Modernizing the building stock – towards a sustainable energy system
Oil is said to drive the global economy. But the era of “cheap oil” is over – page 6.

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Far-reaching changes have been initiated in German energy policy. The federal government has decided to phase out nuclear power earlier than planned, marking a paradigm shift in energy policy. The declared aim is to accelerate the transition to renewable energies. But is such a changeover possible? And what consequences does it have for the heating market?

The challenges are enormous: reserves of fossil fuels are finite, and the world population currently consumes as much of them in one year as were created in one million years. However, it is no longer seriously disputed today that the CO2 emissions generated from combusting coal, oil and gas have played a significant role in global warming in the past 50 years.

Global climate change must be limited

Scientists and policy-makers agree that the temperature increase relative to the pre-industrial era must not exceed two degrees Celsius if we want to avoid global climate change with its uncontrollable consequences. To achieve this, CO2 emissions relative to 1990 must be cut in half by the year 2050. But up to now they have increased 40 percent.

This raises the following questions:
- Can the two-degree target even be reached?
- Will we soon have to completely forego fossil energy?
- Can the German government adhere to their climate protection objectives, now that it has decided to accelerate the phase-out of nuclear power?
- What costs will result from converting the energy supply? And who will be responsible for them?

Potential of renewables insufficient

At the current level of energy consumption, the potential offered by renewable energy sources will not be sufficient to cover demand, even in the long run. Nearly 40% of current energy consumption would first have to be eliminated by increasing efficiency. Beyond this, effective means of storing energy must be created. Only then can demand be completely met by renewables. In this sense, energy efficiency is our most important resource.

Buildings consume the most energy

One thing is certain: modernizing the energy systems of existing buildings is a key prerequisite for the future viability of the energy supply. Building heating accounts for nearly 40 percent of energy consumption, a greater share than transportation and generating electricity, and has been anything but energy efficient up to now. For example, 75 percent of existing buildings in Germany were constructed before the first thermal insulation and heating system regulations came into effect in 1977 and 1978 and remain largely uninsulated today. Fewer than 20 percent of the 17.5 million existing heating systems are at the current state of the art. What is more, heating systems are only replaced every 25 years on average. According to expert calculations, at least 30 percent more energy is being used than is necessary.

Many home owners are aware that investing in the energy efficiency of their buildings not only helps to protect the environment but also saves heating costs and increases the value of their real estate. But hardly any progress has been made in modernizing existing building heating equipment.

Eliminating the backlog of deferred modernization: framework conditions must be changed

A political framework must be established to eliminate the backlog of deferred modernization. Even before the Fukushima tragedy, policy-makers have been aware of the problems and have been working at various levels to establish measures to achieve the ambitious targets. But the previously planned increase in funding to promote modernization will no longer be enough. Additionally, there were significant problems with the German government’s bill to reinstate tax write-offs for modernization costs in owner-occupied residences proposed this past May.

The date of January 1, 2012, when the law was to go into effect, would alone have been highly problematic. As a result, the heating market would have largely come to a standstill in the second half of this year. Moreover, the draft law specified the tax incentive not for individual measures but exclusively for complete modernizations, which would have reduced the energy demand of these buildings to 85 percent of the standard for new buildings. To meet this requirement, investments on the order of significantly more than 50,000 euros for a single-family home would have been necessary – an amount that is simply too much for many home owners. Affordable individual measures which would have achieved the same objective in a series of steps would not have been covered.

Ultimately, the German Bundesrat rejected the bill in its entirety because the German states feared high tax revenue losses and also questioned the social fairness of the law, arguing that tax write-offs would unfairly favor those with higher incomes.

Through mid-September, it was unclear whether a mediation committee would be appointed to get the legislative procedure back on track. If this does not happen, the government risks obstructing its own energy and climate policy goals.

No one can expect the government to finance building modernization from the national budget. But the German government must provide stimulus to mobilize private capital to achieve its political aims. It has been proven that one euro of subsidies

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Energy efficiency is our most important resource
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generates seven to eight euros of investment. The additional VAT alone would more than offset the loss of income tax revenues. Thus costs are not a valid argument, as experience from the early 1990s has shown, when subsidies for pension scheme contributions were introduced under the German Income Tax Act.

There is also a very simple solution to the issue of social fairness: instead of basing the write-off on the individual income tax rate, introduce a flat amount to be deducted from income tax owed. In cases where this amount is larger than the tax liability, the difference could be reimbursed using funds from the German KfW development bank. In this way all investors would be treated equally.

To avoid demand peaks at the end of the planned ten-year period, it would also make sense to progressively reduce the subsidy over the years. There are many ways this could be structured, but the important thing is to take action now. If nothing is done, the transition to a new energy era is in acute danger of failing.

Modernizing buildings involves more than just insulation

Unfortunately, both the general population and political decision-makers still often reduce modernization to simply insulating buildings. This misconception is another reason that modernization remains sluggish. Every building must be considered as an integrated system of structural physics and system technology. It must be possible to carry out individual modernization measures in steps, so as not to overwhelm investors. Subsidies must not be limited to complete modernization in a single, all-encompassing project.

Modernization only makes economic sense when it is co-ordinated with the typical service lives of building components, which are longer for roofs and facades for instance than for building services equipment. Furthermore, extensive insulation measures are usually spread over many years for reasons of cost. If a building has an old heating system, it is always best to replace this first.

Need for political action

There is urgent need for political action in the areas of communication, regulations and funding:
In Groß-Umstadt near Darmstadt, preparations are currently underway for the first deep geothermal wells in the German state of Hesse. Darmstadt energy providers HSE hope to promote the use of energy from the interior of the earth with this undertaking.

A system comprised of a near-surface field of geothermal probes and a deep geothermal probe at 800 m depth is to provide medium-sized industrial company Frenger Systemen BV Heiz- und Kühltechnik GmbH with energy for heating and cooling. While the deep well will provide energy for a KWT heat pump (type BW 190) with 65.8 kW of output, the field of geothermal probes will be connected to a Viessmann Vitocal 300-G with an output of 42.8 kW. The wells will be drilled by the company H. Anger’s Söhne from Hessisch Lichtenau.

Scientific supervision of the project will be carried out by the University of Kassel and the Hessian Agency for the Environment and Geology on behalf of the Hessian Ministry for Environment, Energy, Agriculture and Consumer Protection. The aim of the project is to investigate the viability of deep geothermal well probes and whether they can be transferred to other locations, and is supported by the European Regional Development Fund (ERDF). Operational start-up is planned for early 2012.

With this project, Schlering GmbH demonstrates to its customers how to significantly reduce energy costs thanks to efficient system technology and a well-insulated building envelope.

**1,000th CHP unit manufactured by ESS**

ESS Energie Systeme & Service GmbH in Landsberg am Lech, a member of the Viessmann Group, is proud to have manufactured its 1,000th combined heating and power unit on 29 April – a model EM-238/363 with a twelve-cylinder MAN engine. Management and staff commemorated the milestone with a small company celebration. The unit with 238 kW of electrical output and 363 kW of thermal output is destined for the Seniorenstift Klingenburg nursing home in Mosbach, Germany.

**First deep geothermal wells in Hesse**

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**Heat Pump Innovation Prize**

Every year, energy suppliers RWE award their Heat Pump Innovation Prize to an innovative heat pump project. This year the award went to a system in the city of Drensteinfurt near Münster. Heating contractors Schiering GmbH from Drensteinfurt-Rinkerode installed a Viessmann Vitocal 300-G ground source heat pump with a 1,000-liter buffer cylinder in their new model house and a solar thermal system with 5.74 square meters of Vitosol 300-T collectors on the roof. The total heating demand of the passive house is less than 15 kWh per square meter per year.

**Innovation Award goes to Schmack Biogas**

In 2010, the high-performance “Methanos” bacteria developed by Schmack Biogas were honored with the Bavarian Energy Award. Now the project has won its next prize: the 2011 Biogas Innovation Award from the German Agriculture Industry. Vice-President of the Regional Farmer’s Association Heinz Korte presented the award to Dr. Doris Schmack during the 4th Biogas Innovation Congress in Osnabrück.

