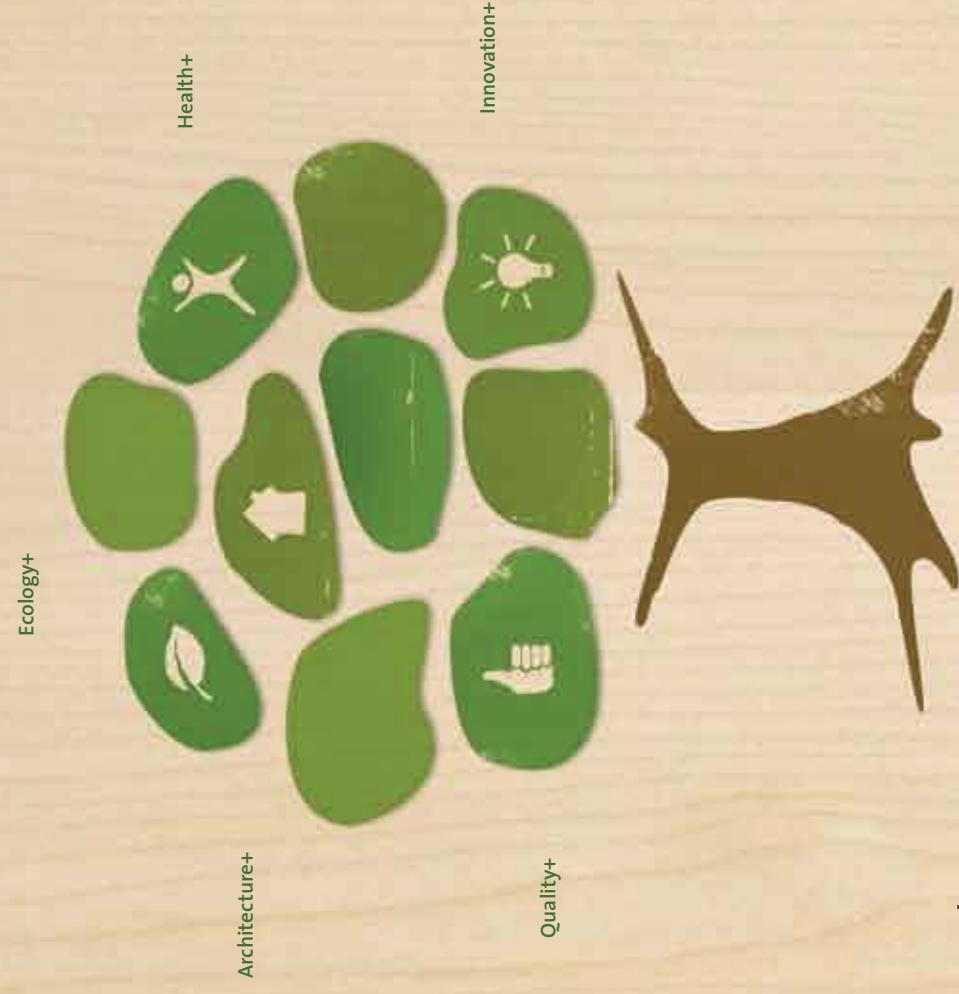


APPENDIX E – BAUFRITZ SYSTEM

APPENDIX E – BAUFRITZ SYSTEM

Baufritz designs and builds high quality timber homes that are environmentally friendly and offer an unrivalled level of comfort and a unique healthy living climate.





Our Values

Architecture

Our design team is made up of architects and designers, all of whom are creative, practically-minded, cost-conscious and experienced in designing high quality homes. They are trained in our off-site timber construction system, technical installations and finishes in order to design beautiful houses that meet the highest efficiency and ecological standards.

Health

Healthy living starts at home. Houses should protect their occupants from external factors that may adversely affect their wellbeing and actively promote good health. Our work with building biologists and environmental specialists has ensured Baufritz houses provide the healthiest possible living environment.

Ecology

Our ecological vision is all-encompassing: it includes the choice of sustainable timber and all building materials, the component design, the manufacturing process, packaging and transportation, waste management and site operations.

Innovation

But it doesn't end there. For the lifespan of your home, it will continue to run in an energy efficient manner and be truly environmentally friendly.

Quality

When it comes to where you want to live, you shouldn't accept any compromise. Baufritz has been leading the way in ecological, timber construction for the last four generations. With over a hundred years' experience comes a tradition and quality that money can't buy. We have the knowledge, skills and workforce to design and build you a beautiful, bespoke home that is branded with excellence.

Ecology+

We believe a house should have a brain as well as a heart and this is why we invest considerable time and money in research and development. Investing in innovation ensures that we can anticipate the future needs of you and your home, whether in relation to labour saving devices, technologies to safeguard your health, energy efficiency or simply to guarantee absolute luxury.

Advantages of building with Baufritz

- Market leader in high quality bespoke timber homes for 117 years
- Your house is individually designed according to your brief and budget
- Experienced in-house architects and designers
- A healthy home built only with natural materials
- Environmentally friendly construction with low embodied energy
- An energy efficient home, surpassing national standards
- Prefabricated in our state of the art factory guaranteeing an exceptional quality of construction
- German precision engineering and craftsmanship ensuring the highest quality of finish
- Fast construction with your home secure and watertight on site in a matter of days
- A low maintenance home with low running costs and a long life span
- UK based project manager
- Six year warranty on house structure and two years on all machinery and moving parts
- Strong working relationship with foundation/basement builder, ground worker and bespoke furniture maker
- Inclusion of professional services such as: working drawings, structural engineering, energy performance calculations, air tightness inspection, building regulations approval for the house, interior design service for selection of finishes, full project management of above-ground build
- Huge range of finishes available to select from in our showroom

All delivered to a fixed price and fixed timescale.

Home-made since 1896.

The Baufritz success story.

