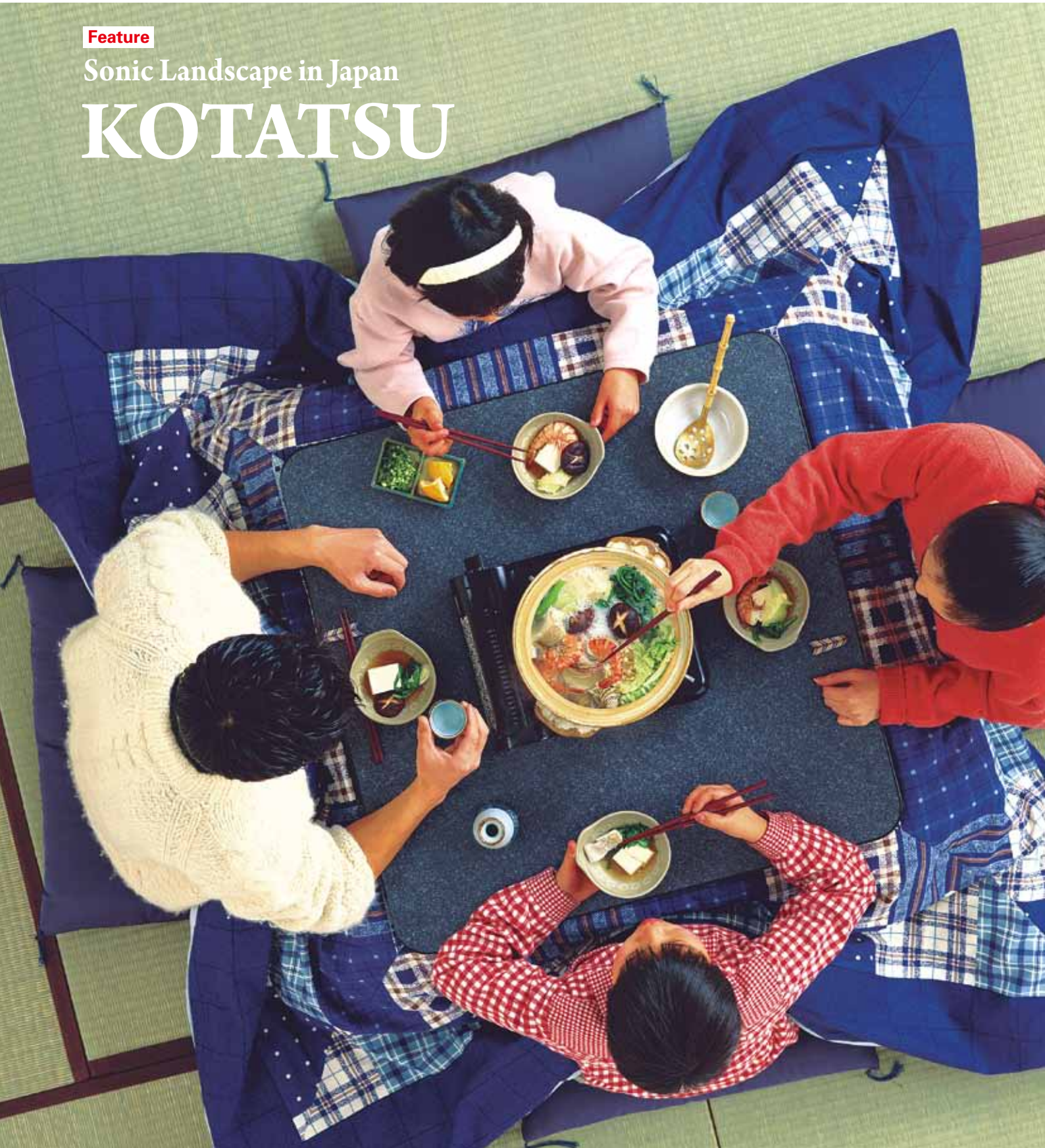
azbil MIND **The azbil Group is expanding its BA business in China's building market by utilizing its strengths in energy conservation and environmental control technologies**