Methanos are efficient, high-output micro-organisms which significantly increase the gas yield from substrates used in biogas plants. Initial field tests have been successfully completed, and a range of deployment scenarios are currently being offered for pilot customers.

Dr. Doris Schmack accepted the Innovation Award certificate of the German Agriculture Industry from Heinz Korte.

The objective of the Biogas Innovation Congress and the award is to facilitate market entry and commercial breakthrough of the presented innovations.
The work and health protection management programs at Viessmann plants have been certified according to OHSAS 18001 (Occupational Health And Safety Assessment Services). The company has already been certified for quality management (DIN/ISO 9001), environmental management (EMAS and DIN/ISO 14001) and energy management (DIN/ISO 16001).

The foundations for the recently certified work and health protection management at Viessmann were established in 1995 and have been constantly improved ever since. The next logical step was to have the work and health protection management verified externally.

Auditors from the employers’ liability insurance association (wood and metal industry) spent three days inspecting occupational health and safety management at company headquarters in Allen-dorf. Association representatives observed that management and workers are equally involved in this issue at Viessmann, a distinctive feature in the sector.

The initial certification will be followed by annual control audits, and another certification audit must be passed in three years.

Viessmann’s new steam boiler planning manual is hot off the presses. It focuses on designing stationary steam boiler systems running on oil, gas and wood, as well as on waste heat boilers. Separate chapters explain the individual components and address their sizing in detail: steam boilers, combustion units, economizers, water analysis and processing, condensate treatment, thermal equipment such as mixing/cooling units and feedwater pre-heaters, pumps, pipes and flue gas systems. Numerous photos, diagrams and system schematics along with sample calculations and checklists provide valuable assistance in understanding how things work.

Other chapters of the 300+ page manual are dedicated to the key rules and regulations for installing, obtaining approval for and operating steam boiler systems. The appendix includes technical data, tables, diagrams and more schematics.

The new steam boiler planning manual (in German) can be downloaded free of cost at www.viessmann.de/dampfkessel.

Dr. Walter Sichert from the employers’ liability insurance association (wood and metal industry) (right) presented the certificates to Viessmann Supervisory Board members Klaus Gantner (2nd from right) and Joachim Janssen (left), managing directors Gerhard Bastet, Dr. Harald Dörnbach, Dr. Hans-Ullrich Förster, Dr. Frank Schmidt, Udo Teubert and Michael Weber and occupational health and safety officer Harald Schmidt. Works Council president Matthias Godzik represented the employees at the ceremony.

Köb boilers at the Soonwald nature center

For three days, 16 apprentices from the heating industry traded the classroom for the Soonwald nature center near Bad Neuenahr. The purpose of this training exercise organized by the SHK Association of the Sanitation, Heating and Cooling Industry in Ahrweiler was to learn about renewable energies and promote social skills.

Viessmann sales engineer Frank Keller gave a talk about efficient biomass boilers at the event, explaining the numerous advantages of Viessmann’s biomass boilers to training participants. Following his talk, Keller gave a hands-on presentation of a biomass boiler, a Köb Pyrot used to heat the nature center.

25 members of the Hessian state chapter of the German Foundrymen’s Association recently visited the Weso-Aurorahütte foundry in Gladenebach. Specialising in high-quality grey cast iron products, Weso has been a member of the Viessmann Group since 1979 and is active around the globe.

Following a comprehensive tour of the plant, Manfred Greis, head of Corporate Communications at Viessmann, gave a talk on energy efficiency in buildings and renewable energies. In his talk, he also described the company’s “Efficiency Plus” sustainability project for climate protection, resource efficiency and safeguarding jobs and production sites. The visitors were impressed by their tour of the company’s ultra-modern production facilities. “Such a bright, clean working atmosphere is truly unusual for a foundry”, remarked a member of the group. “It fits with the high-tech products being manufactured here.”
Crude oil: Important raw material, highly valued as a fuel

The development of the global economy in the 19th and 20th centuries was facilitated by a seemingly infinite supply of cheap energy. Economic progress at the beginning of the 21st century, however, takes place under a different set of conditions. People are realising that the supplies of oil and natural gas are finite, and that CO₂ emissions must be reduced to prevent climate change. Both of these developments necessitate the use of ultra-efficient technology at a broad level, along with a balanced mix of energy in which renewable sources are becoming increasingly important but in which natural gas and crude oil will continue to play key roles in the foreseeable future. This is why it is imperative to be as efficient as possible with fossil fuels in cases whenever they must be used.

In a series of articles, aktuell has been examining the various fuel sources and their prospects for the future. Following reports in previous issues on renewable energies, including biomass, solar energy and ambient heat, as well as natural gas as a fossil fuel, this last article in the series is dedicated to oil.

Although global economic growth in the past two centuries can be attributed to a number of factors, one of the driving forces is a gift of nature: crude oil. Like natural gas, this “black gold” was created over the course of millions of years from deposits of microorganisms in the earth’s crust. The oil era is considered to have started in 1854 when Canadian Abraham P. Gesner was issued a patent for the production of kerosene. Kerosene was discovered while searching for a clean, inexpensive alternative to whale oil, which had been burned in lamps up to then. Demand for this new lamp oil practically exploded, leading to the first ever oil boom. But it was the inexorable rise of the automobile as a mass product in the form of the Ford Model T which heralded the era of oil as a global big business.

The curve shows the rate of oil extraction in various regions of the world over time. In the US for instance it can be seen that “peak oil” was reached around 1970, in the Middle East about 2008. The maximum of global oil extraction shifts a few years when unconventional oil deposits are also taken into consideration (illustration from the book “Energy Future - Efficiency and Renewable Energies in the Heating Sector” by Jürgen Petermann).
Oil

Most important fuel source

Oil and products derived from it continue to drive the global economy today. According to the German Federal Institute for Geosciences and Natural Resources (BGR), oil continues to be the most important fuel source worldwide, accounting for 35 percent of primary energy consumption. It provides the fuel for road, air and ship transport and is used to generate heat in private households and industrial facilities. Oil is also an important starting material for all kinds of plastics, dyes, fertilizers, cleaning agents and many medications. There is no other raw material upon which humankind is so dependent.

The end of cheap oil is approaching

The world’s growing hunger for energy also means an increase in demand for oil. According to a BGR study, 159 billion tonnes have been produced since the start of industrial extraction in the middle of the 19th century – more than half of that since the 1980s. And global demand will continue to expand, especially due to strong growth of large economies such as China and India. At the same time, it is apparent that oil will be the first fuel source which will start to dwindle in a few decades.

Experts are still debating how long current worldwide oil stocks will last. Conventional discoveries of oil (see box) have been decreasing for decades, they say. The point in time of the maximum rate of global petroleum extraction, also known as “peak oil”, was presumably already reached in the past decade. If this is the case, the divide between oil supply and demand will continue to grow, resulting in rising prices for the popular raw material on the world market.

There are also discussions of the ultimate end of “easy oil”, oil which is relatively simple and inexpensive to produce. It is estimated that we have roughly 40 to 50 years before the usual sources of oil have been exhausted. What remains is oil whose extraction has been unprofitable up to now or associated with environmental risks, such as deposits deep in the ocean and in the polar regions.

Another possibility to extend the availability of oil is to exploit unconventional sources such as oil sands, oil shale and extra-heavy oils. These reservoirs are purported to be gigantic in size, but their extraction is considered to be complicated and expensive. And because they frequently have to be mined, they often also involve serious interference with nature.

Conserving resources is imperative

Although oil will still be available for a few decades according to current estimates, it is imperative that we conserve this increasingly scarce fuel source as much as possible. A decrease in production and growing international demand will lead to rising world prices for oil in the long run. Another factor is that CO2 is always released when fossil fuels are combusted, which accelerates atmospheric warming. For these reasons, consumption needs to be reduced significantly – by using high-efficiency technology such as modern oil condensing boilers and economical engines, and through greater reliance on renewable energy, including oil and petrol obtained from renewable raw materials.