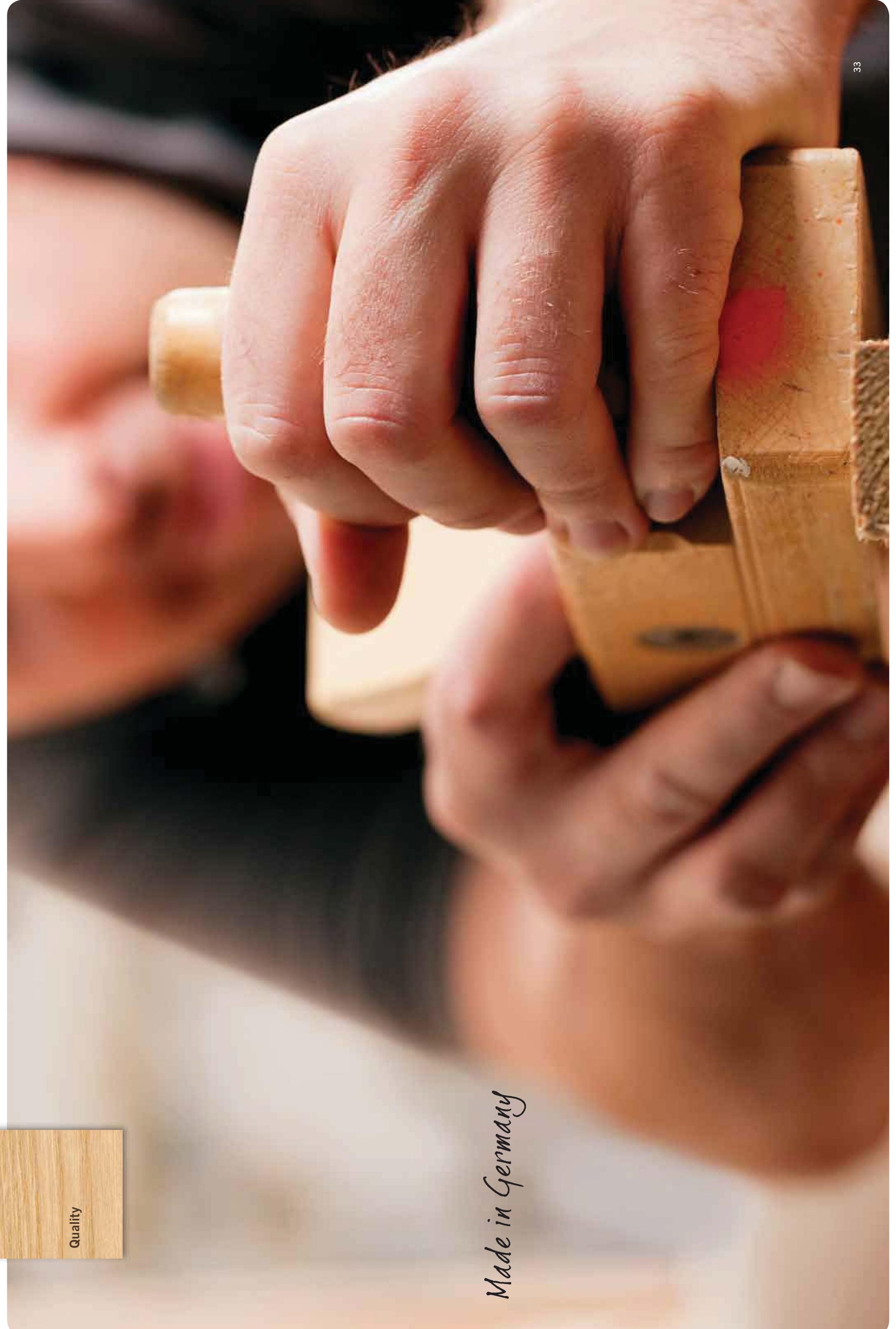


» **2008**
Dagmar Fritz-Kramer
is voted business-
woman of the year.

» **2008**
Award for being the **most family-friendly company in Germany.**



» **2002**
The insulating material
HOIZ is awarded the
European eco-seal **natureplus**.



Made in Germany

Quality

Four marks of quality

For Baufritz, quality is more than just a word. From sourcing our materials to planning and processing and all the way to the home owners' moving in: our homes live up to the highest expectations.

1



Quality of Materials

2



Quality of Living

We invest a considerable amount of time into choosing the materials we use. Our technicians and building biologists rigorously test and measure all building materials. From quality kiln-dried timber and fittings to the building services – only first class and pollutant free materials make it into a Baufritz home.

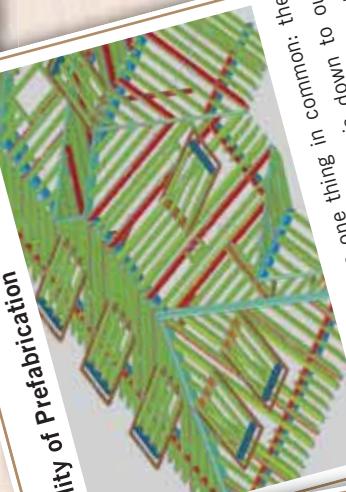
After design, construction and completion it is time to fully enjoy your new Baufritz home. Whether it is the first time you set foot into your new home or decades later, you will still enjoy the healthy climate and the unique architecture of your bespoke home. You will feel a sense of wellbeing like never before.

3



Quality of Detail

4



Quality of Prefabrication

the common: the All our houses, have one thing in common: the highest level of precision. This is down to our computer-controlled machinery includes not only windows and doors, but also electrical prefabrication processes, such as windows and doors, walls and bathrooms and ceilings, the majority of bathrooms and installations.



Highest precision and perfect fit // thanks to computer controlled cutting of the building parts and sections

No matter if it is the wall, ceiling or roof section, all our components from the shell to the decking elements are made with the highest precision thanks to computer controlled machinery. Each and every part is cut with perfect accuracy, mortises, tenons and joints are perfectly moulded. The result is an amazing level of precision, which you will only find in a Baufritz home.



Long-lasting protection // of the weight-bearing balcony and terrace construction from the elements

In order to increase the durability of the balcony and terrace components, which are exposed to all weathers, we cover all of the load bearing components with an edged zinc cover. This provides permanent protection from standing water and increases longevity.

*Our architect
designs your building.*

Bespoke Design

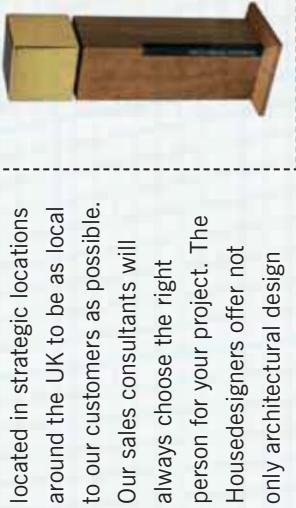
Designing and building your own home is usually a once in a lifetime experience. As a unique experience it should be memorable for all the right reasons. To realise your dream home, on time and on budget, you need absolute trust in the whole team working to make your vision a reality; a trust which can only be developed through absolute clarity regarding building costs, budget and planning constraints particular to your build area.

Our experienced sales consultants will be able to advise you very early on likely construction costs for the whole project based on your space requirements. This will help you to define a firm budget for your project. Our Housedesigners will be able to advise, after an initial site visit and liaison with the planning authorities (sometimes in conjunction with a planning consultant), on the location, method of construction, size and style of property permitted on your building plot. Once these basic questions have been answered the design process can start properly to create a building that meets all of your expectations. Our designers will explore various conceptual options and our sales consultants advise on costs until you have found the right design for the right price ready for submission to the planning authorities.

For your house design we recommend our architectural and design partner 'The Housedesigners'. A firm of architects, engineers and designers specialised in creating unique houses – be they statement buildings or special family homes. They are specifically trained on the Baufritz building system, designing to meet the highest quality and environmental standards; they are also very experienced, having designed Baufritz homes since the firm's inception in the UK in 2006.

25 prizes and awards

More than 25 prizes and awards have gone to Baufritz just for the design of its Eco-Premium houses. From the Pro Wood Award, the Golden Cube, the Green Apple Award, the Best Timber House in Britain Award or the many awards for the 'House of the Year' by leading building and living magazines like 'Schöner Wohnen' (Beautiful Living) – experts and the public agree that Baufritz homes have many amazing things to offer.