Feature

Sonic Landscape in Japan

KOTATSU



KOTATSU 炬燵

A traditional heated table that is still a favorite of many today

【*nuku nuku*】～ぬくぬく

One of the most common ways of keeping yourself warm in ordinary Japanese households is with a* kotatsu*. A* kotatsu *is a heating appliance that evolved in Japan. It is commonly placed in the living room. They are often pictured in Japanese* anime *and* manga*, so you may have seen one before. Even on the coldest days of winter, sitting at or "getting into" a* kotatsu *will warm you to the bones in no time. There is a mimetic phrase used in Japanese to describe the feeling of comfort and relaxation brought about by this sort of warmth…*nuku nuku*.* Kotatsu *offer the ultimate feeling of warm comfort, a feeling you cannot get with other heating appliances.

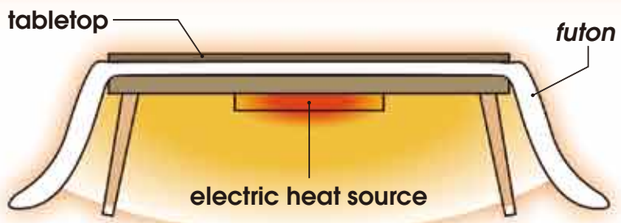
Stay warm without having to raise the room temperature

A *kotatsu* is a low-lying table frame with an electric heat source underneath. On top of frame sit a *futon* (a thick blanket) and a table top. People seat themselves on the floor at the *kotatsu* with the lower half of their bodies more or less under it, covered by the *futon*, and enjoy meals or tea. When the weather warms up, the *futon* can be removed and the *kotatsu* can be used as an ordinary table.

Sizes vary widely, from *kotatsu* made for one all the way to those designed to comfortably seat six people. Many households use *kotatsu* in conjunction with air conditioners or space heaters that heat entire rooms. A *kotatsu* will warm you up to the core, so you don't have to turn up the temperature of the room to stay comfortable. *Kotatsu* are the preferred surfaces to study on by a great many students, because even though your body warms up, your head and face stay cool, keeping you alert. Also, *kotatsu* are relatively inexpensive and do not use very much electricity, so many people use them because they make more sense cost-wise than other heating appliances.

How a *kotatsu* works

An electric heat source is attached to the top of a table frame.
A *futon* is spread over it, and the tabletop is placed on top of the *futon*.



A heating device that originated in China and evolved in Japan

The *kotatsu* evolved from the *anka*, which was introduced to Japan from China. An *anka* is simple heating apparatus in which one places a heat-generating source such as charcoal properly encased inside a wooden or clay frame, and places it underneath a blanket. Sometime around the 15th century, using the same basic principle of the *anka*, people began building tower-like frames on top of open hearths containing smoldering charcoal and then placing *futon* over these frames. This is thought to be the primitive form of the modern *kotatsu*.

Along with the *kotatsu*, another heating device that has long been in use in Japan is the *hibachi*. *Hibachi* are large ceramic bowls or wooden boxes in which charcoal is burned. In contrast with *kotatsu*, which were (and still are) commonly used in the household, *hibachi* were more decorative, and were apparently used mainly when people had visitors. In the latter half of the 19th century, stoves were made that used wood and coke as fuel, and early in the 20th century, gas stoves became more and more common in ordinary households.

Anka © Iwate Science Museum of Agriculture

The *kotatsu* as a natural extension of houses built for the Japanese climate

Until the end of World War II, when great changes occurred in Japan's housing situation, the majority of the people kept themselves warm through the Japanese winters with apparatuses that just radiated heat, such as *irori* (open hearths), *hibachi*, *kotatsu*, and stoves. It has been said that, up to that point, the Japanese people had no concept of heating up an entire space. One factor is the climate of the country: it has four distinct seasons, and the summers are hot and humid.

