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Ambient heat – safe, free and carbon-neutral







Ambient heat plays an important role in the energy mix – Page 6

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Cover:
Symbolic depiction of ambient heat sources
(Artwork: Karl Duschek)

2nd cover page:
Christmas cheer at Viessmann
headquarters in Allendorf

3rd cover page:
Depiction of the birth of Christ on an
oven plate designed by Philipp Soldan.



Operational start-up of the biogas system in Allendorf with honoured guests – Page 14

The 5-star Kempinski Hotel opened in January in Yinchuan, China relies on Viessmann heating technology – Page 26



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German economy recovers from the financial crisis – will the heating market also bounce back?

National economies have developed at different paces in the first year following the international financial crisis. The German economy recovered more quickly than expected. It grew significantly more strongly (3.6 percent) than predicted by the renowned DIW German Institute for Economic Research in early summer (1.9 percent). According to German Minister of Economics Rainer Brüderle, this positive development has primarily to do with strong demand for German products abroad. Apparently it paid off that Germany, unlike other European countries, still has a largely intact, comprehensive chain of real economic value creation, shouldered in particular by SMEs.

Negative trend in renewable energies

The German heating market however did not live up to expectations, losing roughly four percent of its volume this year despite the tremendous need for modernisation. The situation is particularly critical for renewable energy products such as solar thermal systems, heat pumps and biomass boilers. Overall losses here are in the double digits, and log burning boilers in particular lost 35 percent of their market volume.

Goal of the energy concept: climate-neutral buildings

The ambitious goals of the energy concept issued by the German government this past autumn have been thwarted for the time being by this decline. But the concept is the first of its kind to emphasise that the modernisation of building energy systems is essential to achieving the energy policy goals. This is a welcome development, as the debate on energy policy has focused almost exclusively on generating electricity and transport up to now. The aim is to make existing buildings largely climate neutral; in other words, by 2050, German residential buildings should account for only 20

percent of today's primary energy consumption, which basically can be supplied entirely through renewable energy.

The European Energy Performance of Buildings Directive (EPBD) currently being transformed by Member States into national law mandates the passive house standard for new construction as of 2020, and 2018 for public buildings.

Structural shift continues

This all leaves no doubt that the structural changes in our industry towards high-efficiency technology and renewable energies will continue or even accelerate

ANN

ate of innovation

despite the decline in 2010, and a large amount of work lies ahead for us in terms of system technology and building shells.

But in light of this background, why has there been no movement in the market in 2010?

The German Industrial Association for Building Services, Energy and Environmental Engineering (BDH) is convinced that the unreliability of government subsidies for renewable energies due to funding cuts and budget freezes is largely responsible for the lack of enthusiasm amongst investors. The BDH also assumes that the photovoltaic boom this year used up investment funds that would have otherwise been allocated to modernising building envelope and heating systems.

Critical reception of a good concept

In addition to these factors, communication of the energy concept initially worsened the existing insecurity of many home owners. Media articles and editorials hyped the dreaded "compulsory modernisation" and in particular the "huge costs" which would burden building owners.

This certainly didn't help the initial public reception of a concept that is very well structured in many respects. The discussion has since become more objective; it is apparent the concerns were exaggerated to a certain extent. For one thing, it is unrealistic to think that building elements such as windows, roofs, façades and heating systems currently in place can continue to be used through 2050. Replacement and/or maintenance will be necessary regardless, in accordance with the usual intervals of modernisation. Thus any improvements in energy

The revitalization of the market would be a major step towards an environmentally friendly, reliable and affordable energy supply in accordance with the energy concept of the German government. A win-win situation for all those involved – and for the environment as well.

systems must be considered as separate costs.

Enhanced efficiency also saves energy costs, which in turn helps to finance the improvement measures.

As a result, it is recommended to start modernising the energy systems of buildings immediately and not wait until regulations make it mandatory.

Politics must create the proper framework

Policy makers are called on to create a framework as soon as possible to make modernising building energy systems interesting for investors. Compulsory measures tend to be met with resistance. Now is the time to deliver on promises to analyse existing proposals, as provided for in the energy concept in many ways, and develop concrete strategies and programmes.

These measures should include attractive, long-term subsidies, low-interest loans and tax incentives. Furthermore, with respect to existing buildings and the housing market, a fair compromise between the interests of landlords and renters must be found. It is questionable whether this can be achieved by passing new laws. What good is a legal regulation for allocating investment costs when it is unfeasible on the market? As is usually the case, a mutual agreement for the benefit of both sides is preferable here.

Editorial

Another key issue is opening up the heating market for biogas. This means biogas must be fully recognised as a renewable energy when used in high-efficiency condensing equipment.

Finally, investors are looking for long-term perspectives for the future, so they can be sure that decisions made today will still be the right ones tomorrow. Awareness certainly needs to be raised in this area.

When policy makers, the media and all other industry participants are included in this process, it will be possible to revitalise the market in 2011 and reverse this year's negative development in renewable energies. This would be a major step towards an environmentally friendly, reliable and affordable energy supply in accordance with the energy concept of the German government. A win-win situation for all those involved – and for the environment as well.

We wish all our customers, business partners, friends and employees a Merry Christmas and a happy, healthy, successful New Year.

Dr. Martin Viessmann

German industry's climate protection coalition: Membership certificates presented

Seven industrial companies were admitted to membership in the German Climate Protection Coalition for Energy Efficiency and Innovation this past October. The German Federal Environment Ministry, the Federal Ministry of Economics and the German Federation of Chambers of Commerce (DIHK) launched the partnership in 2009 together with four founding companies. The initiators selected Viessmann, berolina Schriftbild GmbH, ebmpapst Mulfingen GmbH and Prinovis GmbH as outstanding examples of energy efficiency and climate protection.

Strict criteria must be met to be admitted to the group. Climate protection and energy efficiency must be an explicit element of company policy and activities in this area must be regularly communicated. Furthermore, consumption data and greenhouse gas emissions must be systematically logged and climate protection and energy efficiency must be anchored in the company's training and professional development programmes. Berthold Goeke, assistant secretary in the German Environment Ministry and Dr. Martin Wansleben, Managing Director of the DIHK, presented the membership certificates to representatives of the partner



Berthold Goeke, assistant secretary in the German Federal Environment Ministry (left), and Dr. Martin Wansleben, Managing Director of the DIHK (right), presented the membership certificate for the Viessmann Group to Manfred Greis, Head of Corporate Communications.

companies at a reception at Haus der Deutschen Wirtschaft in Berlin. Dr. Wansleben pointed out that the companies perceive the greatest economic risk in how raw materials and energy prices will develop. "This makes it all the more important to help companies to conserve energy", he added.

The goal of the partnership for climate protection, energy efficiency and innovation is to develop the existing potential for climate protection and energy efficiency in companies. Additional aims are to drive forward the use of innovative technologies to tap this potential in business practice and to create a framework to achieve the ambitious climate protection goals and increase energy efficiency in an affordable manner.

Viessmann Selection – 2010/11 winter catalogue

Viessmann's sporting goods shop has a new name. The lifestyle programme with premium quality business and recreational products is now called Viessmann Selection. Some of the highlights of the 2010/11 winter catalogue are presented on page 29.



Michelin star for Hotel "Die Sonne Frankenberg"

Gourmet restaurant Philipp Soldan in Hotel "Die Sonne Frankenberg" has been awarded its first Michelin star. Hotel director Kerstin Scholl and chef Florian Hartmann are very pleased to have received this honour.

With his modern European cooking style, Hartmann concentrates on a single basic food item of highest quality instead of cooking meals with a wide variety of ingredients. Fewer ingredients bring out the best in fish and meat while emphasising their quality. Hartmann completed his training with Michelin-starred chef Harald Wohlfahrt at the restaurant "Traube Tonbach", followed by stints at various gourmet restaurants.

Hotel "Die Sonne Frankenberg" is located in the heart of the old town of Frankenberg with its historic timber frame houses,

in the immediate vicinity of the town's landmark, the 500-year-old city hall featuring ten towers. With 61 rooms and suites and 70 employees, the Small Luxury Hotel of the World offers personal, enthusiastic service and the ultimate indulgence for its guests. The hotel's 1,000-square-metre spa is an oasis of relaxation.

Read more about the gourmet restaurant's namesake, Philipp Soldan, and his craft in the section "Classics" (page 32).



Kitchen head Florian Hartmann is pleased to have received his first Michelin star at Hotel "Die Sonne Frankenberg".

Media Prize for "Energy Future" book

A chapter in the book "Energy Future: Efficiency and Renewable Energies in the Heating Sector" published by Viessmann has been awarded the ERM (energy and resource management) Media Prize for sustainable development. The jury recognised "Learning from the Indians – heating and cooling in the future" as the best text in the category of corporate media. In this article, author Dr. Torsten Meise describes various future visions of CO2-free urban centres and elaborates on solutions for providing cities with a promising, environmentally friendly, affordable supply of energy today using technology already available on the market.



The book "Energy Future" published by Viessmann has been honoured with the ERM Media Prize.

The ERM Media Prize is sponsored by Nürtingen-Geislingen University. It has been recognised by the German Commission for UNESCO as a contribution to the United Nations Decade of Education for Sustainable Development and is to be awarded annually for articles in general public media and corporate media.

Vitocal 300-G wins coveted design prize

Viessmann's Vitocal 300-G heat pump has won one of Germany's most prestigious design awards: the 2010 International Design Prize from the State of Baden-Württemberg, sponsored by the Design Center Stuttgart. Companies and designers from around the world participated in this year's competition, submitting 348 products in various categories. The jury was impressed by the symbolic design of the powerful heat pump, which closely resembles a safe. It's the perfect choice for modern architecture with a clean design and a one-piece front. What specifically did the jury have to say about the device? "New aesthetics for such a classic product. Systematic,



The Viessmann Vitocal 300-G heat pump won over the jury of the Design Center Stuttgart.

successful deployment of the corporate design with strong recognition value and attractive representation of the brand family, high quality and good positioning of the logo. Emphasises only the most necessary of operating elements, otherwise a simple geometric shape and a powerful, solid construction."