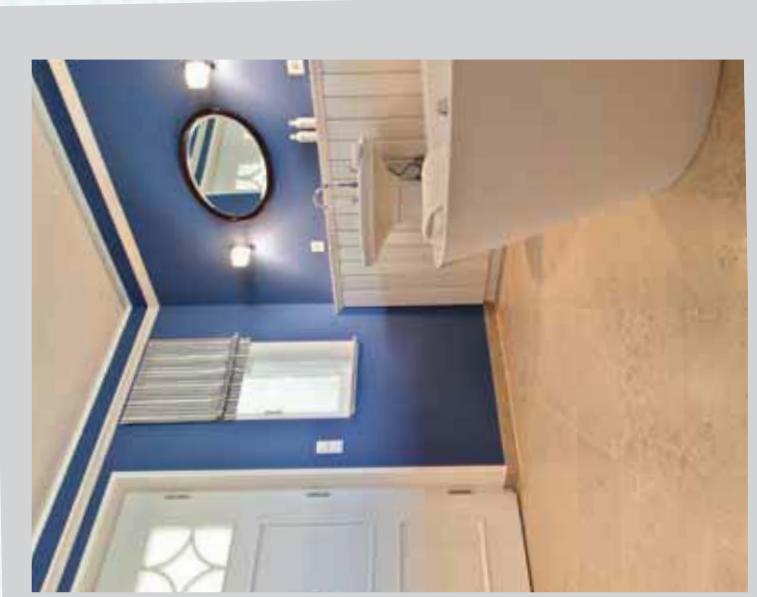
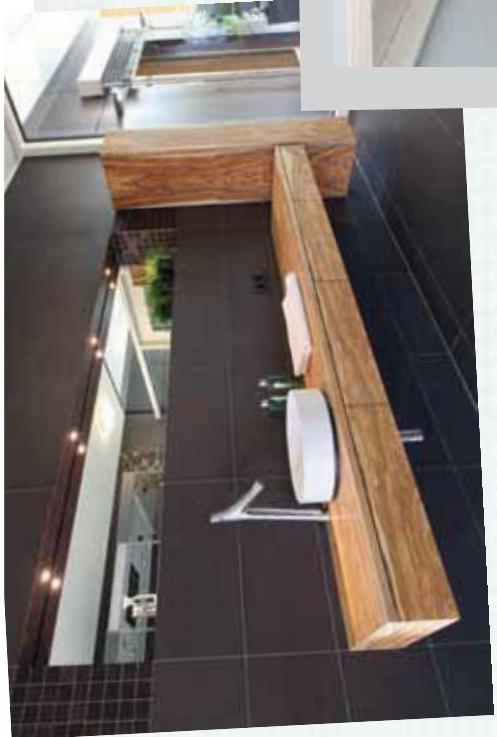
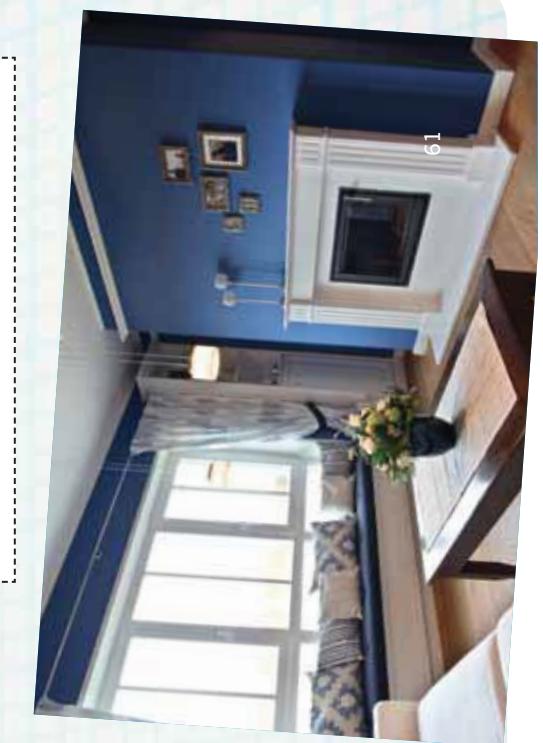
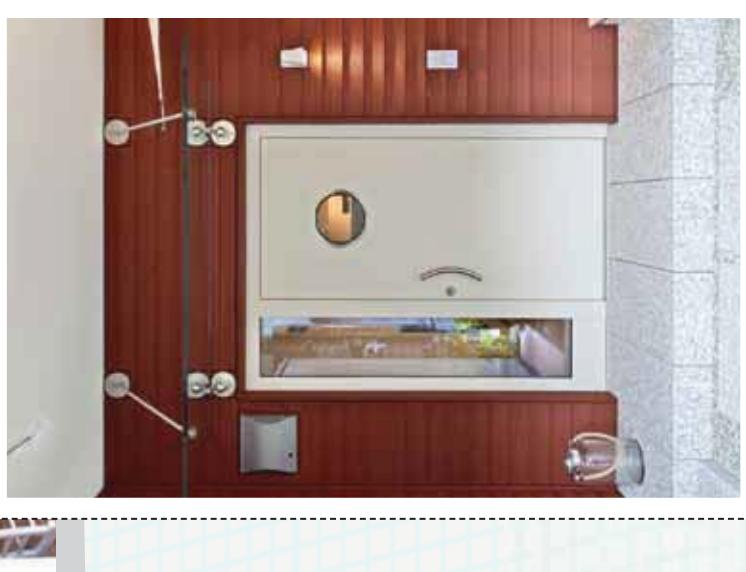
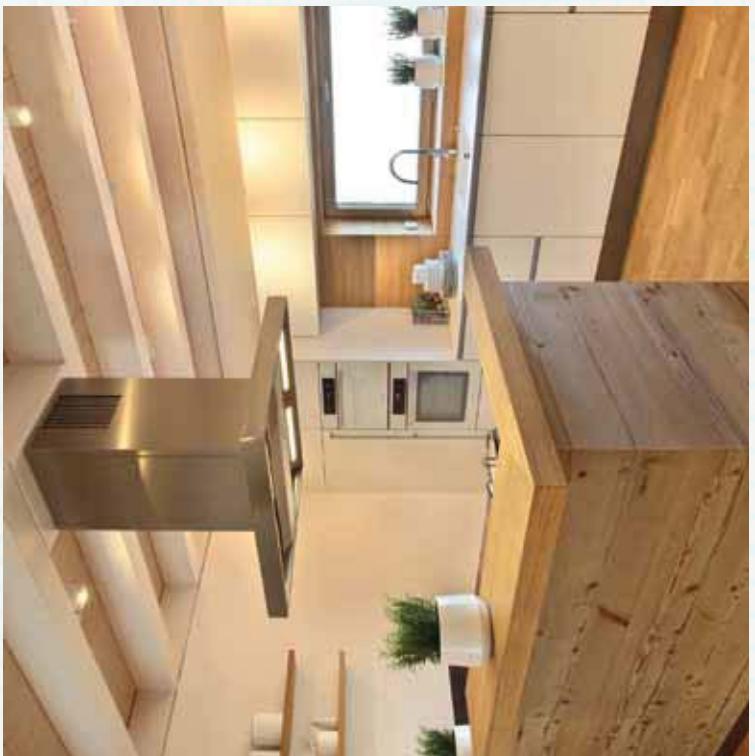
The Housedesigners are located in strategic locations around the UK to be as local to our customers as possible. Our sales consultants will always choose the right person for your project. The Housedesigners offer not only architectural design services up to planning but additional design and project management services, e.g. Kitchen, lighting, landscaping, furnishing etc. which go beyond Baufritz's scope of services. It is often advisable to have one firm providing all of these additional services rather than enlisting a whole range of suppliers for different elements, as this can prove very difficult and time consuming for the client to coordinate. With the Baufritz and Housedesigner team the client can rest assured that if they wish, a complete turnkey service is available.