Tsurezuregusa, which was written in the 14th century by Yoshida Kenkō and is considered to be one of the three most influential essay collections in the history of Japanese literature, contains the following lines: "Houses should be built with summers in mind. One can live anywhere in the winter [by keeping warm by fire, etc.]. But a poorly built dwelling in the heat [of the summer] is unbearable." Traditionally, Japanese houses were built in this spirit, with large doors, windows, and other openings to let in the breeze, and using materials such as wood and paper with excellent humidity-controlling properties. One can also tell from the long eaves on traditional Japanese houses, which were built to block out the sunlight, that more emphasis was placed on keeping cool in the summer. For this reason, hot air does not build up in the spaces inside the houses, so people naturally grew to rely on radiating apparatuses for heat.

You have to be near these heat sources to feel their warmth, so they are placed in spots in the house where the family spends the most time. Conversely, the family naturally gathers around them to keep warm. For Japanese, the *kotatsu* is where the family members get together and spend time with each other in the winter, so it is a symbol of the bonds of family. Perhaps one of the reasons that *kotatsu* are still loved by Japanese despite the fact that modern houses are sealed off from the elements and well insulated is that they make people feel not just physical warmth, but also the warmth of family.

Irori

An *irori* is an open hearth made by cutting a square depression into the floor and filling it with ash, upon which charcoal or firewood is burned. Using a suspended adjustable pothook or a metal stand over the coals, one can even cook proper meals over an *irori*.

Traditional Japanese heating apparatuses

Hibachi

A large vessel filled with deposited ash.Typically, ceramic *hibachi* are round, while wooden *hibachi* are box-shaped. You move around the charcoals with steel chopsticks. It is also possible to heat up *sake* or even roast *mochi* (rice cakes).

Potbelly stoves

These cast iron stoves were once a common sight throughout Japan. The fuel burned was coal or coke. They were often used in schoolrooms and train station waiting rooms.

National Chiao Tung University, Kuang-Fu Campus

National Chiao Tung University, one of the most prestigious universities in Taiwan, carried out a renovation for energy conservation of the heating, ventilation, and air-conditioning (HVAC) facilities of its library building as an ESCO business, in order to comply with the energy conservation measures for public institutions put forth by the Taiwan government in August 2008. By renewing existing facilities and re-examining automatic control and operation, the university achieved energy savings that far exceeded its target. These initiatives are gaining recognition as future guidelines for energy conservation measures in Taiwan.

More advanced energy conservation measures are necessary to meet the requirements set by the government

National Chiao Tung University's (NCTU) main campus is located in Hsinchu City in northwestern Taiwan. Since its establishment in 1958, as Taiwan's leading university, it has produced many of Taiwan's political and business leaders. Today, over 14,600 undergraduate students and graduate students are enrolled in 11 departments of NCTU, which plays a key role as an educational and academic research base in Taiwan. Especially in the engineering and computer science fields, NCTU has produced the world's top research achievements and academic papers, and has made immense contributions to the development of Taiwan's electronic industry.

To comply with a recent move toward CO_2 emissions reduction worldwide, the Taiwan government has set forth an important policy to reduce carbon emissions, and is aggressively promoting measures based on the policy. In August 2008, to set an example for private organizations, the government announced a new requirement for public institutions including public universities and schools to implement energy conservation measures. Specifically, it set a target of 7% energy savings from 2009 to 2015, compared with 2007 energy consumption levels.

Since 2007, prior to the government's announcement, NCTU's Kuang-Fu Campus has been promoting energy conservation through initiatives focused on introducing heat pumps, replacing the school buildings' lighting with high-efficiency LEDs, and installing motion sensor lighting in the hallways and bathrooms.