Oil from renewable raw materials

Fuel oil, diesel, kerosene and petrol from biomass offer a range of advantages. The starting materials, for instance rape and sugar beets, are renewable and do not need to be imported from abroad. They are easy to store and are thus available whenever needed. The energy density of the fuel obtained from them is similar to that of conventional oil and petrol, so that performance, fuel consumption and range are not significantly impacted. Of particular interest is their CO2 balance. When burned, they release only as much CO2 as was previously absorbed by the plants from the atmosphere. However, the important thing is to ensure that biomass is used in a sustainable manner, which means that crops may only ever be harvested to the extent that they can grow again during the equivalent period, and that their cultivation may not compete with food production.

“First-generation” bio liquid fuels are already available in standard form, including bio oil and bio ethanol, obtained in Germany primarily from rapeseed, corn and sugar beets. Standardized fuel oil with a ten percent share of bio oil (EL fuel oil A Bio 10) is currently available in Germany. For several years now, up to seven percent bio oil has been added to conventional diesel fuel, and up to five percent bio ethanol to normal petrol.

Petrol blended with up to ten percent bio fuel (Super E 10) has also been available at German filling stations since early 2011. Super E 10 however has fallen into disrepute in Germany due to potential incompatibility with the engines of certain types of automobiles.

Reserves and resources – important technical terms in the oil industry

In estimating the deposits of oil available worldwide, the following four terms are of special importance:

>- **Reserves** are the amount of crude oil which have been reliably located and can be profitably extracted with technical means available today.

>- **Resources** are oil deposits whose recovery is not profitable with current techniques or whose existence is geologically suspected but not proven with certainty.

>- **Conventional oil** is oil which can be recovered using conventional extraction technologies.

>- **Unconventional oil** (oil sand, oil shale, extra-heavy oil on the other hand can only be made economically useful with new technologies, some of which still need to be developed.

Total oil potential in billions of tonnes

Source: German Federal Institute for Geosciences and Natural Resources (BGR), data from late 2009

<table>
<thead>
<tr>
<th>Total volume of crude oil extracted up to now</th>
<th>Reserves</th>
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<tr>
<td>Conventional oil</td>
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<td>161</td>
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<td>Unconventional oil</td>
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In order to produce first-generation bio fuels, only a small part of the plant can be used. For second-generation liquid bio fuels on the other hand, also known as BtL (biomass to liquid) fuels, almost the entire plant can be exploited, allowing correspondingly higher yields. Another advantage of these synthetic fuels is that their properties can be precisely adjusted to their respective applications. But the technology for producing BtL is still in its infancy, and industrial-scale production has not yet been reached.

**Heating with oil – efficient and affordable**

The heating market is one of the largest areas of application for oil as a fuel source. Roughly 30 percent of all heating systems in Germany operate on oil. Oil is used to generate heat for single-family homes, apartment buildings, industrial facilities and local heating networks.

In light of the growing worldwide scarcity of oil and its increasing price, it is urgent that we use this fuel as sparingly as possible. If oil is used for heating, the most efficient technology available should be deployed in its combustion.

**Condensing technology: the most efficient way of generating heat**

Today’s modern condensing boilers represent the most efficient way of heating with oil. With efficiencies up to 98 percent, they convert the energy chemically bound in fuel oil into usable heat, nearly up to the limit of what is physically possible. High-efficiency oil condensing boilers are available for all applications. Wall-mounted and compact units with integral DHW cylinders take up very little space and are particularly suited for use in single- and two-family dwellings. Flooorsstanding condensing boilers are offered for single-family homes, residential complexes, large administration buildings, industry and local heating networks. For large outputs in the megawatt range in particular, heat exchangers are installed downstream of conventional oil boilers to condense the hot gases and take advantage of the heat they contain.

But oil condensing technology has a number of other benefits. Replacing old heating equipment with a modern oil condensing boiler increases efficiency to significantly reduce both fuel costs and CO2 emissions. Investment costs are also relatively low, and modernising with condensing technology is absolutely unproblematic. The hydraulic connection of the condensing boiler to the heating system is straightforward, and existing equipment such as fuel oil tanks, pumps and radiators can usually continue to be used.

**Greener heating with oil**

Admixing bio oil makes fossil oil greener and decreases dependence on petroleum products. It is no problem for modern oil condensing boilers to be operated with standardized fuel oils containing a proportion of bio components. They can also be combined with solar thermal systems for heating domestic water and backing up central heating or be operated with wood-fired boilers and heat pumps. This additionally reduces the consumption of fossil fuels and significantly decreases CO2 emissions.
Fuel for road, air and ship transportation

Oil is by far the most important fuel for transportation today. Passenger cars and trucks around the world are driven almost exclusively by combustion engines running on either petrol or diesel. All air transport relies on kerosene and special fuel (aviation spirit) obtained from oil. And ocean passenger and cargo transport as well as inland waterway transport also depends on engines running on diesel or heavy fuel oil. Only in rail transport does electricity play a significant role.

Alternatives to petrol and diesel in road transportation

Electric motors are increasingly seen as a promising alternative to combustion engines. Electric automobiles are currently only offered by a few car makers, but are at the top of the development list of most automobile producers. In addition to very low costs per kilometer, electric cars are emission-free and very quiet to drive. When run on electricity from renewable sources, they do not emit CO2 to the atmosphere.

The greatest hurdles to widespread use of electric cars are their high purchase price and limited range. Most electric cars at today’s state of the art can go less than 200 kilometers on a single charge. This has to do with the relatively small amounts of energy which can be stored in the rechargeable batteries available today. To achieve a range of 800 kilometers with a single “full tank” would require more than 600 kilograms of modern lithium ion batteries in the electric car. Compare that with a diesel vehicle, which could drive the same distance on just 40 kg of fuel.

Until higher-performance rechargeable batteries are available, hybrid vehicles are good interim solutions, combining an electric motor with a conventional combustion engine for long-distance trips. Fuel cell vehicles might be another promising solution. They use hydrogen and a fuel cell system to generate electricity for the drivetrain. But unlike hybrid cars, which are already being manufactured in large numbers, fuel cell vehicles are still in the development stage.

Ship and air transport

Electric and hybrid drives are also considered to be an emerging option for ship transport. 100-percent electric motors are already common in small boats such as those used on inland waterways. Some of the batteries in these boats are charged from an on-board photovoltaic system.

Container ships, oil tankers and other vessels suitable for the open seas on the other hand require outputs of several thousand kilowatts, which has only been possible with large diesel engines and atomic propulsion up to now. Nuclear reactors are subject to strict safety regulations, which is why nuclear marine propulsion is mainly found in military ships. As a result, manufacturers of diesel engines and ocean freight companies try to increase efficiency by optimising engine technology.

The aviation industry is also keen on conserving fuel by optimising engines along with the entire aircraft. Fuel consumption per kilogram of flight mass has decreased constantly over the past decades, primarily by improving the aerodynamics of wings and fuselage and reducing overall weight thanks to modern polymers.

Airlines and the military are also exploring biogenic fuel blends. Since mid-July, Lufthansa has been testing kerosene with a 50-percent blend of biofuel in a regularly scheduled flight between Hamburg and Frankfurt. The main objective of this long-range test is to gain experience and investigate the effects of biofuels on the environment as well as on maintenance and the service life of engines. As a positive side effect, Lufthansa expects to conserve roughly 1,500 tonnes of CO2 emissions from this test alone.
Dr. Viessmann has recently been honored with the German Founders’ Lifetime Achievement Award. The awards ceremony took place on June 28 in Berlin, where the initiative’s jury recognized him for outstanding entrepreneurial achievements.

“Corporate culture based on the principles of sustainability”

“Viessmann created a corporate culture based on the principles of sustainability”, states the jury in granting the award. “The company is committed to fulfilling its economic, environmental and social responsibilities. Special attention is paid to the environmental compatibility of all processes, to resource efficiency and to promoting the use of renewable energy. By systematically focusing on organic growth, Viessmann established a strong company culture where employees personally identify with the decisions of the company. Viessmann’s social involvement is exemplary, from sport sponsorships to targeted promotion of social projects, culture and science.” The award organizers add: “Despite its international success, Viessmann has remained a family business. With its organically grown structures, it holds a unique position in a market characterized by multinational conglomerates.”