Sampling

Many people find sampling (the selection of external and internal finishes) the most exciting part of the design and build process as it entails a visit to our showroom in Erkheim, Germany – dubbed “house building heaven” by Kevin McCloud.

After receipt of planning permission and the subsequent order of your new house, Baufritz will invite you, approximately 5 months prior to the manufacture of your building, to our showroom ‘The HausSchneiderei’. A carefully selected range of high quality and eco-friendly products and finishes are on display here. There are also displays of room sets, information on healthy building methods and heating choices. Furthermore you can visit the show houses and factory to gain a full understanding of Baufritz and its unique building method.



Natural protection

The best insulation material in the world

How Baufritz turned house construction upside down with its ecological HOIZ wood shaving insulation.

The walls of our CO₂-neutral eco-homes are much more than they seem. They contain a **24 cm thick layer of natural wood shavings**: vapour permeable, non-flammable and offering outstanding insulation. This simple yet highly efficient insulation material guarantees a **healthy, chemical-free living environment**. Furthermore it reduces energy consumption by **up to 50 %** below EU energy guidelines.

again as required. **No other insulating material can do this.**

NATURAL AND HEALTHY INSULATION

There is **no healthier insulation material than HOIZ**. Glass wool, for example, was classified as being carcinogenic by the WHO in 1996. Just as is the case with rock wool, tiny fibre and dust particles can get into the

air when processing, and then into your respiratory system.

Binders such as phenolformaldehyde resin or impregnation oil can also be harmful to your health. **On the other hand, the whey-soda impregnation of the Baufritz eco-insulating material, HOIZ, is absolutely safe.** What's more, the wood-shaving insulation material

has been tested by our building biologists and was certified by the IBN, the Institute for Building-Biology and Ecology Neubiberg. HOIZ was also awarded with the IBN quality seal. In fact, the eco-insulation is strongly recommended by IBN and Eco-Test.

100 % non-nuclear!

Baufritz is opposed to nuclear energy, and uses no nuclear energy for its offices, manufacturing or show houses. Since 2008, as you might expect from an environmentally responsible company, we have only used energy from renewable sources. We generate the majority of this energy ourselves - including from a huge array of photovoltaic panels on the roofs of our factory and showroom in Germany. Every year we save around 248 tons of CO₂, and avoid the production of approximately 0.3 kg of nuclear waste.

Sources: <http://www.iww.de/re/eu/co2/co2.html>
<http://www.ews-schoenau.de/sauberer-strom/stromherkunft/layer-herkunftsachweis-atommeill.htm>



Completely free of boric salt, and chemical fibre insulation and additives

Optimum humidity and climate control

Settlement free insulation layer

Patented eco-insulation

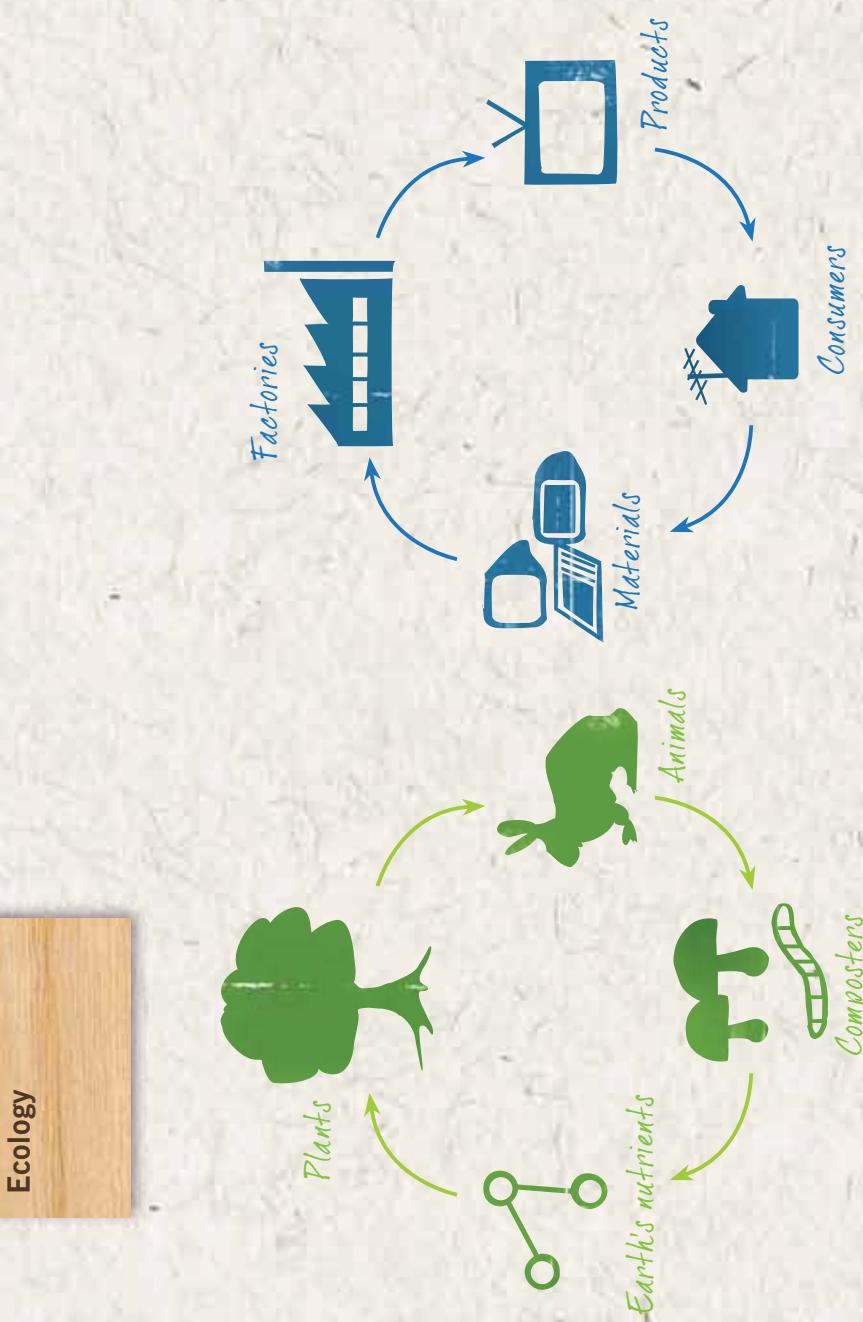
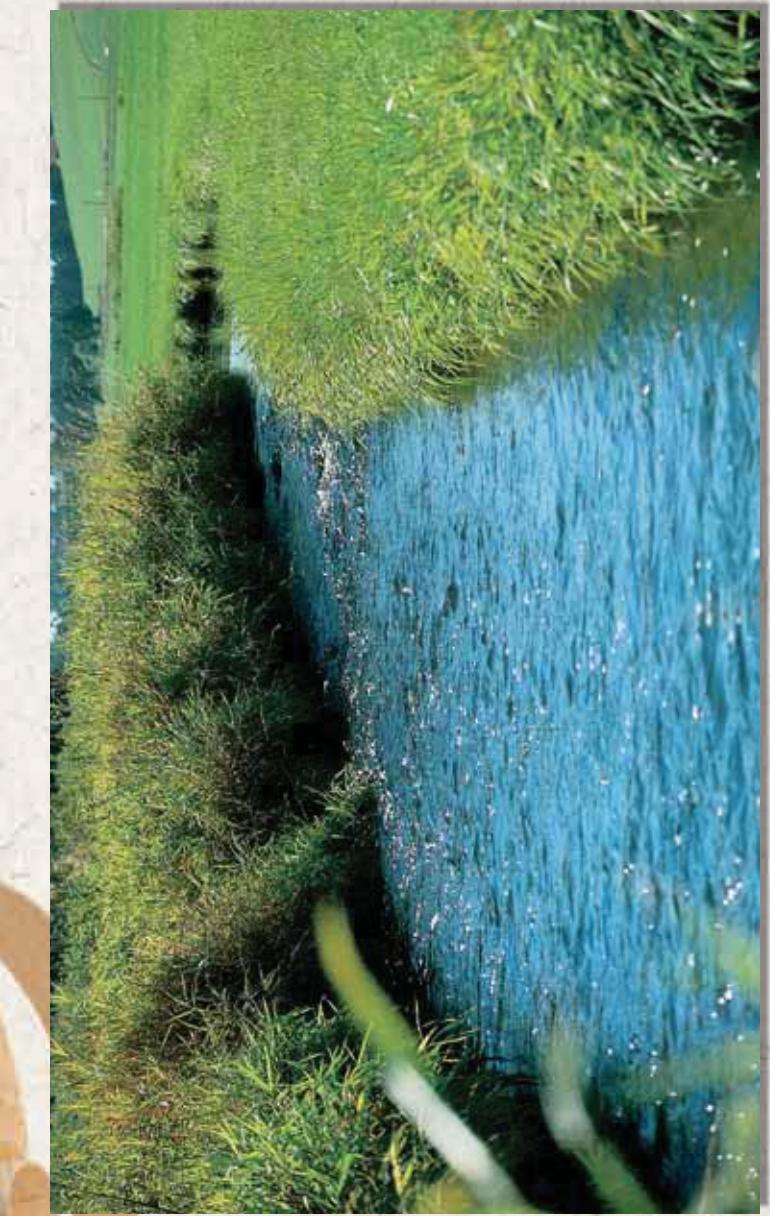
Top-quality heat insulation and heat protection in the summer

