

Raw materials



Natural
raw materials

High durability
and environmental
compatibility



Production



Ecological
and
sustainable



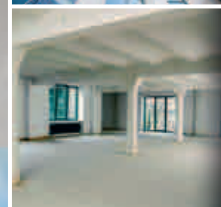
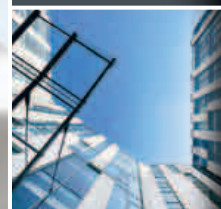
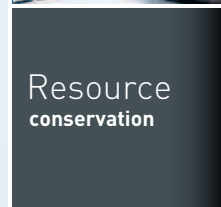
Recycling



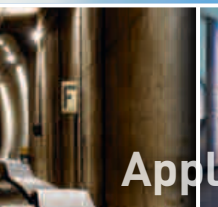
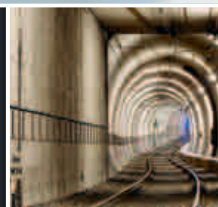
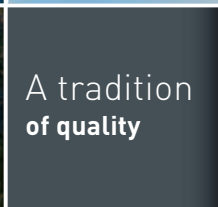
Sustainability
Renaturation
Environmental
protection



Resource
conservation



A tradition
of quality



Applications



Innovative
concepts

Energy efficient
buildings



Sustainability Report 2014



Product Lifecycle

The central issue of the Sustainability Report 2014 is the product lifecycle. All of Xella's products should – as far as possible – meet the requirements of the lifecycle principle. This means that at the end of their "lives"

the products should re-enter the raw material cycle so they can be used in the manufacture of other items. The icon pictured below indicates where this issue arises in this report.



About this Report

In this "Sustainability Report 2014" Xella provides its employees, business partners, politicians and non-governmental organizations – together with interested members of the general public – with information on how Xella is dealing with the issue of sustainability as part of its corporate strategy. The facts and key indicators set forth in this report refer to financial years 2012 and 2013 (1 January to 31 December respectively). Where not otherwise noted, all statements apply to all of our business units and to all of our subsidiary companies worldwide that were part of the Xella Group in 2013. The compilation of data will be gradually expanded over the coming years. The planned publication date of the next report is 2016.

This Sustainability Report has been prepared in accordance with version G3.1 of the Global Reporting Initiative (GRI) international guidelines and complies with the requirements of GRI Application Level B. This has been verified by the GRI during the course of an audit. Further information on the subjects covered by the report can be found on our website at nachhaltigkeit.xella.com. The last sustainability report was published in May 2012 and is still available on our website. For improved readability, we have generally avoided using both genders. This should of course be taken to include all of our female colleagues. The report is published in German and English.

Group Operating Figures

		2011	2012	2013
Turnover	€ million	1,271	1,283	1,254
EBITDA norm.	€ million	208	217	196
EBITDA margin norm.	%	16	17	16
Staff expenses	€ million	-299	-306	-310
Taxes	€ million	5	-21	-4
Investments	€ million	86	91	86
Staff	FTE	6,946	6,869	6,806
	Headcount	7,297	7,306	7,227
Energy consumption				
Natural gas	PJ*	5.25	5.19	5.87
Solid fuels	PJ*	7.85	7.37	7.54
Liquid fuels	PJ*	1.23	1.35	0.67
Electricity	PJ*	1.90	1.50	1.50
CO ₂ emissions	million tons	3.16	3.01	3.09

		2011	2012	2013
BU Building Materials				
Sales volume	Thousand m ³	9,205	8,942	8,675
Sales	€ million	848	854	817
Staff	FTE	5,332	5,177	5,059
	Headcount	5,568	5,463	5,335
BU Dry Lining				
Sales volume	Thousand m ²	33,627	32,200	33,051
Sales	€ million	208	208	210
Staff	FTE	600	676	697
	Headcount	635	720	739
BU Lime**				
Sales volume	Thousand tons	5,489	5,122	5,241
Sales	€ million	268	272	281
Staff	FTE	1,014	1,017	1,050
	Headcount	1,094	1,123	1,153

*PJ = 1 Petajoule = 10¹⁵ J

**The information for the gas generation business unit for the reporting period is given in the details for the lime business unit.