Initiated by stern, Sparkassen, ZDF and Porsche

The Founders Award is Germany’s most important award for outstanding entrepreneurs. The initiative aims to promote a positive climate for start-ups in Germany and encourage people to go into business for themselves. The awards are given out annually in various categories, including Pupils, Start-ups, Up-and-comers and Lifetime achievement. The German Founders Award was established in 1997 to promote entrepreneurship and a start-up culture, and is sponsored by German weekly news magazine stern, German Sparkassen savings banks, German public television broadcaster ZDF and Porsche.
Top rankings in “markt intern” survey
Perfect delivery is an essential service element for trade partners

Once again in 2011, several thousand heating contractors have chosen Viessmann as the Best Professional Trade Partner of the Year, as part of a survey conducted every two years by “markt intern” trade magazine. In the previous issue of aktuell, we reported that Viessmann enjoys this accolade for the 11th time in a row now. In addition to first-place rankings in the categories of boilers, solar thermal systems and biomass, Viessmann was also rated very highly in terms of delivery service. This serves as a recognition of the measures taken by the company in recent months and years to provide Viessmann’s trade partners with an even broader range of services, especially when it comes to delivery.

Customers supplied via overnight delivery

At the heart of Viessmann’s logistics concept is the distribution center opened in 2009 at the company’s headquarters in Allendorf, Germany. It allows for faster connections and shorter distances to many trade partners. Orders are processed in three regional warehouses located throughout Germany. The efficiency of the logistics concept makes it possible to reliably deliver to customers overnight. This means that orders received by 6 p.m. can be delivered by 8 a.m. the next morning if desired. And this even applies to packages of urgent replacement parts from Sunday to Monday when necessary. This capability gives Viessmann an unparalleled position in the industry.

Reducing transport kilometers decreases CO2 emissions

Reducing regional warehouses to only three locations and directly connecting the distribution center to the international goods distribution center has helped to significantly reduce the number of shipments. Central order processing also helps to increase supply capabilities while significantly decreasing the number of transport kilometers driven by heavy trucks. Deliveries with less than five items are sent as postal packages to reduce costs and conserve the environment, as less CO2 is generated this way.

In accordance with the Viessmann motto “Nothing is so good that it cannot be improved”, the company will continue to look for ways to further enhance its delivery service – and expand its competitive edge even more.
Conveniently located near the A2 motorway, the Viessmann Group’s regional sales office in Herford is the first one to be completely supplied with electricity and heat from renewable energy sources.

**Sustainability targets defined early in the planning phase**

The company has invested roughly 3.3 million euros in the new construction project, in which sustainability targets were defined early in the planning phase. By using efficient technologies already available on the market, a state-of-the-art building was created which has been awarded a gold certificate from the German Sustainable Building Council (DGNB).

**Integrated energy concept for heat and power supply**

Ambient sources provide environmentally friendly heating in the winter and cooling in the summer for the 750-square-meter building. A Vitocal 300-G Pro series ground source heat pump has also been installed, specially designed for large outputs and featuring 18 geothermal probes. It provides a heat output of 40 kW and cooling of 60 kW. Triple-paned windows and building envelope insulation help to ensure that the heat generated is used as efficiently as possible.

In addition to ambient heat, the sales office in Herford also utilizes solar energy. Three vacuum tube collectors with an area of six square meters have been mounted on the façade to supply hot water, while 256 photovoltaic modules installed on the roof of the building provide a total power output of 56.3 kW, which is fed into the grid.

As part of its energy concept, the sales office in Herford also obtains environmentally friendly electricity from renewable sources such as biomass, hydroelectric and wind power. This eco-electricity is provided by the public utilities company of Herford, and its quality is tested and verified by the TÜV Technical Inspection Association Rhineland at regular intervals. This means that the overall heat and power supply of the building is carbon-neutral.

**Distinctive architectural concept**

The project on the 4,000-square meter property was completed in just nine months and consists of office space for 15 employees, ex-
A photovoltaic system with an output of 56.3 kW of power has been installed on the roof of the new regional office. Domestic hot water is generated in three vacuum tube collectors.

A distinctive architectural concept was implemented for the regional sales office. Functionality, materials and a clear design determine the aesthetics of the building. Unnecessary frills and add-ons were intentionally avoided. Openness, transparency and light characterize the interior. The friendly atmosphere promotes communication and is additionally enhanced by functional furnishings.

**Hands-on training for all products from the comprehensive range**

The training facilities of the sales office in Herford primarily target local heating contractors. Practical training sessions can be carried out here for all products of the comprehensive Viessmann range, in particular regenerative energy systems. Informative events are also offered for architects and representatives of the housing sector.
BIOFerm:
First dry fermentation digester in the Americas

The first dry fermentation digester in America went operational in May. This system was realized by Viessmann Group member BIOFerm and is not only the first of its kind in the US but throughout the Americas – to date there have only been wet or liquid manure digesters. The project is sponsored by the University of Wisconsin Oshkosh, which has received numerous accolades for its environmentally friendly campus.

**Key step in establishing a carbon-neutral campus**

The installation of the BIOFerm system is a key step in establishing a carbon-neutral campus in Oshkosh. It is essentially identical to the biogas plant at Viessmann’s headquarters in Allendorf. The facility in Oshkosh will conserve resources and generate electricity and heat by fermenting food, agricultural and yard wastes. An annual production of more than 2.3 million kWh is expected, which can meet eight percent of the electricity demand at the university, home to 13,600 students. Additionally, the thermal energy produced by the system will be used to heat adjacent university buildings.

**US offers enormous potential for biogas plants**

More than 100 guests from industry, politics and other universities attended the dedication ceremony. With only about 60 commercial biogas plants up to now, the US represents an enormous potential for environmentally friendly, efficient energy generation with biogas systems.

BIOFerm’s American subsidiary BIOFerm Energy Systems opened an office in Madison in 2007 and has been expanding ever since. In the near future, it is planned to build two additional dry fermentation facilities in the US with 14 digesters and two megawatts of electrical output each. A wet digestion plant will also be built by Viessmann Group member Schmack. The projects are part of Viessmann’s strategy of making dry and wet fermentation technology a key component of renewable energy production in North America.
Viessmann's tube collector plant in Dachang, China was officially opened in autumn 2009. After just 20 months of operation, the facility is already celebrating an impressive achievement: the production of its one-millionth vacuum solar tube.

Managing directors signed milestone tube

“This success would not have been possible without the dedication of our employees”, says Rüdiger Nagel, Managing Director of Viessmann Dachang. And the red carpet was indeed rolled out for a number of staff members during the celebration. Viessmann Supervisory Board member Dr. Klaus-Peter Kegel, Prof. Xinian Jiang and Rüdiger Nagel from Viessmann Dachang management together with Marc Vigneron, Managing Director of Viessmann France and head of the solar thermal department, presented awards to 15 employees for outstanding performance and then signed the one-millionth tube.

300 employees manufacture vacuum tubes for Viessmann’s solar collectors in the roughly 16,000-square-meter production facility in Dachang. Viessmann took over Chinese collector manufacturer Eurocon in 2008, which served as the nucleus for the new plant that was built within just 12 months.

Selected employees from the Dachang plant who were honored for their performance; in the foreground, the one-millionth vacuum solar tube signed by company management.

The advantages of its location in a newly developed industrial area include a modern infrastructure and and short distances to Beijing airport and Xingang seaport.

Other Viessmann locations in China
In addition to its plant in Dachang, Viessmann also operates a production facility with adjoining sales department in Beijing, a regional sales office in Hong Kong and additional branches and representative offices in Shanghai and eight additional large cities in China. The company focuses not only on solar technology and specifically tube collectors, which have a market share of some 90 percent in China; other key products include wall mounted gas fired boilers and industrial boilers.
Combined heating and power systems from ESS Energie Systeme & Service GmbH
Generating heat and power very efficiently

Global warming and increasingly scarce natural resources can be effectively counteracted by using efficient technologies and expanding renewable energy production. Modern combined heat and power (CHP) units are highly efficient systems for generating both heat and electricity. According to ASUE, a German association that promotes energy conservation and environmentally sound energy consumption, using gas fired CHP units reduces primary energy consumption up to 36% and CO2 emissions up to 58%, compared to conventional technologies. When run on bio natural gas from renewable biomass, the heat and electricity they generate is even sustainable and completely carbon-neutral.