Mr. Yang said: "In addition to mandatory energy conservation, the cost of electricity is increasing in Taiwan. To cope with these situations, it was necessary to prepare and execute more advanced energy conservation measures. NCTU decided to implement energy conservation measures for the heating, ventilation, and air-conditioning (HVAC), which consume large amounts of energy. To begin with, we chose to renovate the HVAC of the library building, which is open for long hours, and is also a symbol of the university."

Utilizing Japanese control technology and know-how to achieve a high energy conservation rate

NCTU laid out a plan for renovating the HVAC of the library building, with the support of EAK Engineering Consultants & Technology Co., Ltd., which was already providing energy conservation consultation to the university.

To select a partner who can implement measures based on the plan, NCTU conducted a general competitive bidding in December 2010, where bidders presented concrete measures for energy conservation. Azbil Taiwan Co., Ltd., an overseas affiliate of Azbil Corporation, participated in the bidding jointly with Kuen Ling Refrigerating Machinery Co., Ltd., a local equipment installation company. They succeeded in winning the contract as an ESCO business.*

Mr. Yang said: "Their proposal introduced measures from a different perspective that we had never considered. They also outlined energy conservation measures for automatic control and operation, which are expected to reduce energy consumption by 31%. Their analysis of energy conservation calculations was also appropriate and rational, which we evaluated highly."

Mr. Wu said: "We knew that Azbil accounts for a large share of the energy conservation market in Japan. For this reason, we had complete trust in Azbil Taiwan."

The construction started in January 2011. First of all, to achieve high efficiency and energy conservation of the heat source facilities for HVAC, Azbil's ACTIVAL™PLUS Motorized Two-Way Valve was introduced. This valve alone measures and controls the flow rate, or controls the flow according to load demand. Next, by thoroughly reviewing the chilled water piping system, the number of feedwater pumps was reduced and an inverter was introduced. This realized a system for optimizing the chilled water supply and reducing wasted electricity. In addition, the savic-net™FX BEMS (Building Energy Management System) and the Energy Data Server (EDS) help to visualize energy consumption trends, and this trend data can be evaluated and analyzed to plan for further energy conservation. Instead of replacing individual equipment to conserve energy, this renovation examined the entire heat source system and entire building to realize more comprehensive solutions for energy conservation.

Mr. Kao said: "The library is open even on days when no classes are held, and it is always used until late at night. How to prevent the construction work from affecting the comfort of library users was an important issue for us. Azbil lived up to our expectations with its rigorous, Japanese-style schedule control."

Expectations for Azbil as a leading force in energy conservation in Taiwan

The renovation of the HVAC facilities was completed in May 2011. Since June 2011, the new facilities have been in operation and attaining impressive results.

Mr. Yang said: "After the system began operating, energy consumption decreased significantly by 53%, far exceeding our initial target of 31%."

Mr. Kao said: "The graphical screen of the savic-net FX enables us to monitor and control the facilities more easily than ever before. Moreover, by using data recorded by the EDS, we can easily investigate problems that happened at night when the facility is not monitored. The newly introduced system provides outstanding performance even for purposes other energy conservation."

In the future, NCTU will implement energy conservation measures for the HVAC facilities of buildings other than the library.

Mr. Yang said: "We will examine more effective measures for energy conservation by utilizing the savic-net FX and the EDS to collect and manage important facility operation data. An energy-conserving renovation of two lecture buildings in the same campus is already scheduled. We will implement the same program at other campuses, so we expect to ask for support from Azbil more and more."

Mr. Wu said: "Until now, the concept of standard energy conservation measures in Taiwan was to simply replace existing equipment with the latest, high- efficiency model. The measures we implemented with Azbil this time were to carry out appropriate control while upgrading existing equipment in order to achieve energy conservation. Our method is exactly in line with today's global trend. And I believe it will become guidelines for the energy conservation measures we should take in the future. In that sense, the expectations for Azbil as a leading force in energy conservation is rising in Taiwan."

The monitoring terminals for the savic-net FX (right) and the EDS (left) in the monitoring room on the basement level of the library building. The operator can monitor and control the operation of the newly installed HVAC and check the energy consumption trend.