Energy Forums 8 and 9 in Allendorf

For the 8th and 9th time, the Viessmann Academy in Allendorf hosted Energy Forums this past September and October. Top-ranked experts explored the current energy and climate situation and the potential consequences of climate change, elaborated on ways to solve the problems and answered questions from Viessmann's invited trade partners in a follow-up discussion round. Speakers included Prof. Dr. Hans Joachim Schellnhuber, Director of the Potsdam Institute for Climate Impact Research, Franzjosef Schafhausen from the German Federal Environment Ministry and Stephan Kohler, management spokesperson of the German Energy Agency (dena).

In his opening speech, Dr. Martin Viessmann pointed out that sustainability will more strongly determine political and business activity in the future. "Politics and business owe it to society



Speakers at the Energy Forums: Prof. Dr. Hans Joachim Schellnhuber, Stephan Kohler and Franzjosef Schafhausen (from left).

to balance ecology, economics and social responsibility", said Dr. Viessmann. "This is the only way to secure prosperity and jobs, keep the environment intact and conserve natural resources. To ensure the livelihoods of future generations, a sustainable energy supply is necessary based on highest efficiency and use of all available energy sources."

Youth convention on the topic of sustainability

"It's your energy" was the motto of the Youth Convention held recently in the Berlin Congress Center. The German Energy Agency (dena) invited 300 youth from all over Germany to talk about the energy supply of tomorrow with experts from politics, industry and science. The convention was held under the patronage of Prof. Dr. Annette Schavan, German Federal Minister of Education and Research, and was supported by Viessmann.

Lectures and workshops focused on the topics of energy and sustainability. Participants could visit an internet platform before the event, vote on what issues should be discussed and submit their own suggestions for workshops.

As part of the sustainability strategy of the German state of Hesse, another youth forum was organised at the Frankfurt airport with the motto "Young - Hessian - Sustainable". Participants in this



Prof. Dr. Annette Schavan, German Federal Minister of Education and Research, served as patron of the youth convention.

event also discussed topics related to energy and climate policy. A "Market of Possibilities" also informed youth about the many volunteer opportunities to promote sustainability.

BDH calls for increases to subsidy programmes

The German Industrial Association for Building Services, Energy and Environmental Engineering (BDH) is calling for significant increases to the funding programmes for modernising the energy systems of out-dated buildings. At the same time, they criticise cuts in funding by the KfW Development Bank as well as in the market incentive programme for renewable energy. The positive goals of the energy concept issued by the German government

must now be translated into actual policy, according to a BDH press release. They advocate increasing funding to make it possible to double the rate of modernisation from 1 to 2 percent as mandated by the energy concept. Moreover, the BDH recommends making the subsidies permanent to provide investment security for industry and processing businesses.

Ambient heat – free energy from the environment

The energy supply of the future must be reliable, affordable and compatible with the environment and the climate. It will require a balanced mix of sources, whereby renewable energies will have to play an

increasingly greater role. But their potential is not infinite. Subsequently, complete reliance on renewable energies is only conceivable when energy efficiency is significantly increased beforehand.

In a series of articles, “aktuell” examines the perspectives of the various fuel types and their usage in the heating market. Following biomass (issue 2/2009) and solar energy (issue 1/2010), this edition is dedicated to ambient heat.

Geysir in Iceland: Besides heat from deep inside the earth, the sun is the most important source of ambient heat.

Ambient heat as it is used in Central Europe is essentially the stored energy of the sun. Solar radiation originating from roughly 150 million kilometres away warms the upper layers of the ground and the oceans. The air above absorbs a portion of this heat and distributes it around our planet through global air movement. The main sources of ambient heat in our latitudes are the ground, groundwater, surface water in the form of lakes and rivers, and outside air. Because the sun will continue to provide

us with warmth for many billions of years, these reservoirs will be refilled again and again.

In addition to solar energy, heat from inside the earth is another source of ambient energy. The temperature of the earth’s core is estimated at 5,000 to 7,000 °C. Ninety-nine percent of the mass of our planet is hotter than 1,000 °C. Almost everywhere in the world, the temperature one kilometre beneath the earth’s surface is 35 to 40 °C. Experts believe this energy originates from when the





earth was formed, when our planet was still a ball of fire, as well as from radioactive decay processes deep within the earth's crust, which have been continuously generating heat for millions of years. In regions with volcanic activity, it is relatively easy to tap this ambient heat. But in Central Europe and most other parts of the world, it is usually necessary to drill several kilometres into the earth.

Ambient heat is ideal as a source of heating

As a result, affordable ambient heat in Germany is extracted almost exclusively from the upper layer of the earth and from the air, where stored energy from the sun predominates. It is used in particular to supply buildings with heating and hot water. Ambient heat is not yet relevant for generating electricity, but will gain in importance here in the future when geothermal power plants are built. It plays absolutely no role in traffic and transport.



Heating with ambient heat

The heating sector accounts for the largest share of total energy consumption in Germany at 40 percent. Using ambient heat with heat pumps to heat buildings and generate hot water thus significantly helps to conserve fossil fuels and reduce CO₂ emissions. The share of ambient heat in renewable energies in the heating market is currently approximately 4.5 percent – about the same as solar heating – while biomass predominates (more than 90 percent).

Electric heat pumps extract heat from the heat source and use a compressor to increase it to a temperature viable for the heating system. One kilowatt hour of electricity used to run the compressor yields up to six kilowatt hours of heat from ambient sources when combined with an efficient heat pump. If the

electricity comes from renewable sources, the heating system is also CO₂ neutral.

Modern heat pumps for new construction and modernisation

The technology of modern heat pumps is fully developed. They reliably and efficiently provide the necessary output throughout their entire service life. Units are available for all conceivable applications, including new buildings and modernisation, single-family and two-family homes, and buildings with greater heat demand such as apartment blocks, hotels, and commercial and industrial buildings. What heat source they use (geothermal, groundwater or outside air) depends on the local conditions and the heat demand of the building.

A modern ground source heat pump uses just one kilowatt hour of electrical energy to produce up to six kilowatt hours of heat.

Many heat pumps offer another useful advantage: They can be operated in reverse to cool a building. In this case, they remove heat from rooms on hot summer days and release it to the ground, the groundwater or the outside air.

Constant temperatures underneath the earth's surface

The ground is a good heat accumulator; relatively constant temperatures of 7 to 13 °C are available year-round, just a few metres below the surface. Horizontal geothermal collectors or vertical geothermal probes absorb the heat stored in the ground and release it in a ground source heat pump.

To install a geothermal collector for an average new single-family home, a free area of 200 to



400 square metres is required. Because so much space is often not available, geothermal probes which require much less room are typically used. Geothermal probes absorb heat up to 100 metres beneath the surface, and some extend even deeper into the ground. By increasing the number of probes, even large buildings can be heated using geothermal heat.

How much heat can be extracted from the ground depends on a number of factors. For systems with geothermal probes, proper arrangement and drill depth is of key importance. It is best to

Outside air is the easiest source of heat to use. The heat pump can be simply installed next to the house.

consult a drilling company that specialises in this area.

Groundwater offers constant temperatures

Water is also a good accumulator of ambient heat. Even on cold winter days, groundwater has a constant temperature of roughly 7 to 12 °C. Groundwater is removed from a supply well and transported to the ground source heat pump. The cooled water is then fed back to the ground water via a second well, called a return well.

Surface water in lakes and rivers can also be used as a heat source. Even in the coldest of winters when the water surface is frozen, the water underneath

the ice still has a temperature of approximately 4 °C. Large lakes in particular are good accumulators of heat. This energy can be used in heat pump systems to efficiently heat buildings.

Groundwater and surface water are suitable as heat sources for both single-family dwellings and large buildings. However, water pollution control regulations in Germany strictly limit the use of these heat sources.

Outside air the easiest heat source to tap

The outside air temperature varies greatly depending on the season and weather, but modern air source heat pumps can generate heat even when the air is at -20°C.

What is more, outside air is the easiest and thus most affordable heat source to exploit. All that is required is an incoming air duct to draw in outside air and an exhaust air duct to vent the cooled air back outside. These ducts aren't even necessary when the heat pump is installed outside.

In new buildings and modernised existing buildings whose thermal insulation corresponds to the low energy house standard and whose heating systems require only low system temperatures, air source heat pumps in single-mode operation can meet the complete heating demand.





Ground, groundwater, surface water and outside air are the typical ambient heat sources for heat pumps.

Waste heat – an alternative to ambient heat

In addition to ambient heat from nature, waste heat is an interesting source in many cases. Wastewater and other waste streams from industrial processes contain a considerable amount of energy which is seldom used. With the right heat pump system, this energy can be used to heat office and commercial buildings or be re-used in manufacturing processes. The type of waste heat (hot air, exhaust air, cooling water, etc.) determines the type of heat pump (e.g., ground source heat pump). Due to the unique conditions of their use, the systems must be designed very individually.

Innovative central heat recovery system at Viessmann's headquarters

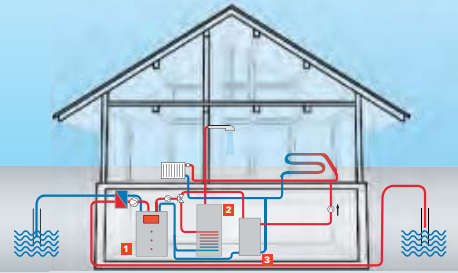
Waste heat also plays an important role in the Efficiency Plus concept designed to improve resource efficiency at Viessmann headquarters in Allendorf. Waste heat from test benches, pressurised air generation and the data processing centre is collected in a central heat recovery system. Before being released to the heating system, a heat pump increases the temperature of the waste heat, reducing consumption of electricity and natural gas by nearly 10 gigawatt hours and sinking CO₂ emissions by 3,000 tonnes per year. Viessmann won the 2010 Energy Efficiency Award for this innovative heat recovery concept.

Air source heat pumps for dual-mode systems

These heat pumps are increasingly being used to modernise heating systems in older buildings. They are combined with the existing boiler, which continues to operate as a peak load boiler. In this type of dual-mode system, the heat pump meets up to 90 percent of annual heating requirements. The boiler takes over only on especially cold days.