The Xella Group

Xella produces and sells building materials, gypsum fiberboard and cement-bonded dry lining panels as well as lime and limestone products. The group was formed in 2002 with the merger of Duisburg's Haniel Bau-Industrie GmbH, Munich's Ytong Holding AG and Goslar's Fels-Werke GmbH. Since 2008 the Xella Group has been owned equally by investment companies PAI Partners and Goldman Sachs Capital Partners. Moreover, 78 managers held shares in the company as of 31 December 2013 through a management partnership program. The company is headquartered in Duisburg.

Xella offers innovative and environmentally friendly products that make an important contribution to the construction of energy-efficient, high-quality buildings and consequently also to environmental protection and the conservation of resources. With its Ytong, Hebel and Silka brands, Xella is the world's largest manufacturer of autoclaved aerated concrete and calcium silicate blocks. The Multipor brand is synonymous with non-flammable mineral insulation boards. Fermacell is the leader in high quality dry lining solutions while with Fels, Xella is among Europe's leading producers of lime and limestone products. In 2013 we established a new field of business under the Ecoloop name. Ecoloop develops technology for generating synthetic gas from waste materials. Xella is one of just a few European building material companies to operate its own Research and Development Center. This focuses its work on three main areas: Product and process research, applied research and construction physics.

In 2013 the company and its 7,227 employees generated total turnover of EUR 1.3 billion. We currently have 98 company-owned plants and 30 sales and marketing organizations worldwide. Targeted export activities ensure that our products are also available in regions where we do not maintain our own sales offices.

Business Units

Building Materials

- Autoclaved aerated concrete (AAC)
- Calcium silicate blocks
- Mineral insulation boards
- Assembly components (prefabricated compound units)