ACTIVAL PLUS Motorized Two-Way Valve installed on a chilled water coil piping for HVAC. An all-in-one valve with the functions of a control valve, flowmeter, pressure gauge, and thermometer, a significant cost saving is possible when these functions are used together.

National Chiao Tung University, Kuang-Fu Campus

Location
1001 University Road, Hsinchu, Taiwan

Established
1958

University outline
Eleven undergraduate and graduate departments and research centers, including electrical engineering and computer science

Library building
8 floors, 1 underground: 32,000 m²

Mr. Li-Hsi Yang
Section Chief
Construction Division
Division of General Affairs
National Chiao Tung University

Mr. Hsiao-Hua Kao
Officer
Library Maintenance Section
National Chiao Tung University

Mr. Hubert Wu
HVAC Consultant
Chairman and President
EAK Engineering Consultants & Technology Co., Ltd.

glossary

ESCO (Energy Service COmpany) business
This business provides comprehensive services for conserving energy in plants and factories. In Japan, there are two types of ESCO business contracts. One is the "guaranteed-savings contract" where customers themselves raise funds for initial investment, and the other is the "shared-savings contract" where the service provider shoulders the initial cost. For both types of contracts, the service provider guarantees the amount of energy cost reduction from which facility investment can be recovered.

Taiwan Energy Service Association (TESA-ESCO) and Azbil Taiwan jointly held a seminar featuring success cases of ESCO business, at the National Chiao Tung University on July 26, 2012. TESA-ESCO Chairman Bill Chen said: "In Taiwan, the ESCO business's energy performance contracting is being promoted, based on the International Performance Measurement and Verification Protocol. TESA-ESCO will actively encourage our government to develop laws providing ESCO businesses with financial assistance. We also hope to have more seminars like this to promote the ESCO business, with the cooperation of Azbil and its energy-saving know how."

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The azbil Group is expanding its BA business in China's building market by utilizing its strengths in energy conservation and environmental control technologies

The azbil Group is aggressively expanding its global operations. In China, the group is now in discussions to form a joint venture with a local company that is funded by the Chinese government and is responsible for planning and implementing China's energy conservation policy. This joint venture is expected to facilitate business expansion by capturing the demand for replacement of building management systems in the market for existing buildings. To expand business in the market for new buildings, the group entered into an equity participation in a Chinese construction and engineering firm for light electrical equipment for buildings, and made it a subsidiary of Azbil Corporation.

Strengthening the BA business in China, where future growth is expected

Azbil Corporation has positioned the expansion of global operations as one of the key measures in its Medium-Term Plan, and it has launched new initiatives to further strengthen its overseas business.

From the latter half of the 1990's until now, Azbil's Building Automation (BA) business provided building automation and control systems for heating, ventilation, and air-conditioning (HVAC) facilities mainly to Japanese-owned plants and factories overseas. In order to expand its global operations, the company is planning to strengthen its overseas business functions, including product development, manufacturing, sales, installation, engineering, and services, by means of equity participation and partnerships with local companies.

Currently, the BA business has been developing its operations in Korea, China, Taiwan, six Southeast Asian countries, as well as India and the Middle East. In particular, it will strengthen business development in the Chinese market. While the building markets in Japan, Korea, and Taiwan have matured, China is still experiencing a building construction boom, with tremendous growth in the market for new buildings. On the other hand, in China there are a considerable number of buildings constructed during the 30 years since building construction began in the 1980's, and the potential demand for the replacement of building management systems in the market for existing buildings is estimated to be more than double that in the market for new buildings. Under these circumstances, Azbil Corporation's Building Systems Company (BSC) is planning to expand business in China by leveraging its energy conservation and environmental control technologies and know how. It will focus on the replacement of building management systems and the introduction of building energy management systems (BEMS) in the market for existing buildings, as well as pursue sales in the market for new buildings.