Ambient heat

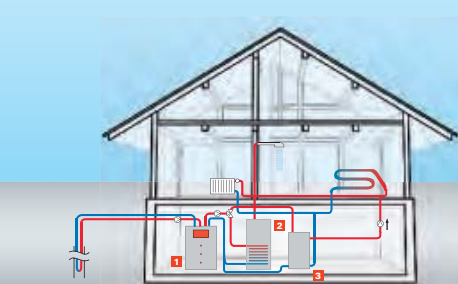
Heat from groundwater



- 1 Vitocal heat pump
- 2 DHW cylinder
- 3 Heating water buffer cylinder

Ground source heat pumps require a supply well and a return well to use the heat of groundwater.

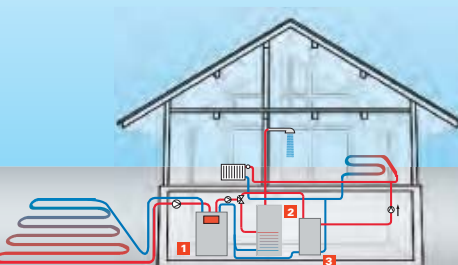
Geothermal heat (probe)



- 1 Vitocal heat pump
- 2 DHW cylinder
- 3 Heating water buffer cylinder

Ground source heat pumps extract heat from the earth via vertical geothermal probes placed up to 100 m deep.

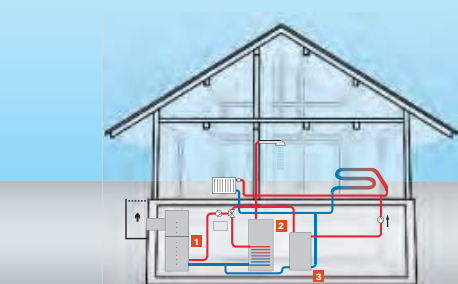
Geothermal heat (collector)



- 1 Vitocal heat pump
- 2 DHW cylinder
- 3 Heating water buffer cylinder

Geothermal collectors collect the water about 1.5 metres below the surface and feed it to the ground source heat pump.

Heat from the air



- 1 Vitocal heat pump
- 2 DHW cylinder
- 3 Heating water buffer cylinder

Air source heat pumps installed in the building draw in the outside air via a ventilation duct.

Electricity from ambient heat

Only relatively deep geothermal heat is currently viable for generating electricity from ambient heat. Of all the ambient heat sources, only deep geothermal energy offers the high temperatures significantly above 100 °C necessary to operate power plant turbines.

It is easy to tap this energy in regions with volcanic activity. In these areas, magma at temperatures of up to 1,200 °C emerges from the lower layers of the earth to partially reach the surface, where it can be used relatively easily to generate steam to drive turbines. As a result, countries with active volcanoes including Iceland, the US, Costa Rica and the Philippines supply a significant share (currently up to 15 percent) of their electricity with geothermal power plants.

High-temperature geothermal power still in its infancy in Germany

Because Germany is located in a region without any significant volcanic activity, generating

ORC systems are particularly suited to generating electricity from renewable sources such as geothermal heat or biomass combustion.

power from deep geothermal energy is still in its infancy here. All underground thermal water and hot rock are located several kilometres beneath the surface and their temperatures are not sufficient to drive normal steam turbines. The maximum temperature found so far has been approximately 170 °C at a depth of some 4,500 metres near Bad Urach in the Swabian Alb.

In the ideal case, the heat source found at these depths is hot thermal water which only needs to be pumped to the surface. However, this kind of water-bearing permeable rock (known as an aquifer) is the exception, and the risk is great that expensive exploratory drilling will not find anything.

The “hot dry rock” technique is currently being tried for the first time in Germany in Bad Urach, Hannover, Bruchsal and Landau. This method does not rely on water-bearing layers because it creates its own artificial water flow through the hot rock. High-pressure water is pumped into the hot dry rock, causing fractures that serve as artificial heat exchangers, after which the water returns back to the surface. The hot dry rock technique significantly increases the number of potential geothermal sites while avoiding the danger of incorrectly placed wells.



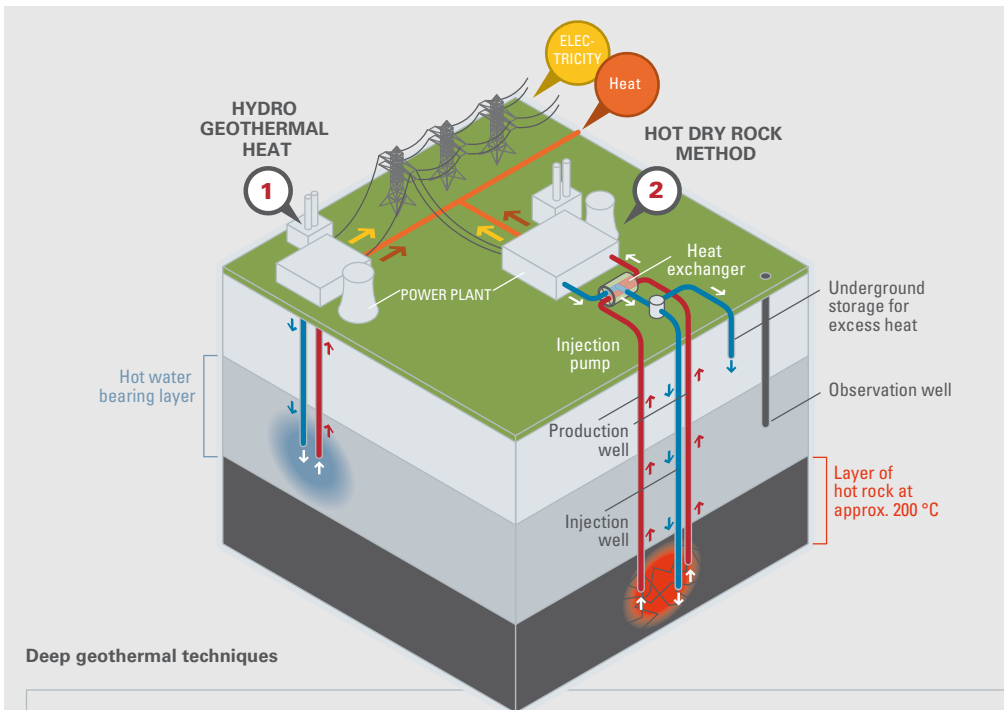
ORC process makes it possible to use geothermal heat to generate electricity

To be able to produce electricity despite the low temperatures of geothermal sources in Germany up to now, a working fluid that vaporises well below 100 °C is used in the turbines instead of steam. In the ORC (organic Rankine cycle) process, which is used for instance in biomass power plants, an organic liquid serves as the working fluid. The Kalina process on the other hand works with a mixture of ammonia and water.

Geothermal electricity in the German Renewable Energy Sources Act (EEG)

Although natural conditions in Germany are not ideal for producing geothermal electricity, geothermal power plants were included in the German Renewable

Energy Sources Act (EEG) in 2000. The reason for this is that deep geothermics is the only renewable energy besides biomass that is capable of providing baseload power. Its inclusion in the EEG Act brought with it incentives for using geothermal heat as a renewable energy source for producing electricity, in addition to wind power, photovoltaics and biomass. Several systems have now been realised, producing a relatively low electrical output compared to conventional power plants. Additional plants are in the planning or construction stage.



Deep geothermal techniques

1 Thermal water is pumped up from deep hot water bearing layers (aquifers). The used cooler water is returned to the ground.

2 Water under pressure is pumped into deep hot dry rock. The water is heated as it permeates the rock and is then pumped back to the surface.

It is easy to generate electricity from geothermal heat in the form of magma at the earth's surface.

In Germany, two main techniques are used to exploit deep heat: the hydro geothermal method and the hot dry rock method (illustration from the book "Energy Future – Efficiency and Renewable Energies in the Heating Sector" by Jürgen Petermann).



Founded in Belp, KWT now has its headquarters in Worb. The two municipalities are located in the canton of Bern, Switzerland.

Daniel Trüssel, President of the Management Board and Technical Director of KWT Kälte-Wärmetechnik AG (left), and René Steiner, Administrative Director.

Member of the Viessmann Group since 2008: KWT Kälte-Wärmetechnik AG

Swiss heat pump manufacturer KWT joined the Viessmann Group in spring 2008. With this acquisition, Viessmann further strengthened its leading position in heat pumps. As part of an ongoing series on Group members, this issue of Viessmann aktuell profiles KWT Kälte-Wärmetechnik AG.

Outputs from 6 kW to 2 MW

KWT manufactures heat pumps with output ranges from 6 kW to 2 MW, capturing heat from geothermal, groundwater, river water and air sources. KWT's large machines expand Viessmann's upper range in particular. KWT plans and builds

- ▶ Heat pumps for a broad range of applications
- ▶ Heat recovery systems

- ▶ Geothermal probes bearing the FWS (Swiss Heat Pump Association) seal of quality
- ▶ Cooling systems for industry and commerce
- ▶ Measurement and control equipment

With more than 30 years of experience, KWT offers the right heat pump system for practically every conceivable application. Dual-mode heating systems are also possible, where the heat pump provides basic heating for heating water and DHW, while an oil or gas condensing boiler is automatically activated to accommodate peak load, for instance when temperatures drop drastically. KWT even has suitable heat pumps for extreme outside temperatures, whether -40 °C or +35 °C.

KWT heat pumps can be installed in demanding environments where space is tight. All materials and processes are certified according to ISO 9001.

Using waste heat for heating purposes

Using waste heat can significantly increase energy efficiency, not only in production facilities.

Waste water from hotels and recreation centres for instance typically has a temperature of 25 to 35 °C. At the same time, large amounts of fresh water are required at these sites. KWT offers special high-efficiency heat pumps to take advantage of this waste heat to produce water temperatures of 60 °C.

Combination with cooling

Heating is not always the prime objective. In many industries process water must in fact be cooled, frequently via cooling towers. A KWT heat pump is a

more efficient and usually more economical solution, especially when the heat extracted from the process can be used elsewhere.

Service round the clock

Property heat pumps and other systems from KWT can be arranged to be monitored from KWT headquarters by contract.