YTONG

silka

multipor

hebel

Dry Lining

- Gypsum fiber boards
- Cement-bonded dry lining boards
- Fire protection boards

fermacell

fermacell
AESTUVER

Lime

- Lime
- Limestone

Fels

Gas Generation

ecoloop
recycle to gas

xella®

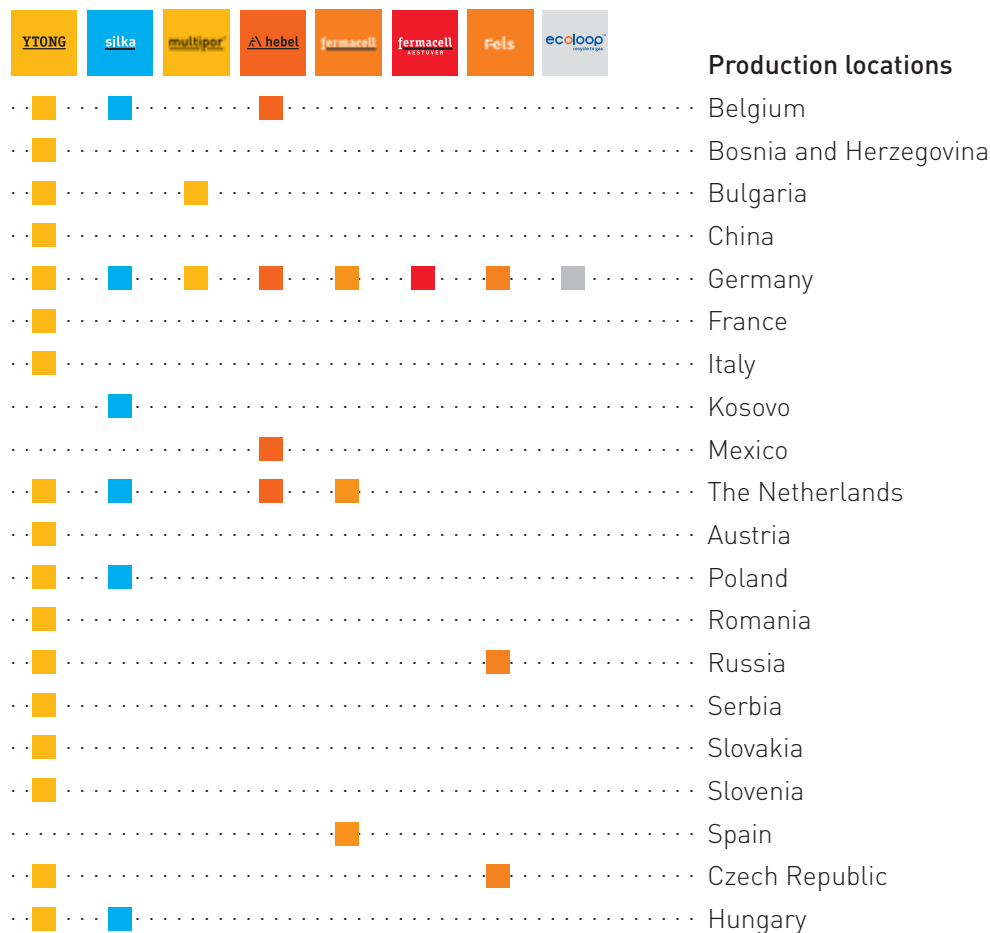
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Xella is represented by 7,227 employees around the globe. The Group has a total of 98 factories in 20 countries and has sales and marketing organizations in 30 countries. With worldwide awareness of sustainability increasing dramatically, Xella is doing its part, especially in the fast-growing economies of Eastern Europe and developing nations, to encourage responsible, sustainable growth with its highly developed, yet completely natural building materials and environmental technologies.





Xella

The Xella Group develops, manufactures and markets building materials, dry lining panels, lime and limestone products. With its Ytong, Multipor, Hebel and Silka brands, Xella is one of the world's largest manufacturers of autoclaved aerated concrete and calcium silicate blocks. Fermacell and Fermacell Aestuver provide dry lining and fire protection solutions while Fels is one of Europe's leading producers of lime and limestone products. Furthermore, Ecoloop is an independent business unit that develops technology for generating synthetic gas from waste materials.

Xella products are sustainable both in manufacture and use. They also undergo a process of continuous development. Our products therefore make an important contribution to the construction of energy-efficient, high-quality buildings and consequently also to environmental protection and the conservation of resources. Our products have already received numerous awards and certificates for their environmentally friendly characteristics.

Xella is one of just a few European building material companies to operate its own Research and Development Center. The Xella Research and Development Center is responsible for driving innovation and delivering sustainable products and processes. Our training centers offer our employees and external experts a range of seminars and training sessions with a focus on energy efficiency and sustainable building.

Xella's commitment is not just limited to products and processes; it also extends to social responsibility. We have supported the promotion of young professionals for many years, for example through student competitions and continued training for employees. We furthermore support a wide range of social projects in many different countries.

Prolog

Dear readers,

As a manufacturer of building materials we must come to terms with the idea that our products will still have to fulfill the expectations harbored by the generation-after-next. As is so often the case when dealing with sustainability issues, it is future generations that will have to decide whether we have taken the right decisions today. This can only succeed if we are already capable of making reliable statements about the lifecycle of our products today. This means that we must have all of the relevant information to hand – from the availability of the necessary raw materials through to the cost associated with products that have reached the end of their life cycle. We can secure the future position of the company with a product design that also sustainably optimizes building materials during every stage of their lives. In the construction sector sustainability and maintaining value always go hand-in-hand. This is why we have focused on the life cycle approach throughout this report. We mainly view this as a question of closed-loop material cycles in accordance with the “Cradle to Cradle” principle.