A joint venture with a company responsible for implementing the government-funded energy conservation policy

The Chinese government has emphasized its energy conservation policy in its 12th Five-Year Plan from 2011 to 2015, and there is a growing awareness of the need for energy conservation in buildings in China. In the market for existing buildings in China, BSC is aiming to increase projects for the replacement of building management systems by providing facility operation and management and countrol of building management systems and by proposing solutions based on a more advanced concept of BEMS, which contribute to enhanced energy efficiency for energy conservation in buildings.

In May 2012, Azbil concluded an agreement to form a joint venture with a subsidiary of China Energy Conservation and Environmental Protection Group (CECEP), which is involved in an environment-related business funded by the Chinese government and is responsible for planning and implementing China's energy conservation policy. Due to rapid urbanization in China, hundreds of millions of people may be migrating to urban areas. To prepare for this situation, buildings in urban areas must implement drastic energy conservation measures to improve energy efficiency. CECEP is responsible for the instruction and supervision of energy conservation measures for buildings, and is managing an estimated 10,000 to 20,000 central government buildings located across China. CECEP and Azbil Corporation are currently working toward establishing the joint venture. After its establishment, the new company is aiming to expand business for the replacement of building management systems and the introduction of BEMS to over 200 airports and Chinese government-owned buildings. It is also planning to establish network operation centers (for remote management of building energy data) to manage energy conservation for the customers' entire building.

Deng Yong, Chairman of Beijing YTYH Intelli-Technology Co., Ltd. (right); Keiichi Fuwa, President of Building Systems Company, Azbil Corporation (middle); Michihiro Tomonaga, Representative and General Manager of Beijing YTYH Intelli-Technology Co., Ltd. (left)

Signing ceremony between CECEP and Azbil Corporation

Making a Chinese construction and engineering firm for light electrical equipment a subsidiary

Meanwhile, to pursue business in the market for new buildings, Azbil required a license as a local construction and engineering company permitted to plan, design, and construct buildings owned by Chinese firms. For this reason, in April 2012, Azbil acquired 60% of Beijing YTYH Intelli-Technology Co., Ltd. and made it a subsidiary of Azbil Corporation and a member of the azbil Group as a local partner.

Beijing YTYH Intelli-Technology is a leading construction and engineering firm that is qualified to provide integrated design and light electrical work for intelligent buildings with building automation systems, including functions for security and fire protection, as well as sales of related equipment. The company is licensed to do construction work anywhere in China; it also has good relationships with many customers, particularly in Beijing's financial district. Through the new subsidiary, BSC is planning to expand its building automation system business for new buildings, including landmark buildings financed by local capital, as well as financial buildings, hotels, and research labs.

So far, Azbil Control Solutions (Shanghai) Co., Ltd., a wholly-owned overseas affiliate of Azbil Corporation, has played a central role in developing the BA business in China. The company has provided HVAC controls for factories and hotels built by Japanese companies; in recent years, it has secured orders for systems for relatively small buildings built by Chinese construction companies.

Azbil Control Solutions (Shanghai) is also promoting the introduction of BEMS for airport buildings. For example, Terminal 3 of Beijing Capital International Airport, the third largest in the world, installed a BEMS solution which links to the airport's existing building automation systems to visualize energy consumption. Furthermore, to support the Chinese government's plan to build eco-friendly cities, the company is providing "Tianjin Eco-city," a joint development project between the Chinese and Singapore governments, with district heating and cooling management systems, an advantage area for Azbil.

In collaboration with these initiatives, Azbil will develop its business in China mainly through the joint venture to be established with a CECEP subsidiary and also its subsidiary, Beijing YTYH Intelli-Technology, to boost sales for the BA business in the Chinese market. By further developing its global operations, Azbil will provide comfortable environments for customers worldwide and contribute to global environmental preservation, including energy conservation and CO_2 reduction, which society demands.