100 % natural and renewable raw materials, 100 % recyclable

Natural, totally healthy and suitable for allergy sufferers

Patented eco-insulation





Gold for Baufritz: first eco-insulation to achieve Cradle to Cradle® certification

Our healthy homes are manufactured from natural, environmentally safe, reusable materials, and are almost completely recyclable. In 2012, Baufritz was awarded Cradle to Cradle gold certification for our pioneering work on sustainability.

What exactly does Cradle to Cradle mean? With traditional "cradle to grave" construction methods, most building materials cannot be recycled, and little thought is given to maintaining valuable resources. The Cradle to Cradle certification system sees things very differently and aims to promote the responsible use of resources, avoiding waste and preserving them for mankind and the environment.



Only nature is good for nature

For millions of years, the natural environment supported and sustained itself. Nowadays, however, we have to protect nature by tackling the harmful consequences of industrialisation.

Baufritz has championed environmental protection and responsible construction for decades. Wood has always been our primary building material, and we are proud to be timber construction pioneers.

Using timber also means that, unlike traditionally built houses, Baufritz homes absorb CO₂ rather than emitting it. Wood is by far the most responsible building material, and

2.03 million

KWh

of environmentally-friendly electricity have been produced by the three photovoltaic units on the roofs of the Baufritz company buildings since 2005 (recorded at the end of 2011). This corresponds to a saving of 1,200 tons of CO₂ and the avoidance of about 1.5 kg of nuclear waste.