Efficiencies up to 96%

CHP stations work on the principle of co-generation. A combustion engine, a generator for creating electricity and all other components are housed in a compact unit. Modern CHP units operating on natural gas or biogas, such as those manufactured by Viessmann Group member ESS Energie Systeme & Service GmbH, achieve efficiencies up to 96%, making them the second-most efficient way of converting energy, after condensing technology.

One reason for the high efficiency of CHP units is their intelligent use of the heat they generate. Many conventional power plants simply release nearly two-thirds of the energy used to generate electricity (from coal, uranium or natural gas) to the environment in the form of waste heat. It is often not possible to employ this energy to heat buildings, for instance via district heating networks, because power plants are usually not located close enough to residential areas. This is
where the idea of decentral CHP stations comes in. The compact devices generate electricity right where the accumulating heat can be directly used—in homes, office buildings, commercial enterprises and local heating networks.

The right output is crucial

The crucial factor is that the output of the CHP unit matches the needs of the building in question and no heat is wasted. At the same time, annual operating times of at least five to six thousand hours should be achieved to ensure economical operation and to produce enough electricity for personal use or feeding back into the grid. With few exceptions, for instance emergency power in hospitals, a CHP unit is sized to cover the basic thermal load of a building. A peak load boiler is used to meet peak demand on the relatively few very cold days of the year.

Attractive subsidies

Due to the high efficiency and climate-friendly properties of co-generation, the German government intends to double the share in the power supply from currently 12% to 25% and offers owners attractive subsidies for operating a CHP unit. The Combined Heat and Power Act (KWKG) pays operators of CHP units with an electrical output up to 50 kW a compensation of 5.11 euro cents per kWh, whether the electricity is fed back into the grid or consumed personally. The remuneration is considerably higher, up to 23.3 cents per kilowatt hour according to the German Renewable Energies Act (EEG), when the electricity is generated from bio natural gas. Thus several thousand euros of subsidies can be earned each year, depending on the amount of electricity produced.

Comprehensive range of CHP units and supply agreements for bio natural gas

In addition to efficient condensing boilers, biomass boilers, heat pumps and solar thermal systems, the Viessmann Group also supplies equipment for co-generating heat and power, including the innovative Vitotwin 300-W micro CHP system with 1 kW of electrical output and 26 kW of thermal output, for single- and two-family homes. Outputs of 5.5 to 401 kWel and up to 549 kWth are possible with the Vitobloc 200 CHP unit from Viessmann Group member ESS GmbH. These units are designed for large apartment buildings, hotels, commercial and industrial sites and for operating local heating networks.

Viessmann also offers a revolutionary new concept: a Vitobloc 200 CHP unit together with a supply contract for bio natural gas, allowing the CHP operator to take advantage of attractive feed-in remuneration under the German Renewable Energies Act (EEG) for up to 20 years. Bio natural gas will now be as easy for CHP unit operators to obtain as electricity from renewable sources. They simply use their usual natural gas from the gas network. The supply contract for bio natural gas includes a certificate of origin, which indicates the quality and volume supplied and is valid proof for receiving remuneration for electricity generated with bio natural gas.

<table>
<thead>
<tr>
<th>Generating power</th>
<th>Separate generation</th>
<th>CHP system</th>
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</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>55%</td>
<td>87%</td>
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<tr>
<td>Energy use</td>
<td>157%</td>
<td>100%</td>
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<tr>
<td>Losses</td>
<td>70%</td>
<td>13%</td>
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| Particulates     | 100%               | 99.0%       |
| SO₂              | 100%               | 98.5%       |
| NOₓ              | 100%               | 29.0%       |
| CO₂              | 100%               | 58.0%       |
| Primary energy   | 100%               | 36.0%       |

Co-generation of heat and power compared with conventional heating technology (Source: ASUE).
The buildings of Köb Holzheizsysteme GmbH in Wolfurt enjoy a carbon-neutral heating supply. In 2010, an internal heating network was installed to use the waste heat from the boiler test station to supply the company’s offices and a neighbouring building. This means that the complete heat supply for the plant and the administration buildings is generated from renewable resources. This year, Köb also switched to green electricity from the VKW utilities company, which generates electricity from hydropower, photovoltaics and biogas. Following the purchase of two electric vehicles for on-site transport, the energy supply of Köb’s operational activities is now completely carbon-neutral.

At Mawera Holzfeuerungsanlagen GmbH in Hard, heat is generated exclusively using renewable resources. The company plans to transition to green electricity in 2012. These measures are modelled on the “Efficiency Plus” project, as part of which Viessmann has reduced CO2 emissions at its headquarters in Allendorf by one-third and increased efficiency by 40%.

Köb Holzheizsysteme GmbH has been a member of the Viessmann Group since 2007. Together with Mawera Holzfeuerungsanlagen GmbH, which was acquired one year previously, the company has continued to expand its leading position in the field of renewable energy from biomass. This issue of aktuell profiles Köb as part of its series of portraits of Viessmann Group members.

Founded 32 years ago
Siegfried Köb and Bernhard Schäfer founded the predecessor company, Köb & Schäfer KG in Wolfurt, Austria, in 1979 and developed a prototype of a wood gasification boiler. The first direct firing system was designed in 1980. Additional pioneering innovations in the following years made Köb into one of the leading manufacturers of wood heating systems.

Innovative combustion technology
Köb wood heating systems are particularly suitable for commercial use, such as schools, hospitals, district heating networks and wood-processing operations. Köb’s PYROT family of boilers currently represents the most advanced combustion technology in the medium output range. These boilers use the patented low particle method for combusting pellets and wood chips, a technology which has been recognized with the Austrian Innovation Award. A fine particle filter for the range from 100 to 540 kW is also available in the comprehensive boiler and system portfolio.

Additionally, Köb offers smaller special boilers for logs and dual-mode operation with wood chips/pellets with outputs from 35 to 170 kW. The fully wired Ecotronic control unit offers outstanding operating convenience for a single system with up to 14 heat consumers. Mastercontrol has been developed for multi-boiler systems.

Extensive range of accessories
Various systems ensure reliable boiler feed and ash removal, including a pellet auger, a hydraulic push floor and a spring core discharge. The extensive range of accessories supplements a comprehensive system tailored to the needs of customers and their individual projects. Köb thus covers the medium output segment between small boilers from Viessmann’s Vitoligno range and outputs above 1,250 kW, for which Mawera Holzfeuerungsanlagen GmbH is responsible.

More than 1,500 of the large Köb systems alone with outputs of 100 kW and higher are in operation around the globe. The company continues to be located in Wolfurt in the Austrian state of Vorarlberg and currently employs a staff of 110.

The Köb Pyrotec is an automatic wood fired boiler for use in large residential complexes, commercial enterprises and local heating networks.
Austria’s export champion has much to offer

Vorarlberg – home to mountains and innovations

The state of Vorarlberg lies in the western part of Austria, bordering on Germany, Switzerland and Liechtenstein. The Arlberg region is a paradise for skiers and hikers in particular and is famous for its winter sport destination St. Anton, the Bregenzerwald mountain range and the Montafon valley. With roughly 28,000 inhabitants, the state capital Bregenz is located on picturesque Lake Constance, right where the borders of Germany, Switzerland and Austria meet. But Vorarlberg’s economic strength is based on more than just tourism.

Robust economy thanks to large industrial companies

After Vienna, Vorarlberg is the second most industrialized state in Austria and is the strongest exporter in the country with an export rate of approximately 70 percent. Germany, Italy and Switzerland are the state’s most important trade partners. Leading industries include tourism, the metal and electrical sector, mechanical engineering and steel construction. The largest employer is plastic bottle manufacturer Alpla in Hard with some 12,000 employees around the globe and turnover of more than 2.5 billion euros. Renowned companies such as Red Bull, Liebherr, Kraft Foods, Zumtobel and Julius Blum are also active in Vorarlberg. The westernmost state in Austria is also home to Viessmann Group members and biomass specialists Köb and Mawera. Köb supplies boilers up to 1,250 kW for standard wood fuels, while Mawera designs and produces complete systems up to 13 megawatts for generating heat and electricity from all kinds of wood sources.