GasCVD calorimeter contributes to fair trade of natural gas

GasCVD natural gas calorimeters are compliant with OIML R 140 (OIML R: International Recommendation of the International Organization of Legal Metrology), and are designed to promote fair, simple trade of natural gas.

Natural gas composition varies widely depending on the country or region from which the gas came, and the need is growing for a more accurate measurement of calorific value. Conventionally, gas chromatographs have been widely used for the sampling and analysis of natural gas. However, due to the high cost of the necessary equipment and space for sampling and analysis, as well as the additional time for analysis, a more cost-effective and fast-responding solution was sought by customers involved in the trade of natural gas.

Unlike existing natural gas calorimeters or gas chromatographs, GasCVD is compact and lightweight, highly accurate, and is offered at a low price. With these qualities, it contributes to the trade of natural gas, which is gaining in importance worldwide. Already, an increasing number of customers in Europe have purchased GasCVD instead of a gas chromatograph after comparing response time and price.

GasCVD is also suitable for applications that improve the combustion efficiency of gas turbines, furnaces, and other combustion equipment.

Features:

- **Low price and fast response**

  GasCVD is provided at 1/5 to 1/20 the price of a general gas chromatograph. Its response time is less than 30 seconds, which is more than 10 times faster than that of a general gas chromatograph.

- **High accuracy**

  GasCVD has an instrument reading of ±1.5 %, which makes it suitable for trade in natural gas. To verify fairness in trade, this unit has acquired certification as an OIML R 140 class B calorific value determining device (CVDD) for natural gas, as well as WELMEC (European Cooperation in Legal Metrology) MID MI-002 certification, indicating measurement with ±1 % accuracy. (Note: The measurable specifications of natural gas composition are defined.)

- **Reduced total cost**

  GasCVD is compatible with simpler sampling equipment than that which is used with gas chromatographs. Using this unit, customers can reduce the total cost of measuring natural gas calorific value.

azbil
http://www.azbil.com/

Yamatake Corporation changed its name to Azbil Corporation on April 1, 2012.

Japan

• Azbil Corporation • Azbil Trading Co., Ltd.
• Azbil Yamatake Friendly Co., Ltd.
• Azbil Care & Support Co., Ltd • Azbil SecurityFriday Co., Ltd.
• Azbil Kimmon Co., Ltd.
• Azbil Kyoto Co., Ltd. • Azbil RoyalControls Co., Ltd.
• Azbil Taishin Co., Ltd. • Tem-tech Lab.

Overseas

• Azbil Korea Co., Ltd. • Azbil Taiwan Co., Ltd.
• Azbil Kimmon Technology Corporation
• Azbil Vietnam Co., Ltd. • Azbil India Pvt. Ltd.
• Azbil (Thailand) Co., Ltd. • Azbil Philippines Corporation
• Azbil Malaysia Sdn. Bhd. • Azbil Singapore Pte. Ltd.
• PT. Azbil Berca Indonesia • Azbil Control Instruments (Dalian) Co., Ltd.
• Azbil Information Technology Center (Dalian) Co., Ltd.
• Yamatake Environmental Control Technology (Beijing) Co., Ltd.
• Beijing YTYH Intelli-Technology Co., Ltd.
• Azbil Control Solutions (Shanghai) Co., Ltd.
• Shanghai Azbil Automation Co., Ltd. • Azbil Hong Kong Limited
• Yamatake Automation Products (Shanghai) Co., Ltd.
• Azbil North America, Inc. • Azbil BioVigilant, Inc.
• Azbil Brazil Limited • Azbil Europe NV

〈Branch/Office〉

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Issued by Mikako Takahashi, Public Relations Section, Corporate Planning Department, Azbil Corporation
19F Tokyo Building, 2-7-3 Marunouchi, Chiyoda-ku, Tokyo 100-6419 Japan TEL:81-3-6810-1006 FAX:81-3-5220-7274 http://www.azbil.com/

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