Founded in 1979

KWT has been growing dynamically and continuously since it was founded in Belp, Switzerland in 1979. The company has more than 100 employees, and sales of approximately EUR 17 million were generated in 2009. The proportion of trainees at KWT is 15 percent. Daniel Trüssel is President of the Management Board and also serves as Technical Director. The position of Administrative Director is held by René Steiner.



KWT ground source heat pump with heating output of 500 kW at Berna Biotech AG, a vaccine producer in Bern, Switzerland.

New company founded Heat pump expertise bundled in Allendorf

Viessmann Wärmepumpen GmbH started business at the beginning of 2010. Viessmann's expertise in heat pumps has been concentrated in this German limited company. From development and design to production and product management – all stages of the value-added chain are covered in the new company. Approximately 220 employees work at Viessmann Wärmepumpen GmbH, 30 of them in development and design. Managing Director is Dr. Frank Schmidt.

Reacting quickly to market needs with the Vitocal 200-S

Pooling expertise at the Allendorf site and closely integrating the company into the Group's sales organisation has made it possible to react to market changes more quickly and flexibly. For example, market demand for a highly affordable air source heat pump which emerged in 2009 was met in summer 2010 with the introduction of the Vitocal 200-S. The Vitocal 200-S is a split air

source heat pump that is not only attractively priced and efficient but also simple to install.

Sharing Viessmann expertise with trade partners

It takes considerable expertise to properly plan and dimension heat pump systems. Viessmann shares the necessary know-how with its trade partners at events held at the Viessmann Academy. Practical training on fully functional equipment is carried out at the Academy Information Centre in Allendorf as well as at all sales offices.

Specialists can also access convenient calculation programmes and a schematic browser as practical aids in their daily work. These applications can be found on the Viessmann website. Once the system has been designed and installed, experts from our Technical Service are available to commission it on-site if desired.

Viessmann Geothermics is your professional partner for installing geothermal probes. It cooperates with carefully selected professional drilling companies and coordinates all work.

Extensive exchange of experience in the Heat Pump Forum

The Viessmann Heat Pump Forum which debuted in Allendorf this year was attended by nearly 200 experts from throughout Germany. The objective of the event is to provide a broad foundation for practically acquired experience and to exchange this knowledge with colleagues.



Dr. Frank Schmidt,
Managing
Director of
Viessmann
Wärmepumpen
GmbH.

The Viessmann heat pump range

Whether for single-family homes, apartment buildings, businesses or local heating networks, the comprehensive range of Viessmann products features efficient heat pumps for using heat from geothermal, groundwater and air sources, with outputs of 1.5 to 1,500 kW. They can heat a building as the sole heat source year-round or be combined with a boiler or a solar thermal system from the comprehensive Viessmann product range.

Viessmann also supplies the complete related system technology including underfloor heating and low-temperature radiators for operation with heat pumps. Viessmann heat pumps that use underground heat or water as sources can optionally be supplied with "natural cooling" and "active cooling" modules for cooling buildings on hot summer days.



The founding of Viessmann Wärmepumpen GmbH makes it possible to react more quickly to market changes. View of heat pump manufacture in Allendorf.



New component in the Efficiency Plus sustainability project Biogas system started up at Allendorf site

Viessmann was pleased to start up a new biogas system at its Allendorf site following 11 months of construction and an investment volume of EUR 2.5 million. The grand opening was attended by Hessian State Environmental Minister Silke Lautenschläger and numerous other guests of honour.

Biogas is generated from agricultural and landscaping waste

Built by Viessmann Group member BIOFerm, the dry fermentation unit will generate biogas from agricultural and landscaping waste. The new system can transform 4,500 tonnes of substrate into more than 500,000 cubic metres of biogas annually, which can be

converted in a combined heating and power (CHP) station with an output of 190 kW into up to 1.2 million kilowatt hours of electrical energy and 1.5 million kilowatt hours of thermal energy. The electricity and heat generated are used in the production facility at company headquarters in Allendorf. The CHP came from manufacturer ESS, based in Landsberg am Lech and likewise

a member of the Viessmann Group. This will cover four percent of local electrical demand and three percent of thermal needs – enough energy to supply some 380 households with electricity and heat approximately 70 single-family homes.

In his speech, Dr. Martin Viessmann emphasised that the new biogas system is a key element in the Efficiency Plus sustainability project. The company has clearly demonstrated in this project that the energy and



The new biogas system shortly before start-up. 4,500 tonnes of various substrates are transformed here into more than 500,000 cubic metres of biogas annually.

Left: Starting up the new biogas system (from left to right): State Parliament representative Heinrich Heidel, District Administrator Dr. Reinhard Kubat, Dr. Martin Viessmann, Hessian State Environmental Minister Silke Lautenschläger, Annette Viessmann, Katharina Viessmann and District Governor Dr. Walter Lübcke.

Right: The new biogas system contributes 3 percentage points to the factory's share of renewable energy.



climate policy targets for 2020 can already be achieved today. The share of renewables in the site's energy supply is now 23 percent, with three percentage points attributable to the new biogas system. Because the system is also used for research and test purposes, the project received a subsidy of EUR 95,000 from the German state of Hesse.

The project is oriented toward the principle of sustainability. Consequently, only biomass from

the immediate vicinity is used, to avoid unnecessary transportation and to actively include farmers from the region as suppliers of the substrate.

Biomass plays a key role

Biomass plays the central role in renewable energy – one of the key ways to solve energy and climate problems, in addition to increasing efficiency. It has the greatest potential because it is

an indigenous energy source and unlike the sun and wind can be used year-round whenever needed. The ambitious goals specified by German climate protection policy can only be achieved when, in addition to increasing energy efficiency especially in buildings, the use of biomass as a carbon-neutral fuel source is significantly expanded. Biogas in particular offers a wealth of opportunities here. However, current legal regulations in Germany only recognise biogas

as a renewable energy when it is used in co-generation. High-efficiency condensing technology is not taken into consideration. For the sake of further development, it is imperative that the heating market be opened up for biogas.

Gas bags serve as intermediate storage for biogas.



The CHP unit meets four percent of electrical demand and three percent of thermal needs at the Allendorf facility.



Fermentation test to measure the additional gas yield from adding "Methanos".



High-performance microorganisms double the efficiency of biogas systems 2010 Bavarian Energy Award goes to Schmack Biogas

Viessmann Group member Schmack Biogas GmbH located in Schwandorf, Germany has been honoured for its innovative energy use as part of the 2010 Bavarian Energy Award. The company received this award for isolating special "Methanos" microorganisms, which produce methane in biogas units.

Bavarian Secretary of State for Economic Affairs Katja Hessel presented the award to Ulrich Schmack and Dr. Doris Schmack in Nuremberg on 28 October. The award is given to outstanding innovative products in the field of efficient energy generation and usage. Schmack won the prize for developing "Methanos" into a market-ready product as part of the company's microbacterial research.

Efficiency of biogas systems significantly enhanced

Schmack microbiologists have succeeded in isolating high-performance methanogenic microorganisms. This has enabled the company to produce these microorganisms in large quantities, which improves the efficiency of biogas systems in two ways. By introducing sufficient volumes of the microorganisms into the

biogas fermenter, the specific gas yield from the starting materials can be increased by up to 20 percent. Moreover, the biogas system can now process twice as much raw materials without retrofitting the fermenter, thus doubling production of electricity and heat.

Ulrich Schmack sees the use of high-performance microorganisms as a milestone in company history: "With 'Methanos', our employees have developed a product with a unique selling proposition. The profitability of our biogas systems will increase significantly relative to the competition. Investment costs will decrease while system yields will increase."

Schmack 

VIESSMANN Group

Presentation of the 2010 Bavarian Energy Award: Bavarian Secretary of State for Economic Affairs Katja Hessel (right) presents the award to Ulrich Schmack and Dr. Doris Schmack.



Viessmann supports students Team from Wuppertal University builds a net zero energy house for the Solar Decathlon Europe

The Solar Decathlon organised every two years by the US Department of Energy is considered one of the most important architectural and energy technology competitions in the world. The goal is to design the energy-efficient houses of the future, heated and powered exclusively by their own solar sources. A European version of the competition, the Solar Decathlon Europe, has now been established in Madrid, Spain. The German teams participating in this competition are sponsored by the Federal Ministry of Economics and Technology following a resolution of German Parliament. 17 teams took part in the Solar Decathlon Europe. The University of Wuppertal's project received both financial and technical support from Viessmann, including a compact energy tower and two Vitosol 300-T vacuum tube collectors to install in the house.

The 40 students and their professors Anett-Maud Joppin and Karsten Voss garnered three awards and came in sixth place overall in the international competition.

Podium finish in three sub-categories

The competition for the 17 participating teams from around the globe and their 100-percent solar-powered houses concluded with the awards ceremony in late June. 190,000 visitors toured the "Solar Village" near the Royal Palace in the city centre of Madrid, where competition submissions were publicly exhibited. Because the results of the top teams were very close, the University of Wuppertal team had to settle for sixth place, despite trailing the overall winner by only five percent.



But they made it to the podium in three individual categories, including second place finishes in "Architecture" and "Lighting Planning" as well as third place in "Appliances and Functionality". Following their outstanding performance at the Solar Decathlon Europe, the students are now focused primarily on completing their studies. "With a Master's degree and the Solar Decathlon under my belt, I can

hardly wait to start my career", commented one team member. "Of course I hope this helps me stand out against the competition in the job market."

Experiences shared at talks in Germany and abroad

The students will share their experiences in a range of talks in Germany and abroad. All the

The students from the University of Wuppertal are proud of their success at the Solar Decathlon Europe in Madrid.

German teams are scheduled to present their projects at the 2011 BAU trade fair for architecture, materials and systems in Munich. The net zero energy house of the Wuppertal team will be installed in Wuppertal, where it will be used as an experimental laboratory for teaching and research purposes. Industry has already expressed interest in follow-up projects.



For more information, please visit www.sdeurope.uni-wuppertal.de.

Viessmann Vitosol 300-T vacuum tube collectors in the net zero energy house built for the Solar Decathlon Europe.



German Federal Minister of Economics Rainer Brüderle (left) and Minister for the Environment Norbert Röttgen present the energy concept of the federal government at a press conference.