High-tech skis for the World Cup

Skis from manufacturer Head in the small village of Kennelbach are world-famous. The high-tech products are popular with hobby skiers and top athletes alike, including Bode Miller, Didier Cuche, Maria Riesch and Lindsey Vonn. Kennelbach seems to have a strong affinity for winter sports – SUFAG, international manufacturer of snow cannons, also has its headquarters here. And in Wolfurt, which is also home to Köb, the high-tech company Doppelmayr produces ski lifts and cable cars. Their products transport skiers and hikers to mountaintops around the world.

Vorarlberg aspires to energy autonomy

Generating electricity is a cornerstone of the economy in Vorarlberg. Hydroelectricity is the main power source here due to the local topography. The largest energy supplier of the region, Illwerke VKW Gruppe, now operates more than 250 feed-in plants and produces more than 22 million kWh of electricity annually. Green electricity from Vorarlberg is also exported to Germany and Switzerland. Vorarlberg hopes to gain complete energy autonomy within 30 to 40 years, and primarily plans to increase energy efficiency to reach this ambitious goal. Incidentally, in 2003 Vorarlberg was the first region of Europe to have produced more renewable energy than it consumed.
Vitosolar 300-F
Easy-to-install heating center with solar central heating back-up

Modern condensing technology is the most efficient way to generate heat. But heating is even more cost-effective when a share of the required energy comes from the sun. The new Vitosolar 300-F combines efficient condensing technology and solar central heating back-up in a compact, easy-to-install heating unit for single-family homes.

All components, including oil or gas condensing boiler, 750-liter combination cylinder for solar DHW generation/back-up heating and other equipment, are ready for easy installation. The pre-assembled, thermally insulated base comes with all necessary parts for hydraulic and electrical connection, making it a breeze to install the complete heating center.

Less than 1.5 square meters of floorspace
Choosing where to install the center is also easy: the new compact device takes up less than 1.5 square meters of floorspace, requiring much less area than conventional solutions of separate components. The visually appealing housing means the new heating central can even be installed in housekeeping or utility rooms, should no basement be present in new houses.

A single control unit for all systems
Unlike conventional systems with solar central heating back-up, the Vitosolar 300-F only needs one control unit. All settings are made via the straightforward, intuitive Vitotronic 200. Solar yields are shown as a diagram on the large display.

Highly efficient complete system
Modern condensing boilers – a choice of the Vitoladens 300-W oil condensing unit, the Vitodens 300-W gas condensing unit or the Vitodens 200-W – feature high seasonal efficiencies up to 98% (Hs) and ensure economical, climate-friendly combustion of fossil fuels. The free energy of the sun can meet 25% or more of heating and DHW demands in new buildings and more than 12% in older buildings (according to tests conducted by German consumer organization Stiftung Warentest).

The pumps for the heating and solar circuits in the Vitosolar 300-F are also engineered for efficiency. The variable-speed high-efficiency pumps (energy label A) use as much as 70% less electricity than conventional pumps.

Eligible for subsidies in Germany
Because the Vitosolar 300-F fulfils the requirements of the German Renewable Energies Heat Act (EEWärmeG) and the Renewable Heat Act (EWärmeG) in the state of Baden-Württemberg, homeowners can apply for public subsidies.
Oil will remain an essential fuel for a long time to come, but its finite reservoirs make it important to conserve this resource as much as possible. High-efficiency condensing technology for supplying heat represents an important way of achieving this goal. Particularly affordable condensing boilers are now available in the form of the new Vitorondens 200-T and 222-F, allowing economical, sustainable oil condensing technology to be used even with tight budgets.

Vitorondens 200-T (20.2 to 53.7 kW) and 222-F (20.2 to 28.9 kW) are cast iron boilers with the proven Eutectoplex heat exchanger surface, which boasts high operational reliability and a long service life. The downstream corrosion-resistant Inox stainless steel radial heat exchanger cools the hot gas down so much that the steam it contains condenses. The additional heat obtained in this manner is fed into the heating system, allowing seasonal efficiencies up to 97% (Hs).

Additionally, the Vitorondens 222-F comes equipped with an integrated DHW cylinder. With a volume of 130 liters or 160 liters in the 28.9 kW version, it ensures outstanding domestic hot water convenience for showering, washing and cooking.

Both boilers are compact in size and thus ideal for modernization.

Sustainable thanks to renewable energy

The Vitoflame 300 blue flame burner in the Vitorondens 200-T and 222-F models can be operated in either open flue or balanced flue mode. In addition to burning conventional fuel oil grades, standardized fuel oil/bio blends with up to ten percent bio oil (EL fuel oil A Bio 10) can also be used without any problem. This improves the CO2 balance of the house and makes the oil condensing boiler sustainable for the future.

The Vitorondens 200-T can also be combined with a solar thermal system for DHW generation and central heating back-up to further reduce fuel consumption and CO2 emissions. To achieve this, an SM1 solar control module can be added to the Vitotronic 200 control of the boiler. No additional solar control unit is necessary. The complete heating system including the solar thermal system can be set and controlled via the Vitotronic 200 unit.

Easy and convenient to operate

The large lighted display and straightforward navigation of the control system’s innovative programming unit make the boiler easy and intuitive to operate. Operating times, heating curves and solar yields are shown in convenient diagrams.
To conduct automatic flow balancing, the service technician needs a laptop and a service set including remote-controlled actuators and the Vitosoft 300 software.

Vitodens 300-W
Flow balancing in less than one hour

Optimizing the heating system through flow balancing can mean up to 15% savings in energy. To achieve this, heating water flows to the individual radiators must be matched to the output of the circulation pump, so that every radiator receives exactly as much heat as it needs.

Viessmann has introduced an innovative solution for this complex, time-consuming task. The new Vitodens 300-W wall mounted gas boiler (1.9 to 11 kW) and the Vitosoft 300 software now automatically make the necessary fine adjustments in less than one hour. The output of the circulation pump and the corresponding heating curve are automatically set by the boiler. Complex calculations and tables are a thing of the past; no special skills are required.

Vitodens 300-W and Vitosoft 300 automatically determine all settings
To be able to carry out automatic flow balancing for customers using the new Vitodens 300-W, technicians will need to buy a service set (one-time purchase). The set includes Viessmann’s Vitosoft 300 software along with twelve remote-controlled actuators to temporarily replace the usual thermostatic valves.

The new Vitodens 300-W is the first wall mounted gas condensing boiler to allow automatic flow balancing. This technique can mean up to 15% savings in fuel.

No actions are necessary while the Vitodens 300-W and Vitosoft 300 automatically carry out the measurements. Once the TÜV-certified process has been completed, the settings for every radiator valve are reported by the Vitosoft 300 software in a service record sheet and transferred to the thermostatic valves by the service technician. The user can then use this service record sheet to apply for subsidies from the KfW Development Bank.

Temperature sensors, a flow rate sensor and an intelligent control unit make it possible to operate the unit without a minimum flow rate, which can compromise efficiency. In conventional wall mounted boilers, a minimum flow rate must be maintained to prevent the unit from overheating if heat consumption suddenly decreases (for instance by closing all thermostatic valves). Sensors and the control system in the Vitodens 300-W ensure that the burner is turned off in a timely manner.

High-efficiency wall mounted gas boiler with extensive innovations
The new Vitodens 300-W features a number of innovations beyond automatic flow balancing. The MatriX gas burner with a large modulation range of 1:6 and the stainless steel radial heat exchanger ensure outstanding seasonal efficiencies up to 98% (Hs). The Lambda Pro system keeps combustion under control despite any fluctuations in gas quality or changes in the exhaust/ventilation air system.

Temperature sensors, a flow rate sensor and an intelligent control unit make it possible to operate the unit without a minimum flow rate, which can compromise efficiency. In conventional wall mounted boilers, a minimum flow rate must be maintained to prevent the unit from overheating if heat consumption suddenly decreases (for instance by closing all thermostatic valves). Sensors and the control system in the Vitodens 300-W ensure that the burner is turned off in a timely manner.
Viessmann is pleased to introduce the new Vitotwin 300-W, a heating system which supplies not only comfortable heat but also electricity for single- and two-family homes.

The Vitotwin 300-W micro CHP system combines a high-efficiency gas condensing boiler, MatriX burners, an Inox stainless steel radial heat exchanger and a newly developed Stirling engine – all in a compact housing the same size as a conventional wall mounted gas boiler.