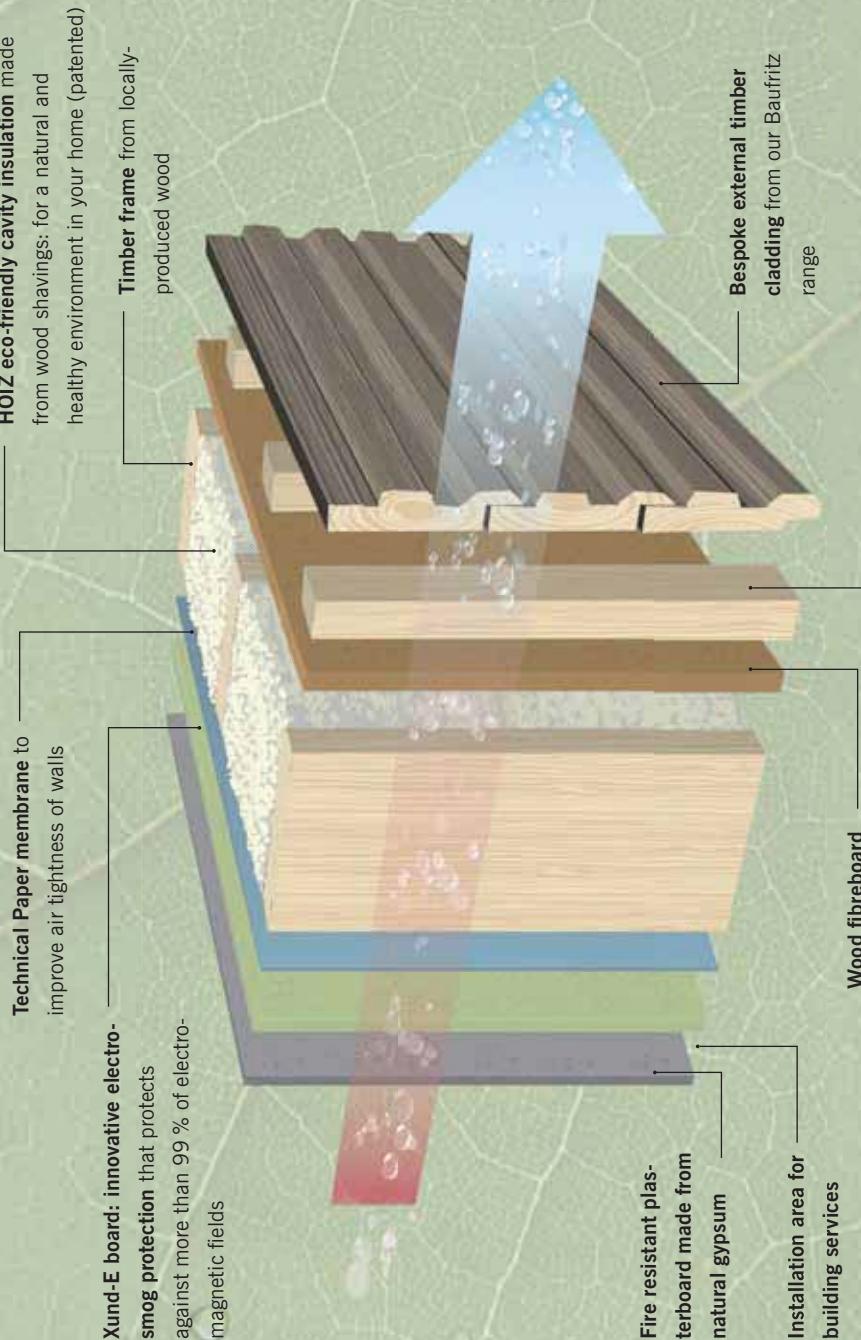


A photograph of a man in a white long-sleeved shirt and dark pants performing a dynamic stretching exercise. He is leaning forward from the waist, with his right leg extended straight behind him and his left leg bent at the knee. His arms are extended forward, reaching towards his right foot. The background is a bright, clear sky.

*Healthy living starts
at home.*

Climate protection in your own four walls

Climate protection has become a worldwide issue. The climate in your home also affects your health. This is why we should protect it with innovative developments.



Top of the list is the 37 cm thick and highly efficient Baufritz 'Energy Wall'. This **'actively breathing'** wall is airtight, however it is open to diffusion, meaning that it allows a certain amount of moisture arising inside of the house to exit through it. This provides a constantly pleasant level of humidity inside the house, leading to a perfect room climate, which is unique to Baufritz houses. **A further feature is the intelligent CO₂ ventilation.** Carefully positioned ventilators exchange stale internal air with oxygen-rich fresh air from outside.

Relax and take a deep breath

You don't just recognise a conventional new build from the outside. It also smells new – mainly because of unhealthy emissions from building materials. Interior paint, flooring adhesive, insulation materials etc. omit 10,000 - 15,000 µg/m³ of volatile, harmful substances – many times more than what is deemed acceptable by leading scientists.



Nature plus we do not use any tools fuelled by petrol in the construction of our houses. Furthermore, our own custom-built Scalar windows and all our doors can be installed without the use of toxic expanding foam.

More than 800

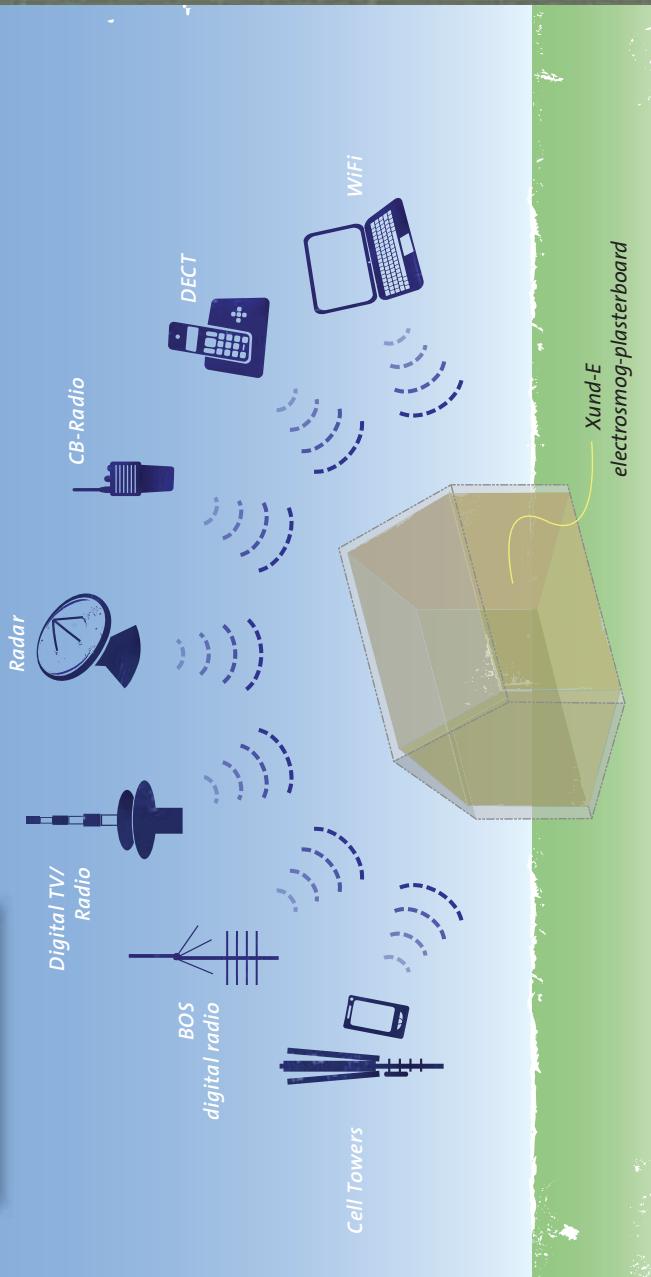
You can see all this for yourself. No face masks are required in our production process as the materials used do not contain harmful substances. Once your house has been built, you will receive a certificate which includes your personal interior air measurement and external laboratory analysis. Most of all, however, you can smell it yourself. Day after day you breathe in nothing but healthy air.



Tragedy inspires new beginning

In 1981 Gerti Fritz, the wife of Baufritz's third generation owner Hubert Fritz, was diagnosed with cancer. The news came completely out of the blue and was a huge shock for the family. Hubert and his children, Dagmar and Volker, could not accept the diagnosis without trying to find out what had caused it. They went over their home with a fine tooth comb, honing in not only on emissions and dust from building materials, but also on radiation from nearby electricity pylons and radio masts - factors that we now know can make people ill.

In 1984, the first ecological Baufritz house was built, using only natural materials and free from any harmful substances. Since then, around 3,000 ecological Baufritz homes have been built for the benefit of their owners, mankind and nature. Sadly, in 1988, Gerti Fritz died from her illness. Her legacy, however, is Baufritz's commitment to develop our pioneering work even further.



No entry for Electro Smog

How Baufritz protects home owners from up to 99 % of all high frequency radiation

What is electrosmog?

This is a question that all owners of a Baufritz home ask us. It has been proved that the patented electro smog protection board Xund-E successfully filters up to 98 % of electro-magnetic fields. These include high-frequency waves from mobile phones, mobile phone masts, radio transmitters, radar and also electric fields produced by nearby power lines. For particularly badly affected residential areas, such as those close to larger radio transmitters, we have developed the additional premium protection, Xund-E Plus. It achieves a level of protection in excess of 99 %. Nevertheless, telephone calls are still possible.