Environmentally friendly, reliable and affordable energy supply New energy concept from the German federal government

The German federal government presented its new energy concept this past September. The overarching goal of the paper is an environmentally friendly, reliable and affordable energy supply. Quantitative targets have been clearly defined: By 2050, the emission of greenhouse gases should be progressively decreased by 80 percent relative to 1990 levels. The consumption of primary energy is also to be decreased by 50 percent by the year 2050, based on the figures from 2008. It also provides for increasing the share of renewable energy to 60 percent over the same time period.

The government has identified increasing energy efficiency as the key to reaching these goals, in both private households and the public domain. The heating

industry welcomes this concept and is pleased that the importance of the heating market has been recognised for the first time.

Tremendous potential for savings in existing buildings

Buildings account for roughly 40 percent of energy consumption in Germany and approximately one-third of CO₂ emissions. Thus the potential for conserving energy and reducing emissions in this area is gigantic. Three-quarters of today's old buildings were constructed before the first thermal insulation regulations came into force in Germany in 1979. These buildings have often not been renovated at all, or might

as well not have been for practical purposes. The overwhelming majority of heating systems do not correspond to the state of the art – this applies to four out of five of the existing 17.5 million heating systems in Germany.

The goal of climate neutrality

The goal is to reduce building heating demand in the long term, so that buildings in 2050 are nearly completely climate neutral. Climate neutral means that buildings have a very low need for energy and the rest is provided for the most part by renewable energies. To achieve this, it will be necessary to double the annual modernisation rate of

energy systems from currently one percent to two. Heating demand should be reduced by 20 percent by the year 2020. Furthermore, primary energy consumption is to be decreased on the order of 80 percent by the year 2050.

Building Modernisation Campaign

A Building Modernisation Campaign is being planned to reach the goals of the German government. The cornerstones of the programme:

- ▶ A relatively moderate standard is to be chosen for 2020, so that first only buildings with the worst energy efficiency are affected, which typically need to be structurally renovated as

well. To modernise, owners can choose between insulating the building shell, improving energy equipment or opting for renewable energy. They can decide to modernise over a period of time or all at once.

- ▶ If owners exceed the targets or meet them ahead of time, they receive a government subsidy. This represents a continuation and financial improvement of the current CO2 building modernisation programme for instance. Tax incentives to promote modernisation will also be considered.
- ▶ To drive forward the use of renewable energy in existing buildings, the current market incentive programme promoting the use of renewables in the heating market will be extended beyond 2011. Additionally, a budget-independent incentive programme for renewable heating will be examined.
- ▶ The German federal government will establish a subsidy programme to modernise urban buildings through the KfW Development Bank. The objective of this programme is to promote extensive, locally adapted investments in energy efficiency and renewable energies while minimising red tape.
- ▶ To better capture potential for energy efficiency in buildings, German rental law will be reformed and made more attractive to investors in energy system modernisation.

Renewable energy: a cornerstone of the energy supply of the future

The German federal government sees renewable energy as a cornerstone of the future energy supply. But as the proportion of renewables grows steadily, the overall energy supply system including conventional and

renewable sources, networks, storage and their interactions must be optimised. The goal is to make the transformation of the energy supply economically viable for businesses and consumers. The federal government has identified the following key challenges:

- ▶ The expansion of wind energy (offshore and onshore)
- ▶ The sustainable generation and use of bioenergy
- ▶ An increased reliance on renewable energy to provide heating and cooling
- ▶ More demand-oriented generation and usage of renewable energy
- ▶ A better integration of renewable energy into the supply system
- ▶ A qualitative and quantitative expansion of existing electricity networks
- ▶ The development and promotion of storage technology
- ▶ The further strengthening of the European electricity market

Sustainable, efficient use of bioenergy

Its broad range of applications and excellent storage ability mean bioenergy will play a key role in the energy supply of the future. Bioenergy is to continue to be developed as an important source in the categories of heating, electricity and fuels. The German federal government

plans to continue to use sustainable biomass to ensure an environmentally friendly, reliable energy supply. Key factors in the sustainable use of biomass include:

- ▶ Improved exploitation of bioenergy potential in Germany, avoidance of usage conflicts by relying more on organic wastes and by-products, agricultural co-products, material from landscape maintenance and wood from short-rotation plantations.
- ▶ Increased energy and space efficiency through improved types of cultivation, more biomass utilisation in combined heat and power systems, improved electricity production from biomass to further integrate renewable energies into the energy supply, and the further development of integrated biomass usage concepts.
- ▶ Creating a legal foundation for greater use of biomethane converted into bio natural gas by establishing additional ways of feeding it into the natural gas network.
- ▶ Supplementing the bioenergy supply with sustainably generated biomass from abroad.

Capturing potentials for better efficiency in industry

Energy efficiency will become a more important measure of international industrial competitiveness and innovativeness in the future. As a result, increasing energy efficiency is a key issue in industry as well. Scientific studies have identified an annual savings potential of EUR 10 billion in German companies. In light of this potential, the federal government will support industry's own initiatives, for instance the partnership for climate protection and energy efficiency launched by the German Federation of Chambers of Commerce (DIHK).

Additionally, as of 2013 tax breaks for energy and electricity taxes will only be granted when companies make efforts to conserve energy, as demonstrated by certified logging in energy management systems.

The German government sees additional potential in promoting innovative technologies to increase energy efficiency.

Modernising the energy systems of existing buildings represents a tremendous savings potential which can be quickly captured by updating heating equipment.





Biomass and wind power play an important role in a study from the FVEE Renewable Energy Research Association. To solve the problem of storing electricity from wind and photovoltaic power, the association proposes converting it into artificial methane. The photo shows the Helpershain communal wind park and the Ulrichstein-Helpershain wind park.

Researchers say: 100 percent renewable energy is possible

The German federal government doesn't have it easy. The political opposition sees a grave error in the government's courageous, visionary Energy Concept 2050: the extension of the lifespan of nuclear power plants, which has precipitated considerable criticism but could be seen as simply a concession to the lack of viable alternatives. But in fact an even more visionary proposal has been put forward by the FVEE Renewable Energy Research Association, a consortium of seven research institutes involved in alternative energies, including three Fraunhofer institutes.

All opportunities for conserving energy must be exploited

Before the government released its concept, the group published the provocative proposition that it is theoretically possible to convert the German energy supply completely to renewables by 2050. But politics, industry and citizens would have to pull out all the stops to achieve this, not only within Germany. It would be necessary to exploit every opportunity to conserve energy, especially by modernising buildings, and to optimise the energy supply through systematic decentralisation. Combined heat and power (CHP) units based on renewable fuels for instance

would play a role in this, which would also fulfil the need for fast-reacting power plants. The current large-scale power plants are unnecessary in this alternative concept.

Greater efficiency and new storage methods required

It would also be necessary to use all renewable energies as efficiently as possible, whether solar, wind, hydroelectric, geothermal, ocean waves or biomass. What is more, extensive storage capacities would be needed to store methane generated with renewable electricity, as gas is stored in the German natural gas network. The electricity networks must also be expanded considerably to offset local and temporal fluctuations in the energy supply. It practically goes without saying that mobility is powered completely by electrical sources in this concept, whether directly (with electric motors) or indirectly via hydrogen or methane generated from electricity.

Methane from electricity

There are a number of developmental hurdles to realising this vision however. Producing

methane from CO₂ and hydrogen generated from renewable electricity is still at the laboratory stage today. Only about 100 of the necessary 3,500 kilometres of high-voltage power lines required by 2020 have been installed. Electric cars are two to three times more expensive today than conventional automobiles, with only one-fourth to one-third of their range.

In concrete terms, additional large wind parks would have to be built and the number of solar thermal and photovoltaic systems would have to increase greatly.

European super network

Moreover, energy would have to be transmitted regionally over a much denser, more precisely controlled network with fewer losses than is the case today. A European "super network" (in technical terms: a high-voltage DC grid) would distribute not only European electricity between the North Cape and Gibraltar. The FVEE concept also includes importing electricity from outside Europe as a key element, but not from nuclear power plants. The researchers already consider power from desert regions to be a tangible reality, for instance from North Africa with its Desertec solar power project.

Political uncertainties

Political will, political stability and security in the regions in question represent significant uncertainties in such concepts.

As fascinating as the institutes' scenario might be, their vision depends on research advances and developments that are inherently uncertain even under ideal funding conditions.

Furthermore, they observe that a close European cooperation is one of the prerequisites for progressively increasing the proportion of renewable energy in the electricity network. As this involves not only goodwill but huge financial investments in a time of empty national coffers, the bar is already set very high.

Even in Germany, the 100-percent goal could and may quickly fail due to finances. Although researchers estimate savings of EUR 730 billion in fossil fuels between 2010 and 2050 by converting to renewable sources for heating and electricity alone (not including transportation) and from lower environmental impact costs, the economy would first have to shoulder the annual difference (costs of switching to renewable energy sources minus savings resulting from their use). Cost differences are expected to start at EUR 10 billion for heating and electricity in 2010 and reach a maximum of EUR 17 billion (including transportation) by 2015, after which they should sink again.

Catalyst for growth in the heart of Switzerland

Bern – business hub and tourist magnet

The capital city of Bern is located in Switzerland's heartland. Many Europeans are familiar with the city from when Germany won the final match of the FIFA World Cup there in 1954, referred to colloquially as the "Miracle of Bern".

But the city has much more to offer than legendary sports history. Bern is not only the capital of Switzerland and the Canton of Bern; with more than 130,000 inhabitants it is also the fifth-largest city in Switzerland and the economic hub of the Bern-Mittelland district, whose more than 380,000 residents make up roughly one-third of the Canton of Bern. It is the second-largest canton of Switzerland in terms of area and population, and the official languages are German and French.

Named World Heritage Site in 1983

The main attraction of Bern is its historic old town, which was declared a World Heritage by UNESCO in 1983. The organisation made this decision in recognition of how Bern has managed to

maintain its medieval structure while meeting the challenges of modern society. In the heart of the old town are the 6-kilometre-long "Lauben" shopping arcades, one of the longest covered shopping promenades in Europe.