The very quiet Stirling engine generates one kilowatt of power, and its waste heat (6 kW) is used for heating and generating DHW. If a larger heat output is required, for instance on especially cold days, the gas condensing boiler can provide up to an additional 20 kW. The Stirling engine and the condensing boiler operate on an efficiency level of 96% (Hs).

The micro CHP system meets the total heat demand of a house and is especially well-suited for modernization. The Vitotwin 300-W is also very economical at gas consumption rates of at least 20,000 kWh per year and electricity consumption rates of more than 3,000 kWh per year.

**Attractive remuneration for all electricity generated**

Electricity generated by the Vitotwin 300-W is enough to meet the typical basic needs of a house and reduces dependence on power from the utilities company. Operators not only save costs but can also take advantage of remuneration as provided for by the German Combined Heat and Power Generation Act (KWKG). Self-generated electricity which is not needed in the house is automatically fed back into the local grid. All electricity generated by the Vitotwin 300-W is remunerated with 5.11 euro cents/kWh.

**Simple installation and service**

Installing and servicing the Vitotwin 300-W is just as easy as with conventional wall mounted gas units. Only the electrical connection must be installed by an electrician. The Stirling engine and the condensing boiler share both the gas connection and the exhaust system, so that there is no additional installation work. Maintenance of the peak load burner is comparable to that of regular wall mounted gas boilers. The Stirling engine is maintenance-free; unlike conventional combustion engines, it does not require filters or lubrication.

Viessmann’s Vitotwin 300-W micro CHP system makes it possible to generate both heat and electricity even in single-family homes.
KWT heat pump used for heating and cooling
OTTO Luft- und Klimatechnik GmbH opens state-of-the-art office building

The Eco Port industrial park is located directly at the transport hub of Dortmund Airport and the A1 and A40/B1 motorways in Germany. A modern office building has been built there by ventilation and air conditioning specialists OTTO GmbH & Co. KG from Bad Berleburg, Germany. A custom-tailored KWT heat pump is used to heat and cool the building.

Variable building concept
The flexible building concept accommodates a variety of spatial arrangements, from individual offices to open floor plans. The total leasable area can be subdivided to create rooms of 125 to 830 square meters. Roughly 200 square meters of hall space plus storage areas in the basement are also available.

The KWT heat pump can be used for both heating and cooling, with a heat output of 145 kW and a cooling output of 158 kW. The screw compressor in the KWT heat pump is highly efficient in all operating modes and has low levels of noise and vibration.

15 geothermal probes provide energy
15 geothermal probes as deep as 130 meters provide energy for the heat pump, which transfers the heat not to domestic hot water as usual but to the ventilation system. The low heat demand of the building, which exceeds the requirements of the German Energy Saving Ordinance (EnEV2009) by more than 30%, makes it possible to heat and cool all rooms via the ventilation system alone. Additionally waste heat from the server room is utilized.

KWT – customized built heat pump systems
Like the system in Dortmund, a majority of KWT heat pump systems are individually planned and built according to customer specifications, regardless of whether they involve ground source or air source heat pumps. The output ranges from 15 to 2,000 kW and can be cascaded as desired to achieve even higher outputs.
Intelligent control concepts

Modern building service equipment requires integrated control solutions which are able to communicate with other systems. KWT control systems offer a maximum of functionality combined with an open system architecture which can communicate with standard systems on the market.

Incidentally, OTTO itself occupies the office building it constructed near Dortmund, where the company has opened a branch office on the ground floor.

The KWT heat pump can be used for both heating and cooling.
Two Mawera woodchip boilers supply a large monastery complex
European Architecture Award for the energy center at St. Ottilien’s Archabbey

Every year, the Association of German Architects (BDA) and the German Sanitation, Heating and Air Conditioning Federation (ZVSHK) present the European Energy + Architecture Award to honor projects integrating energy concepts, innovative building technology and sophisticated architecture. The 2011 award went to the energy center of St. Ottilien’s Archabbey in Germany, where two Mawera woodchip boilers supply heat.

One of the largest Benedictine monasteries in Europe

Idyllically located near the Ammersee lake in Upper Bavaria, St. Ottilien’s Archabbey is one of the largest Benedictine monasteries in Europe with approximately 110 monks. In addition to the actual monastery and church, the monastic village consists of about 45 buildings, including a boarding school, several residential buildings, workshops, a publishing house, a monastery fire brigade and a restaurant with beer garden.

The objective in planning the new energy center was to create a woodchip heat plant whose architecture poetically expressed its ecological aspect, a kind of brilliant “fire house” with woodchip storage.

Located in an idyllic setting, St. Ottilien Archabbey is one of the largest Benedictine monasteries in Europe.

Former heating centers now heat transfer stations

The site was heated exclusively by oil through early 2008 – an estimated 700,000 liters per year. Due to increasing environmental awareness, rising oil prices and not least the monastery’s own large forests, it was decided to switch to woodchips as a fuel. The heating equipment was to be concentrated in one building, whereby the three old heating centers were to be used as heat transfer stations for self-generated district heating.

Two Mawera woodchip boilers, models FSB 350 and FSB 700, now supply heat in the new energy concept. The smaller boiler delivers a maximum output of 350 kW, enough to cover the base load in summer of approximately 150 kW. The larger boiler with a maximum output of 700 kW is
Residents performed much of the work themselves. As is usual for construction projects at St. Ottilien, a large share of the work involved in installing the energy center was performed by the residents themselves.

Various fuels suitable, low particle content in exhaust gas

A flat moving grate allows the two Mawera boilers to even burn wood fuels with a high ash content. Advantages of flat moving grate combustion include the ability to use various types of fuel and a low particle content in the exhaust gas thanks to the stationary fuel bed. Low NOx reduction technology is generally used in Mawera flat moving grate combustion. The low NOx combustion chamber comes with primary-side air staging to reduce NOx emissions up to 80% relative to conventional moving grate combustion systems.

Thanks to the new boilers, now only 375 tonnes of carbon dioxide are emitted annually instead of 2,500 tonnes previously, with a total annual consumption of roughly 6.7 million kWh of heating energy.

The monastery's energy center with its award-winning architecture.

Two Mawera woodchip boilers provide the 45 buildings of the monastery with environmentally friendly heat.

Architects: Atelier Lüps, W.E. Lüps, architect, BDA, Schondorf, in co-operation with Günter Schmitt-Bossl!et, architect, VDA, Utting am Ammersee

Heat supply technology: Ebert-Ingenieure GmbH & Co. KG, Munich

General technical contractor: Imtech Deutschland GmbH & Co. KG, Munich headquarters

Project support and feasibility study: Research Center for Energy Economics (FfE), Munich
Autumn has arrived again, and active, sporty people are already looking forward to a winter of skiing and tobogganing in powder snow. What could be nicer than gliding down the slopes in brilliant sunshine – assuming one has the proper material. Viessmann’s winter 2011/2012 Selection catalogue offers the right equipment for every activity, with appealing design and excellent quality.

**Vito-Ski**

The Selection range presents downhill skis this year for the first time. Carving skis from the Differences ski company in Vorarlberg, Austria are a mixture of racing and freeride skis and offer the ultimate in comfort in all snow and slope conditions. These skis are perfect for advanced beginners to experienced racing athletes, and their exclusive design will make you stand out in any crowd. Produced exclusively with materials used in ski racing, their sandwich construction consists of a wooden core, aluminium layers, a high-molecular-weight polymer running base and a soft-touch surface. Edgar Anneser, qualified sports teacher and German Ski Association instructor, has put the Vito-Ski to the test and can attest to their outstanding qualities. For more information, please refer to the Selection winter catalogue, which will be available in October.

**Ski jacket and pants set**

You can rely on this wind- and waterproof set in any weather. It consists of a top-quality 2-in-1 ski jacket and colour co-ordinated pants.