Electro Smog can cause illness
According to the 'Naila Study' in 2004, there is a direct connection between electromagnetic radiation and cases of illness. Results showed that the proportion of patients who had developed cancer was significantly higher for patients who, in the last ten years, had lived no more than 400 metres from mobile phone transmitters in operation since 1993, than those who lived further away.

Between 1999 and 2004, that is after five or more years of the transmitter being in operation, the risk of malignant tumours to the population living closer to the transmitter was three times higher than for those living on the outskirts of Naila.

(Source: Influence of proximity to mobile phone masts on incidences of cancer. Umwelt-Medizin-Gesellschaft 2004)



Guaranteed freedom from harmful substances //
thanks to all building materials being tested in our own inspection chamber

Before construction even begins, we take VOC measurements to ensure we only select materials and components that are not polluting or harmful to your health.

For this purpose we have developed our own measuring site, which includes a chamber for testing emissions. This enables us to prove the rate of decay of volatile compounds, such as solvents, solvent replacements or formaldehyde from various materials (paint, varnish, adhesive, building materials etc.). These tests allow us to prevent suspicious materials from being included in our production process. Once again this guarantees the uniquely healthy climate in all Baufritz homes.



Beneficial for your health // PVC- and PU-free pipe work

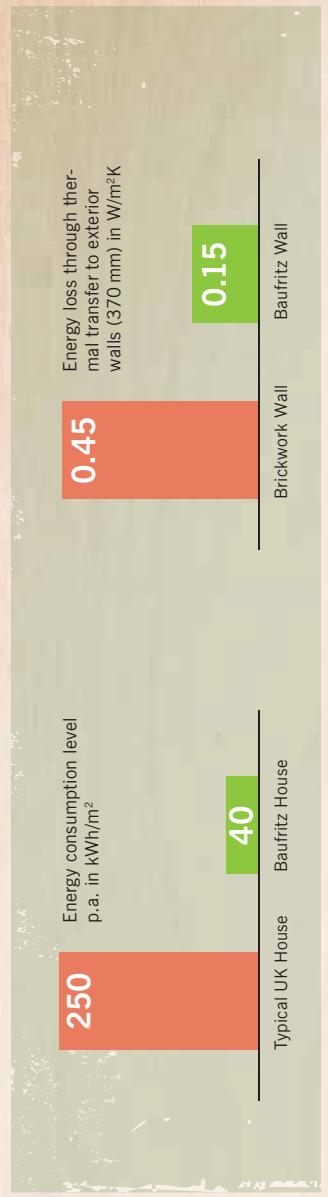
Baufritz carries out building biological tests for harmful substances on every single building material we use, including our heating and sanitary installations. Our experienced experts make sure they do not use PVC or PU pipe work and only use tested dioxin- heavy metal- and PU-free materials. Similarly, we do without insulation containing fibre. In this way, all pipes carrying water, drinking water and interior air remain free from potentially harmful materials.



Live greener.

The ECO-WALL – A Baufritz innovation

Save Money – save Nature



Internal wall finish:
Choose from either natural gypsum plasterboard or timber

XundE Plus Board against electro-smog: stopping more than 99% of electromagnetic fields and providing an additional fire retardant layer

Technical paper membrane:
to improve air tightness of the wall

Void for installation of building services:
also accessible for future installations

Wind-tight layer: vapour-permeable wood fibreboard



Energy Consumption

Ameeta and Jayesh Patel

London

There has been a significant saving in our heating costs. For the past three years, we have paid on average about the same as we did when we lived in our flat, however, our Baufritz home is 5 times larger than the flat. Our gas bills have been about £ 1,000 per annum.



- Natural insulation of walls, ceiling and roof
- Energy saving timber wall with insulation made of wood shavings
- Windows with triple glazing as standard
- Efficient heating and ventilation systems – including Ground- and Air Source Heat Pumps or solar systems
- Special climate control concept with decentralised ventilation system, heat recovery and climate heaters

Patently obvious

Using nature as our role model, we are constantly developing new solutions for all aspects of our timber construction. We have registered over 40 patents and trademarks in Germany and abroad from our best solutions. They include the HOIZ insulation made from wood shavings, and many more. Innovation helping to keep your Baufritz house up-to-date for many years to come.



More than
300
laboratory tests

External cladding as weather protection: No visible fixings and design of your choice - Rondo (left), Credo (right)



Integrated rainwater downpipe (optional):
For draining water off roof, with maintenance free surface



For decades, Baufritz has made significant investment into research, developing new solutions for all aspects of timber frame house construction. At Baufritz we believe that we can do great things together, and work with some of the world's leading universities, institutes and companies to develop this research. An example is our partnership with the Faculty of Wood Technology and Construction at the University of Rosenheim in Germany, where we are not only developing new construction solutions but also are giving young talent the opportunity to turn their ideas into long lasting innovations.

Learning from each other

Advantages for all to see

Our innovative Skalar window sees off all conventional models. It combines the highest standards for quality, functionality, insulation and design. But see for yourself...

An economical shell: insulation is everything

Whatever type of house you are planning, you should make sure the building structure is compact. This not only reduces the energy consumption, but also keeps building costs down.

Innovative building services

Innovative building services are essential for saving energy, whatever type of house is built – not just a passive house. Highly efficient gas heating systems, the use of renewable energy sources or the combination of different technologies – whatever method is used, our energy advisors reduce your heating costs and keep unnecessary ecological damage to a minimum.

GAS ENERGY TECHNOLOGY

In addition to the energy source (e.g. gas) modern gas condensing boilers also use the heat of the resultant waste gas, thus reducing total energy consumption by up to 20 percent.

The use of intelligent control technology

Innovation: LED Light

Baufritz has developed modern, innovative, environmentally friendly and pleasantly warm LED lighting. It stands out through its flickering percentage of 0% and its balanced spectrum distribution. Its lifetime of approximate