Bern is the seat of the Swiss government and not surprisingly, public administration is the largest provider of employment. The next most important economic areas are healthcare and social services. Many people are also employed in construction and printing/publishing. Energy, textiles, mechanical engineering, electrical engineering and telecommunication are additional key industries in Bern.

Low unemployment, high per-capita income

The Bern-Mittelland region offers more than 260,000 jobs, including nearly 150,000 in the city of Bern itself. Bern's strong economy means unemployment is very low at just 3.9 percent (2009). Incomes in the Bern-Mittelland region are correspondingly high: In 2005,



The car-free Bärenplatz (Bear Square) in the heart of Bern's old town attracts countless tourists and locals every day.

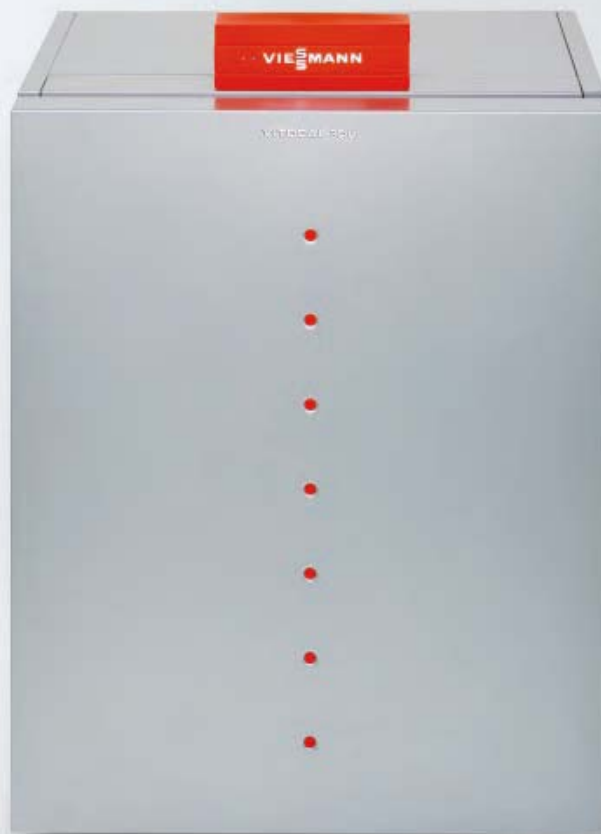
the average per-capita income was 52,500 Swiss Francs, roughly equivalent to 39,000 euros per year.

In addition to being an economic powerhouse, Bern is a major Swiss tourist attraction. The city is one of the most-visited destinations for both Swiss and international tourists. Nearly 700,000 overnight stays were registered here in 2009. According to a 2008 report from the BAKBASEL Economics research institute, Bern is in the top 10 of a ranking of 43 international destination cities.

As of last year, Bern boasts a new major attraction: More than 2.4 million people have visited the Bear Park since it opened in 2009. The city generally has a very special relationship to the heraldic animal in its coat of arms: Bern was founded by Berthold V, Duke of Zähringen, who according to legend named the city after the first animal killed there during a hunt, a bear. Bears have been kept in Bern since 1513.



The townscape of Bern is characterised by historic buildings and the Aare river, a tributary of the Rhine.



With coefficients of performance as high as 6.0, the Viessmann Vitocal 300-G is one of the most efficient heat pumps available.

Viessmann Vitocal 300-G **Efficient heating with geothermal or groundwater sources**

The main advantage of modern heat pumps is that they require relatively little electrical energy to make use of a large amount of free ambient heat to heat buildings, generating up to six kilowatt hours of heat per kilowatt hour of operating electricity, depending on heat source. This not only keeps energy costs low but also helps to protect the climate and conserve fossil resources.

Viessmann heat pumps from 1.5 to 1,500 kW

Viessmann's comprehensive range includes heat pumps to efficiently use heat from geothermal sources, the groundwater and the air. Whether for single-family homes, large apartment buildings, commercial premises or local heating networks, the portfolio

includes heat pumps for all applications, with outputs of 1.5 to 1,500 kW.

A number of Viessmann's heat pumps can also be used to cool buildings – a pleasant bonus on hot summer days. Whether heating or cooling, Viessmann also supplies the full range of related systems technology from a single source, including state-of-the-art control technology, DHW cylinders, heating water buffer cylinders, radiators and underfloor heating.

Vitocal 300-G: High-efficiency heat pump with new output ranges

With high coefficients of performance up to 6.0, the Vitocal 300-G heat pump from Viessmann is one of the most efficient units for exploiting heat from the earth or groundwater. New output

ranges now make the Vitocal 300-G suitable for higher-demand applications such as apartment buildings, hotels and commercial premises.

Modular construction for outputs up to 471 kW

The Vitocal 300-G brine/water heat pump (COP up to 4.8 for 0°C brine/35°C water according to DIN EN 14511) now comes in outputs of 21.2 to 42.8 kW for single units. As a water/water heat pump (COP up to 6.0 for 10°C water/35°C water according to DIN EN 14511), the maximum rated heat output is as high as 58.9 kW. With flow temperatures up to 60°C, the Vitocal 300-G is suitable for both new construction and modernising existing heating systems.

The modular construction of the Vitocal 300-G allows it to be combined to adapt to any specific needs. To achieve higher outputs, these new heat pumps can be joined in a master/slave concept. The master pump outfitted with a control unit is first operated by itself. As heating demand increases, the control unit of the master module automatically starts the slave module, allowing outputs up to 85.6 kW (brine/water) or 117.8 kW (water/water). Even higher outputs are possible by cascading as many as eight Vitocal 300-G units, up to 342.8 kW with geothermal heat and up to 471.2 kW using groundwater.

Electronic expansion valve and RCD system for high efficiency

All versions of the Vitocal 300-G combine a Compliant scroll compressor with an electronic

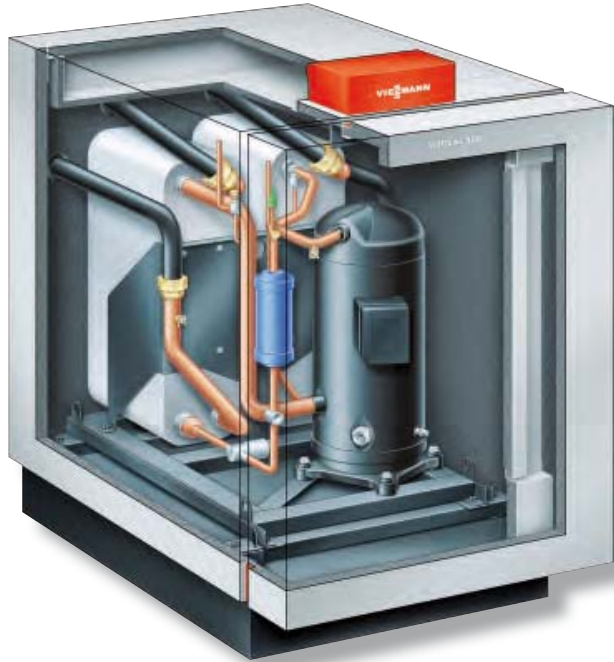
expansion valve and an RCD (refrigerant cycle diagnostic) system for outstanding efficiency. The RCD system constantly monitors and controls the refrigerant cycle, ensuring optimum performance at all stages of operation. The RCD system also logs energy input from the power grid and heat discharged to the radiators and domestic hot water. This means no additional heat or electricity meters must be installed to obtain subsidies in the German market incentive scheme.

Particularly quiet operation

An effective noise reduction concept makes Vitocal 300-G heat pumps amongst the quietest on the market. The completely sound-insulated housing and the three-dimensional vibration isolation of the scroll compressor in the new Vitocal 300-G yield sound power levels under 44 dB(A), depending on output. This means that the units can be installed in the immediate vicinity of living space.

Ease of operation

The new Vitotronic control system with menu-driven interface, large graphics display and convenient



The three-dimensional vibration isolation and sound-insulated housing of the new Vitocal 300-G ensure particularly quiet operation.

scroll button permits simple programming and operation of the Vitocal 300-G (starting at 21.2 kW). The display shows not only diagrams of heating curves but summaries of energy input from the public grid and heat discharged to the building and domestic hot water. Moreover,

the Vitocom/Vitodata telecontrol systems available as accessories make it possible to monitor and maintain the heat pumps remotely.

To achieve larger outputs, the new Vitocal 300-G units can be combined in a master/slave concept.



New low-temperature radiators for high efficiency

Heat pumps and condensing boilers are particularly efficient when operated at low system temperatures. The new low-temperature radiators from Viessmann's comprehensive range are thus the ideal complement to these heat sources. With an innovative dynamic boost effect (DBE) from electronically controlled, extremely quiet axial fans on the heat exchanger, the low-temperature radiators provide the same amount of heating as conventional radiators two to three times larger in size. They also heat the room up to nine times faster than underfloor heating. By modernising the heating system, operating temperatures can be systematically reduced using the new low-temperature radiators while comfort is enhanced.



The new low-temperature radiators provide the same amount of heating as conventional radiators two to three times larger in size.



The Pyromat ECO is available with outputs from 35 to 170 kW. The models with larger outputs can also accommodate metre-long logs.

Pyromat ECO from Köb Efficient log burning boilers for home and commercial applications

“Home grown”, carbon neutral and easy to store: wood is an attractive alternative to heating with oil or gas. This indigenous fuel is renewable and independent of fossil fuel reserves. Its combustion is CO₂-neutral and therefore does not impact the atmosphere with environmentally damaging carbon dioxide emissions. Moreover, wood is available year-round, irrespective of the weather, and is easy to store. Burning wood in modern Viessmann combustion systems is efficient and environmentally clean.

Wood gasification boiler with new menu guided control for ease of programming

The Pyromat ECO developed by Viessmann Group member and wood combustion expert Köb offers new Ecotronic control for unsurpassed operating convenience when heating with wooden logs, wood briquettes and scrap wood. In contrast to the previous versions, the new programming unit of the Pyromat ECO has now been integrated into the boiler.

The large, impact-resistant, graphics-capable display of the new Ecotronic control makes all information easy to read. The intuitive interface and multiple-line plain text display allow the various menus to be quickly navigated. Menu navigation is identical to the interface of Viessmann’s compact gas, oil and heat pump units introduced at the 2009 ISH trade fair. All parameters are conveniently set via a scroll button, similar to many modern mobile phones.