The pleasantly light outer jacket features unsurpassed quality; made of soft nylon, it is breathable yet completely waterproof. The fabric exceeds the European standard for waterproofing by a factor of eight, even under pressure. The inner lining consists of high-tech “Thermore” insulation, which traps natural body heat in while allowing moisture to escape. The resulting air circulation guarantees excellent wear comfort. With four outer and three inner pockets, practical snow and wind protection and adjustable cuffs, this jacket not only looks great but is also highly functional. The easy-care soft-shell inner jacket is made of three-layer micro fleece and can be worn alone or underneath the outer jacket. The ski pants are also made from nylon and Thermore. Adjustable suspenders and a pre-formed knee section make them the perfect performance in all snow and slope conditions.
Viessmann Selection

UVEX Uvision Pro ski helmet

Set a good example for children on the slopes with the UVEX Uvision Pro ski helmet. Its outer shell and especially the EPS inner shell absorb the force of impact to provide maximum protection. And comfort is a priority: this helmet adjusts to the shape of your head, with chin pad and removable ear pads to make it even more comfortable. The anti-allergenic comfort liner ensures a pressure-free fit. Integrated ventilation channels in the inner shell guarantee optimum fresh air intake. The adjustable air vents at the top can be opened and closed as desired, and the Monomatic chin closure can be adjusted with just one hand. Another advantage in terms of comfort: the natural sound system, a special membrane in the ear padding to prevent the helmet from distorting hearing and ensure that no annoying drafts reach the ear.

UVEX x-ride Junior ski helmet

Especially for children, ski safety should be the number one priority. It’s not surprising that helmets are already mandatory in some countries for children up to the age of 14. The UVEX x-ride Junior ski helmet combines a flashy look with maximum protection. The inner shell acts as a crumple zone which can save lives in case of impact. The Monomatic comfort chin closure with multi-level adjustment is padded, cannot be accidentally turned and can be easily exchanged.

Insulated mug

Enjoy your favourite hot or cold beverage wherever you go with this attractive insulated mug, made of powder-coated, rust-free, double-walled stainless steel. The mug holds 0.4 liters, is leak-proof and easy to open and close at the touch of a button. The ergonomic shape fits in nearly every cup holder, and the lid closes tightly.

Solar charger

Your “electrical outlet” for on the go: the Viessmann Selection solar charger charges MP3 players, mobile phones and iPods with carbon-neutral electricity. It comes with four mobile phone adapters, high-quality solar cell, rechargeable lithium battery, USB output/cable and LED indicator. The device is equipped with an LED torch and can also be used on cold days as a hand warmer at the click of a button.
The Olympic Summer Games in London and the European Football Championships in Poland and Ukraine will be the sport highlights in summer 2012. But half a year before, it will be another major event which attracts millions of television viewers from around the world: the International Biathlon Union’s World Championships will take place from February 29 to March 11 in Ruhpolding in Upper Bavaria. The recently renovated Chiemgau Arena is a mecca for biathletes and will host a total of eleven races. It is the only world championship to take place in Germany in 2012.

**Viessmann team athletes reaching for the gold**

The athletes on Viessmann’s team are hoping for top finishes in the fourth event held in Ruhpolding. At the 2011 world championships in Khanty-Mansiysk (Russia), the German women’s relay team with the two Viessmann biathletes Andrea Henkel and Tina Bachmann took home gold for the German women’s team. The event was the first world championship for Bachmann, who also won a silver medal in the individual discipline. Arnd Peiffer, who won the sprint in Khanty-Mansiysk, also hopes to earn his next medal in Ruhpolding.

**Championships open with mixed relay**

The competition in Ruhpolding will open on March 1 with the mixed relay, which has been added by the International Olympic Committee to the 2014 Winter Olympic Games. The German mixed relay team including Andrea Henkel and Arnd Peiffer won silver at the 2011 world championships.

**Attractive fringe program**

But Ruhpolding is worth a trip in 2012 not just for the races. Visitors can also look forward to an extensive fringe program. Following the spectacular opening ceremony on February 29, the Champions Park will offer numerous attractions including the medal ceremonies and exciting parties with live music.

Whereas the Nordic ski athletes only hold world championships in uneven years, luge athletes will once again compete for the title of world champion in 2012, this time in Altenberg in Saxony. Olympic champion and Viessmann team member Felix Loch hopes to recapture the title he won in 2008 and 2009 but had to concede to Armin Zöggeler (Italy) in 2011 (there were no world luge championships in 2010 due to the Olympic Games). Three-time world champion and Olympic champion Tatjana Hüfner will be pursuing her fourth title. And doubles team Tobias Wendl/Tobias Arlt, who complete the Viessmann luge quartet, hope to bring home their first world championship gold.

**Exciting events besides the world championships**

But not only the world championships promise excitement. Cross-country fans are particularly looking forward to the Tour de Ski. World-class sprint and medium-distance races will take place from December 28 to January 5 in Oberhof, Oberstdorf, Toblach and Val di Fiemme. Only the best all-rounders have a chance of winning the title.

Following the outstanding performance of Viessmann’s Nordic combined team at the World Championships in Oslo (gold, silver and 2 bronze), Eric Frenzel and Björn Kircheisen hope to continue their success at the 2012 World Cup.

Now that Michael Uhrmann has ended his active career, German hopes for ski jumping are primarily on the athletes from the Viessmann team: Pascal Bodmer, Felix Schoft and Andreas Wank.

What was previously reserved for men only has now finally been opened up for participation by women. The women’s World Cup ski jumping event will be held for the first time in 2011/2012. Viessmann is the main sponsor of this event, where Germany’s female athletes aim to make a strong impression.

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**Biathlon World Championships 2012 schedule in Ruhpolding:**

<table>
<thead>
<tr>
<th>Day</th>
<th>Monday, March 5</th>
<th>Tuesday, March 6</th>
<th>Wednesday, March 7</th>
<th>Thursday, March 8</th>
<th>Friday, March 9</th>
<th>Saturday, March 10</th>
<th>Sunday, March 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event</td>
<td>Training</td>
<td>3:15 p.m.: Men’s individual</td>
<td>3:15 p.m.: Women’s individual</td>
<td>Training</td>
<td>3:15 p.m.: Men’s relay</td>
<td>3:15 p.m.: Women’s relay</td>
<td>1:30 p.m.: Men’s mass start</td>
</tr>
</tbody>
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Viessmann is breaking new ground in promoting young athletes by supporting a project unique in all of Germany. The “Haus der Athleten” (House of Athletes) in Garmisch-Partenkirchen is the first private winter sports school in Germany. Young athletes live on-site, attend class in adjacent schools, and depending on performance level work with trainers from the Olympia Sport School, local sport clubs or the teams of the Olympic Training Center in Garmisch-Partenkirchen. The comprehensive program of sport and education is what makes this concept unique. The winter sports school welcomed the first ten athletes in September, representing the disciplines of downhill skiing, cross-country skiing, ski jumping and biathlon.

Filling a gap in elite training

With its internationally recognized winter sports center, Garmisch-Partenkirchen offers ideal conditions for professional training of tomorrow’s winter sports stars. The school fills a large gap in the elite training of German winter sports athletes. Young athletes who don’t already belong to a team or promising talents still attending school can pursue both sport and an education for the first time as part of this model project.

Unique concept

“The concept of the House of Athletes is unique because parents can be sure their children are receiving the best possible education and athletic training – without excessive bureaucracy. And they don’t have to belong to a team already”, says Christian Neureuther, former downhill ski racer and father of Felix Neureuther, currently Germany’s only world-class downhill athlete.

The talented young residents of the House of Athletes are supported by the “Förderverein Olympia Sportschule”, an association which has initiated a “Diamond in the Rough” promotional concept among other projects. It plans to solicit funding from businesses and private supporters to provide scholarships.

On the luge track of Altenberg, Felix Loch hopes to recapture the world champion title which he was forced to concede this year to Armin Zöggeler.
Graphically depicting oil as a fuel is anything but easy. The main problem is that liquids do not have any shape – except for drops. In 2003, the decision was made to replace the previously used symbol for oil, a barrel, with a stylized drop.

The issue of time also played a role in developing the drop: the more time a drop has to form, the thicker its “belly” becomes. Reflections were integrated to make the visual representation more interesting and easily recognizable.

An orange-brown colour was chosen to represent oil. Variations in colour make the symbol into independent works of art.

The drop is also used in other colours to symbolize the condensate which is generated in the condensing process.

Experimenting with various styles of reflection on the drops to explore their effect.