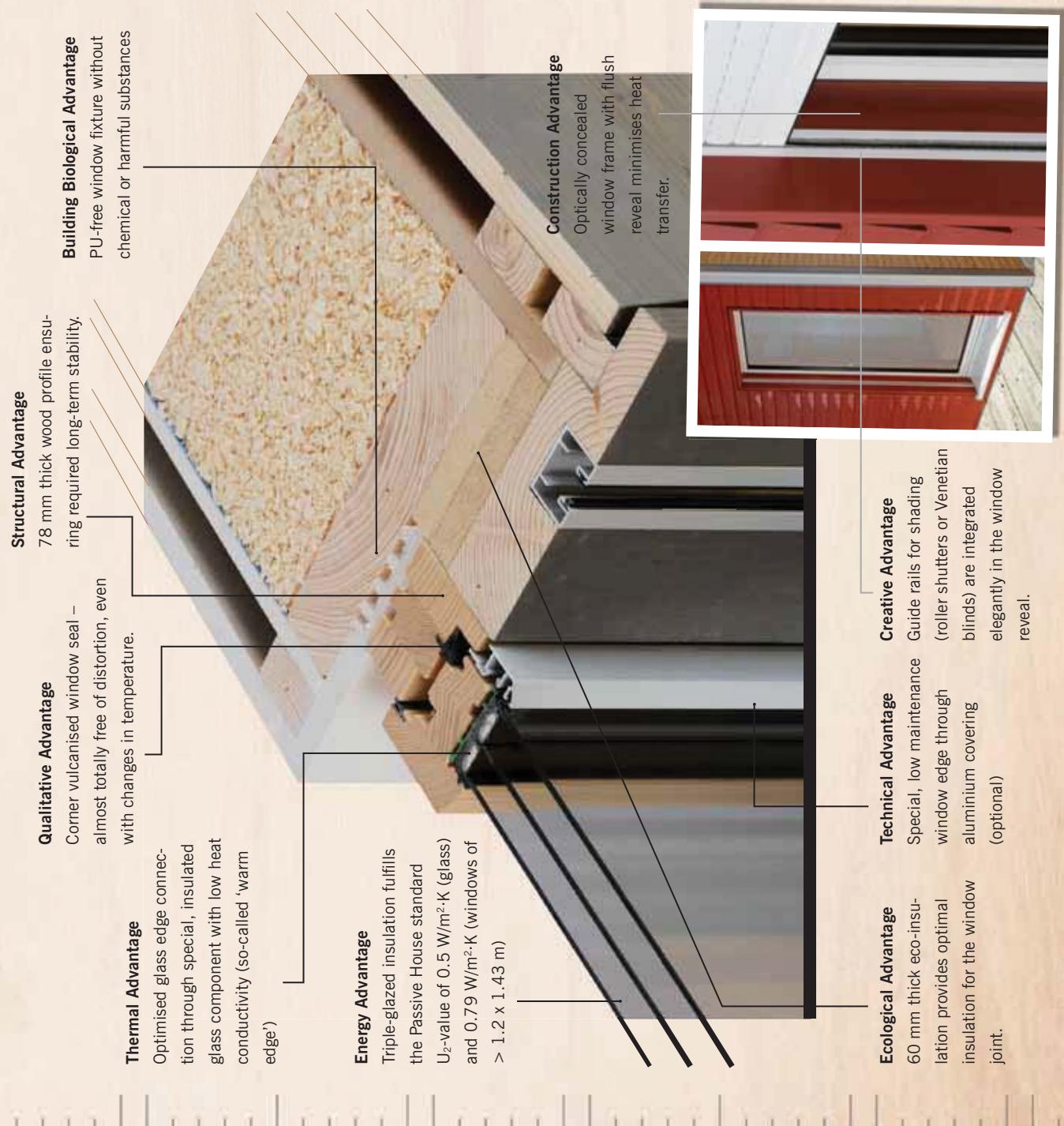


GEO THERMAL

The ground temperature is consistently approx 10°C all year round. This is enough for a ground source heat pump to heat the house and provide domestic hot water.

SOLAR THERMAL SYSTEM

The ideal complement to gas boiler or pellet heating. A solar thermal system provides most of the energy needed for the domestic hot water and can offer considerable support for the building's heating system. This reduces fuel consumption and increases the units lifespan



Precision made for you.



Off site manufacture

Our manufacturing facility is one of the most advanced in Europe with fully automated machines designed especially for us. We use state-of-the-art CAD technology to ensure millimetre precision for every house we build. Quality starts with the selection and testing of the building materials, and we only use high-quality timber and building materials that contain no potential pollutants. Chemical preservatives are not used in our manufacturing process.

All large elements such as walls, ceilings and roofs are prefabricated on our computer controlled production line. Windows and doors are fitted in the factory to 100% accuracy ensuring that no harmful PU foam fillers are required. The elements are thermally insulated in the factory with Baufritz's HOIZ insulation which guarantees not only excellent heat retention and energy efficiency, but ensures your home safeguards your health as much as possible. The timber facade and other external joinery is either left in its natural state or finished with a double coat of environmentally-friendly paint in the colour of your choice.

But we don't just rely on technology: our factory is manned by expert craftsmen who have been extensively trained to ensure accuracy and quality. They are always present to control the machines, monitor quality, put the finishing touches to your home and, after a final inspection, award the Baufritz quality seal. Only then will your house be wrapped in a waterproof cover ready for transportation directly to your site.



*We offer you the following services
under a design and build contract*

DESIGN AND TURNKEY CONSTRUCTION ABOVE FOUNDATIONS

Inclusions: Full design and planning application, professional services, manufacturing, transport, on-site construction, external walls, doors, windows, roof, rainwater goods, internal walls, ceiling, internal stairs, flooring, tiling, plumbing and sanitary ware, heating system, electrical installation, internal painting and plastering, external painting.

Significant exclusions: Plot purchase and associated fees, groundworks, basement structure and/or foundations, landscaping, kitchen, furniture and light fittings (please ask for details about how we can help with these items).

PRICES FOR THE DESIGN SERVICE

Our design fees relate to the size of the house and the complexity of the design. The fee typically starts from 2% of the anticipated build cost.

The design service includes a full conceptual design, preparation of the planning application and the application itself. The design fee is split into two parts: 1/3 of the fee to provide the concepts and a detailed quotation, following this you can choose to commit to the second 2/3 of the fee to prepare and carry out the planning application.

PRICES FOR THE HOUSE BUILDING SERVICE

Following receipt of your planning approval you will be asked to commit to the construction of the house.

Prices for the turnkey service start from € 190/m²

The advantages of prefabrication at a glance:

- Perfect accuracy thanks to state-of-the-art computer controlled production
- Prefabrication is more energy-efficient and produces less waste so it is a more eco-friendly way of building
- Strict quality control
- Construction is unaffected by the weather and so keeps to schedule
- Construction time on-site is minimised so within 48 hours your house can be watertight and secure
- Faster on-site construction means less disruption for you and your neighbours

6 Steps to your home



Step 1

Individual consultancy

You meet with our specialist consultant in Cambridge to discuss ideas and requirements for your new home.



Step 2

Design drawings and planning application

Our experienced house-designers prepare design drawings for you and submit a planning application for your new home on your behalf.



Step 3

Building contract

The building contract is signed based on the planning application drawings and accompanying cost calculation.



Step 4

Detailed plan

Our architects and engineers will complete the design and calculations for the ground works, structure and building services of the house.



Step 5

Sampling

You will be invited to come to our state-of-the-art design centre in Germany to specify your house. Here you can be inspired by our show homes and design centre and make choices regarding floors, windows, cladding, doors, roof tiles etc. with advice from our experienced designers.



Step 6

Prefabrication, shipping, assembly and fitting

The groundworks and preparation for house assembly will be performed by our building partners on-site. All large construction elements will be precisely prefabricated by our joiners and carpenters in our German factory. We deliver all elements to the building site where our specialised team will assemble your Baufritz house on-site. Our Teams of craftsmen will then complete the fitout of your house.