The new control can also be expanded via a bus to operate up to three mixer circuits or two

mixer circuits and DHW. It is also compatible with accessories from the comprehensive Viessmann range of products. The Pyromat ECO can thus be combined with a solar thermal system or operated with a second boiler.

Efficient wood gasification boiler

The Pyromat ECO is available with outputs from 35 to 170 kW. It is particularly well-suited for buildings with higher heat demands such as two-family homes, apartment buildings and commercial premises. The large top-loading

hopper (185 to 500 litres) can accommodate half-metre or metre-long logs depending on boiler size and allows combustion periods of roughly six to eight hours depending on wood type and boiler utilisation. Combustion in this unit is not sensitive to foreign materials such as screws and nails, which are often present in scrap wood.

A lambda probe and a flue gas temperature sensor ensure efficient fuel combustion. They regulate the supply of combustion air via an induced draught fan, depending on the current wood gas/air ratio and the flue gas temperature. This allows the Pyromat ECO to achieve a boiler efficiency of up to 92%. Furthermore, the integral buffer heating management in Ecotronic control intelligently uses residual heat from the boiler water during the combustion phase, providing



an incremental heat yield of up to 9 percent per burnout.

Unsurpassed ease of operation when heating with logs: The Pyromat ECO now comes with the Vitotronic control introduced in 2009.

Can also be operated with additional oil burner

The Pyromat ECO can also be operated with fuel oil. The addition of an oil burner is useful during longer absences, for example holidays, when manual loading of logs is not feasible. The necessary connections have been pre-installed.

Time-saving installation, maintenance and service

The Pyromat ECO comes fully wired with the return temperature raising unit pre-mounted on the boiler to save installation time and thus costs.

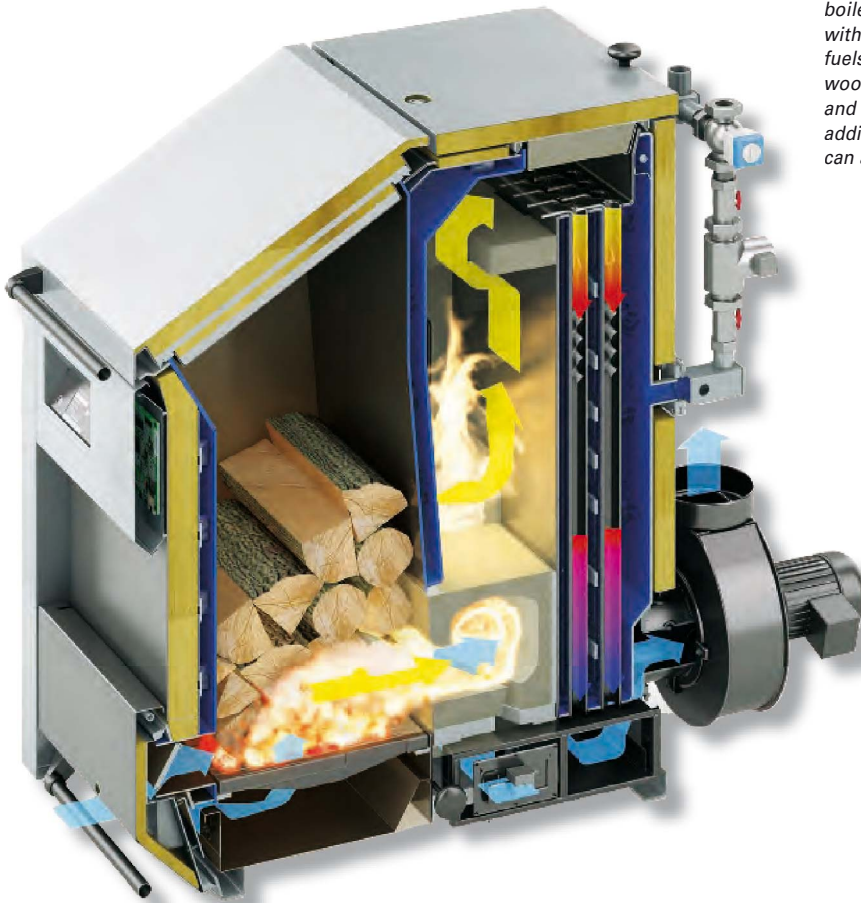
Fine dust filter for wood fired systems up to 540 kW

To separate out fine dust in wood fired systems of 100 kW output and higher, Viessmann Group member Köb Holzheizsysteme GmbH offers a metal mesh filter perfectly matched to the Pyrot and Pyrotec range of wood boilers. An additional size has been developed to extend the application range of the filter to systems of up to 540 kW heating output.

Complies with strict emission control limits in Germany

The filter cartridges of the fine particulate filter are made of stainless steel mesh in an isolated filter housing. The metal mesh filter provides for a high degree of separation, achieving emission values well under 10 mg/Nm³ (milligram per normal cubic metre). This means that larger wood combustion systems can even be operated under the stricter thresholds scheduled to go into effect in Germany in 2015.

The wood gasification boiler can be operated with a range of wood fuels including logs, wood briquettes and scrap wood. An additional oil burner can also be fitted.



Compact and easy to maintain

Compared to conventional electrostatic filters, the metal mesh filter is more compact and takes up significantly less space. The filter cartridges can be automatically cleaned with pressurised air during online operation. The cartridges are also easy to remove and can be cleaned by operators by hand for instance using a steam jet. No special tools are necessary.



Heat and steam for five-star hotel in Chinese metropolis Seven Vitomax boilers at the Kempinski Hotel Yinchuan

The Kempinski Hotel in Yinchuan, China was opened in July. It is not only the first hotel from the Kempinski chain in the city of more than one million inhabitants; it is also the first five-star hotel in Yinchuan. The impressive building is heated by five Vitomax industrial boilers, while two additional Vitomax boilers generate the process steam required for hotel facilities.

First-class location in the business district

Yinchuan is the capital of Ningxia Hui Autonomous Region and is located near the headwaters of the Yellow River, the second-longest river in China. The Kempinski Hotel enjoys a first-class location in the heart of the Jinfeng quarter, the business district of the city. The International Conference and Exhibition Center, two renowned museums and the popular People's Square are located in the immediate vicinity. Hedong airport is only 30 minutes away by car.

At the opening ceremony, Reto Wittwer, President and CEO of the Kempinski Group, explained that Yinchuan was chosen because of the enormous economic growth anticipated in the region.

The 409 rooms and suites of the Kempinski Hotel are not only elegantly and stylishly furnished; they also offer guests breathtaking views of the city. A broad range of culinary styles are available in the hotel's restaurants, bars and lounges. Choices include an authentic Paulaner brewery pub, innovative Chinese cuisine with traditional roots and a

sophisticated "Café Berlin" open round the clock. Two additional restaurants, the Kemp Deli and the Garden Bar & Grill, will be finished in spring 2011.

Spread over 2,600 square metres, conference and banquet facilities offer state-of-the-art media equipment and a column-free ballroom of 860 square metres. Guests can relax in the hotel spa, while the fitness centre features the latest equipment and 20-metre heated pool.



The Kempinski Hotel is the first luxury five-star hotel in the metropolis of Yinchuan.

Efficient, environmentally friendly heating

Five gas-fired Viessmann Vitomax 200-LW industrial boilers of 2.6 MW each keep the Hotel Kempinski cosy and warm. The three-pass boilers guarantee particularly environmentally friendly, clean combustion across the complete output range, while wide water galleries ensure excellent natural circulation and reliable heat transfer. High quality composite thermal insulation and a fully water-cooled rear reversing chamber mean extremely low radiation losses and a boiler efficiency of up to 92%. High energy efficiency was one of the main reasons why management at the Kempinski Hotel Yinchuan chose Viessmann for their heating technology.

Practical applications



The steam required in the hotel and in the kitchen and laundry facilities in particular comes from two reliable, economical Vitomax 200-HS boilers with an output of 2.9 tonnes/hour each. The large evaporator in the steam chamber of the three-pass boiler provides high steam quality with low residual moisture. The Vitomax 200-HS boilers also feature a large water capacity and a wide

steam chamber to ensure reliable, continuous steam supply despite strong load fluctuations, as is the case in hotels.

Five Vitomax 200-LW boilers provide heating, while two Vitomax 200-HS boilers generate the process steam required for hotel facilities.





The Vitomax 200-HS steam boiler fulfils all the requirements of the project planners: high reliability, efficiency and a broad modulation range.

Viessmann industrial boiler expertise at StoVerotec GmbH Efficient steam boiler system for new production facility

Germans from the Swabian region have a reputation for being hard-working and entrepreneurial. This certainly holds true for StoVerotec GmbH, located in the Danube valley at the edge of the Swabian Alb. The successful subsidiary of international company Sto AG was founded in 1989 as a special producer for aesthetically sophisticated, high-quality design concepts for building façades and interiors and has since become a leading manufacturer of façade systems. Approximately 100 employees in Lauingen are responsible for the high quality of StoVerotec products.

insulate exterior façades. Industrial steam was needed to expand the feedstock and then process it into blocks. In choosing a steam boiler system, the company was looking for a complete solution with ideally matched components. The main requirements were reliability, highest efficiency and a broad modulation range, as the system needed to have capacity reserves to accommodate future expansions. The decision was made for a Viessmann Vitomax 200-HS.

Low operating costs and quiet operation

Professional planners B + S Baupartner GmbH from Berlin began planning the new system in 2008. The Vitomax 200-HS has an output of 4 tonnes/hour and a safety pressure of 16 bar, and comes with an integrated economiser for low flue gas temperatures. The ancillary equipment such as feedwater deaerators, mixing/cooling units, T.D.S. expanders, exhaust vapour coolers (heat exchangers) and the control panel with PLC (programmable logic control) were chosen specifically for this project.

The modulating, emission-reduced gas burner is equipped with a variable speed blower to reduce operating costs and noise levels.

The Vitomax 200-HS including all related equipment was installed and commissioned by Renner GmbH & Co. KG in mid-2009. Since starting up production in autumn 2009, the steam boiler system has completely fulfilled all expectations. The broad modulation range of the burner and the large water capacity and steam chamber of the boiler ensure reliable operation without controlled shutdowns.

Reliability, efficiency and a broad modulation range

An expansion of the product range had made it necessary to build a new production facility for top-quality thermal insulation panels to



StoVerotec GmbH in Lauingen ranks among the leading manufacturers of façade systems.



Carving toboggan

Whether carving toboggan, Nici bear or chronograph watch, these gifts are sure to hit the mark.



Practical applications / Viessmann Selection



Sport Shop under new name Viessmann 2010/2011 Selection catalogue with great gift ideas

Starting with the winter 2010/2011 catalogue, the Sport Shop presents itself under a new name: Viessmann Selection. The new name emphasises what you will find in the catalogue: innovative products, unique design and incomparable quality. The catalogue's 86 pages present numerous exciting ideas for winter. When it's cold outside and you're warm and comfortable at home, take some time to browse through the new Selection catalogue. Whether exclusive, practical, fancy or sharp: the large

selection offers something for every taste and price range. You'll find a wealth of gift ideas for others – or yourself.

Carving toboggan

Hot stuff: the carving toboggan has flexible carving skis instead of runners and a tiltable contoured seat instead of an inflexible one. This fun sled is steered by shifting one's weight and will have you screaming down the run.

Bogner functional apparel

Sporty clothing with an elegant touch: Discover Bogner's premium

functional collection of racing apparel for men and women.

The highly elastic softshell jacket features a warm fleece lining and is breathable and wind- and water-resistant. The knit team and racing logos combined with the contrast embroidery featuring the Bogner flame logo make this piece a real eye-catcher.

Finest materials in the Bogner functional shirt ensure an ergonomic fit. Extremely robust, elastic and stable in shape, the shirt offers optimum moisture absorption and unrivalled wear comfort.

Chronograph watch

Precision, robustness and quality are united in the new chronograph watch with the elegance of classic design. Details include a massive, matte-brushed stainless steel case, hardened, scratch-proof mineral glass, a stopwatch function and a high-quality croc-embossed leather strap with a stainless steel buckle. The watch is waterproof to three bars and comes in an attractive metal box.

Nici polar bear

The 30-cm Nici stuffed polar bear with a Viessmann scarf will win the hearts of children and adults alike. If his ultra-soft fur ever gets dirty, he can be machine washed at 30°C.

The knit team and racing logos transform the jackets and shirts from the Bogner performance collection into real eye-catchers.



BOGNER Women's softshell jacket



BOGNER Women's functional shirt



BOGNER Men's softshell jacket



BOGNER Men's functional shirt

The winter 2010/2011 Selection catalogue is available at the Viessmann website under www.viessmann.de.



Four world championships Athletes from the Viessmann team highly motivated at the opening of the 2010/2011 season

Four world championships are scheduled for the coming winter sport season. Sports fans can look forward to the next exciting title competitions following the Olympic Games in Vancouver.

Cross-country skiing

Oslo with its impressive winter sports facilities in the Holmenkollen district will play host to the Nordic World Ski Championships from 23 February to 6 March 2011. "I'm definitely looking to winning a medal in the individual race and the relay", says Evi Sachenbacher-Stehle from the Viessmann team. The world championships are also one of two season highlights for her male colleagues Tobias Angerer and Axel Teichmann. Before heading to Norway, they will first take part in the Viessmann Tour de Ski, where only the most physically and mentally strong all-rounders have a chance of winning. Points are already being accumulated in the Viessmann World Cup, which began in Sweden in late November.

Nordic combined

The German Nordic combined members of the Viessmann team, Eric Frenzel, Björn Kircheisen and Johannes Rydzek, are bound to impress again at the World Cup. And the team also plans to bring home several medals from the World Championships in Oslo.

Ski jumping

Ski jumpers Michael Uhrmann, Pascal Bodmer, Felix Schoft and Andreas Wank hope to continue their success from the Olympic Games, where they won silver in the team competition. And of course they plan to dazzle at the Four Hills Tournament at the turn of the year. The traditional event at the ski jumps in Oberstdorf, Garmisch-Partenkirchen, Innsbruck and Bischofshofen is the uncontested highlight of the World Cup, which Viessmann supports as a presenting sponsor.

Biathlon

The company is also a presenting sponsor of the Biathlon World Cup. Following the withdrawal of Martina Beck, Andrea Henkel, Sabrina Buchholz and Tina Bachmann will represent the Viessmann team in the competition. Alexander Wolf, Arnd Peiffer, Simon Schempp and Daniel Böhm will wear the Viessmann colours for the men's team. The company also sponsors the Chinese, Polish and Ukrainian teams. Biathlon fans are already impatiently awaiting the season highlight: the World Championships from 8 to 13 March in Khanty-Mansiysk, Russia.

Luge

The luge squad hopes to reach the Olympics with a new form of competition. The spectacular team relay is scheduled six times in the coming season. Two-time world champion Felix Loch hopes to shine once again as he did in the World Cup. Amongst the women, Tatjana Hüfner is striving for her

The athletes of the Viessmann team – represented here by Nordic combined specialist Eric Frenzel – hope to continue the success of the Olympic season.

fourth World Cup victory in a row and is looking to clinch her third championship title at the World Championships in Cesana in late January. New members of the Viessmann team include World Champion runners-up in men's doubles Tobias Wendl/Tobias Arlt.

Bobsled

Since the beginning of the season, the Viessmann logo has also been featured on all German bobsleds starting in the Viessmann World Cup. Following the opening race in North America, the competition continues in Europe in January. Season highlights include the European championships at the FIBT Viessmann World Cup in Winterberg (14 to 16 January 2011) and of course the World Championships on the artificial track at Königssee (14 to 27 February 2011). Viessmann is a new main sponsor of the FIBT Bob & Skeleton World Cup series.

New athletes in the Viessmann Team

15 new world-class athletes and young talents have joined the Viessmann team. A number of them are profiled below.

Anastasiya Kuzmina

26-year-old Anastasiya Kuzmina, who joined the Viessmann team last winter, celebrated her first successes as a biathlete with gold and silver at the 2004 European Championships in front of a home crowd in Novosibirsk. In winter 2006/2007, the then 22-year-old also took part in a World Cup and a European Cup, after which she became pregnant and took a break from sports. She has competed for the team from Slovakia since 2008, where she lives with her husband in Banská Bystrica. She was a surprise winner of a silver medal in the mass start event at the 2009 Biathlon World Championships in Pyeongchang,

South Korea, and she won the sprint and pursuit events at the European Championships. But her big victory came in Vancouver, where Kuzmina won gold in the sprint followed by silver in the pursuit. It was her first World Cup win and the first gold for Slovakia at the Olympic Winter Games.

Alessandro Pittin

Italian Alessandro Pittin competed at the 2006 Olympics in Turin in the Nordic combined – on his 16th birthday. Four years later he reached the winners' podium in Vancouver. Since winning the bronze medal there, he has been considered one of the most promising up-and-comers in the Nordic combined.

Johannes Rydzek

Another new Viessmann team member is Nordic combined athlete Johannes Rydzek, who competed last year for Viessmann's junior team. He already made a name for himself as an emerging talent at the Olympic level as a member of the German Nordic combined team which brought home bronze from Vancouver.

Tobias Wendl / Tobias Arlt

Viessmann is once again sponsoring a number of talented young athletes on their way to the international elite class. Tobias Wendl/Tobias Arlt, who have brought home two silver medals (2008 World Championships and 2010 European Championships) in men's doubles luge, hope to continue in the footsteps of

Patric Leitner/ Alexander Resch, who won the Olympics in 2002 and finished their careers with a bronze in Vancouver.

Tina Bachmann

In biathlon, Tina Bachmann is emulating the success of her role model Martina Beck. Her tremendous talent was apparent in the 2008/2009 season in Khanty-Mansiysk, where she won her first World Cup in the sprint.

Numerous world-class athletes and emerging talents have joined the Viessmann team.



Daniel
Böhm



Janin
Hammerschmidt



Maren
Hammerschmidt



Stefanie
Hildebrand



Franziska
Hildebrand



Christoph
Knie



Manuel
Müller



Lucia
Anger



Hannes
Dotzler



Dietmar
Nöckler



Federico
Pellegrino



Alessandro
Pittin



Johannes
Rydzek



Tobias
Wendl



Tobias
Arlt



The Christmas message on the stove plates of Philipp Soldan (1500–1569)

Heat is essential to life. Protection against the cold of winter and the night is one of the basic human needs and the foundation of today's culture.

The construction of the first box stove in the late 15th century laid the foundation for a comfortable, uncomplicated heat supply in buildings. These cast iron stoves usually consisted of five plates – a top, a bottom, a front and two side plates. They were installed through the wall and fed from the open back, typically from the kitchen. This prevented smoke and odours from entering the living room.

The first stove plates were plain, but as early as the 16th century wooden moulds began to be carved to make decorated cast iron stove plates. Philipp Soldan from Frankenberg (1500–1569) was one of the most famous mould carvers from this period. He is the namesake of the gourmet restaurant in the Hotel Die Sonne Frankenberg, recently awarded a Michelin star. Soldan created the most beautiful stove plates of the Renaissance, whose Christian themes and depiction of parables are referred to as the "Iron Bible" today.

An elaborately designed five-plate stove in the Museum of Art and Cultural History at the University of Marburg portrays the birth of Christ. Mary leans over the baby Jesus in the halo of the manger, surrounded by Joseph, the angels and the shepherds. The silhouette of Bethlehem can be seen in the background.

Artistic themes such as this were not only uplifting as people gathered around the warm stove on long winter nights. In a time when very few people



Philipp Soldan was not only a mould carver; he also assembled the stoves himself.

could read, Soldan's stove plates communicated the message of the Bible and the teachings of the Reformation. In this way, the stoves of the Renaissance combined function and design.



Polygonal seven-plate stove with top piece (1539).



Artfully crafted five-plate stove from Philipp Soldan in the Museum of Art and Cultural History at the University of Marburg.



The "Bible stoves" of the Renaissance were elaborately decorated with Christian themes.