It is important to Xella that the concept of sustainability is not simply reduced down to energy efficiency alone. Only an understanding of sustainability that spans all of our corporate functions – from research and innovation through production, human resources and the environment, right up to compliance – can achieve real advances in sustainability on the basis of the “triple bottom line” principle: Economy, ecology and society. Our customers for example, are just as concerned with long product life, recycling aspects and certification issues as they are with saving energy.

House building still actually offers immense potential for achieving success in the context of sustainability. Experts have calculated that there are potential reductions of some 70 percent to be made in the area of waste alone. When it comes to the ever more pressing global

problem of potable water supply, it is also possible to reduce consumption by an impressive 40 percent. Climate change remains without doubt the biggest challenge facing the global economy. Savings of up to 50 percent in energy consumption can be made through clever architecture and by using appropriate building materials. Solutions and products for CO₂-friendly building are available. It is completely beyond doubt that the improvements that we can make in this area will also make good financial sense. Realizing returns from sustainability will therefore become a tangible economic factor in terms of remaining competitive. The good news for us and our customers is that Xella is already leading the development of groundbreaking concepts with its know-how and innovations. For instance, we have – together with several partners – constructed Germany's first energy-plus masonry house “M1”, which generates more energy than it consumes.

It is also clear that our industry is on the verge of groundbreaking innovations in terms of research and development. Nanotechnology is just one example of an application that can make a major contribution to maintaining the value and increasing the durability of items. “Smart materials” are capable of providing buildings with hitherto unheard of thermal, mechanical and chemical properties. A good example of our innovative capabilities can be seen in a completely different sector: The cleaning of exhaust gases from ocean-going ships using NautiCal hydrated lime from Fels. The first freight ship to be fitted with such a flue gas cleaning system is already in operation. Fels NautiCal allows us to make a significant contribution to improving both the air quality in port cities and the quality of water in our oceans.

Xella is among the leaders when it comes to the preparation of Environmental Product Declarations (EPDs) for

all of our product ranges. Labelling of this type makes it possible for developers to already select the intended building materials during the planning phase while also taking ecological aspects into consideration. One principle of fundamental importance to our product development process is that the products should be harmless to health, environmentally friendly to manufacture and energy-efficient during use. An example of this is the Ytong Energy+. This building block is composed only of mineral raw materials and its thermal conductivity lies far below the requirements of the German Energy Saving Ordinance and the KfW Efficiency House standards (KfW is a German government-owned development bank). A house constructed with Energy+ blocks only consumes one liter of heating oil per square meter of wall over a single heating season.

Innovative products are not the only factors that drive our success: Qualified and motivated staff are equally important. To ensure that all of our employees know exactly which skills they need to successfully perform their tasks, we have developed a so-called competency model. From the very beginning we have also made the issue of "compliance" a key element of our Sustainability Report. We consider this to be important because we firmly believe that fairness and the encouragement of compliant conduct are essential requirements for innovative companies like Xella to compete successfully in the market.

We published our first Sustainability Report in 2012. This was already aligned with the Global Reporting Initiative (GRI) international guidelines and we have been able to significantly improve upon the quality of reporting in this report. By complying with GRI Application Level B we have significantly improved the level of transparency and the scope of the indicators. Incidentally, you can find a wealth of supplementary information to this report on our website at nachhaltigkeit.xella.com.




Jan Buck-Emden, CEO of the Xella Group

I would like to thank all of our employees for their continued commitment and support in making Xella a leading company in terms of sustainability. I also hope that our readers will gain an interesting insight into our company and our development.

A handwritten signature in black ink, which appears to read "Jan Buck-Emden". The signature is written in a cursive, flowing style.

Jan Buck-Emden



Strategy and Management

Success through Transparency

The quality of processes and products together with their documentation are core components of a successful company. In addition to quality assurance, industrial environmental protection, occupational safety and energy efficiency are further components of modern corporate management. However, the cost of running separate management systems in parallel is huge. By harnessing synergies and bundling resources, lean and efficient management can be achieved by employing an integrated management system.

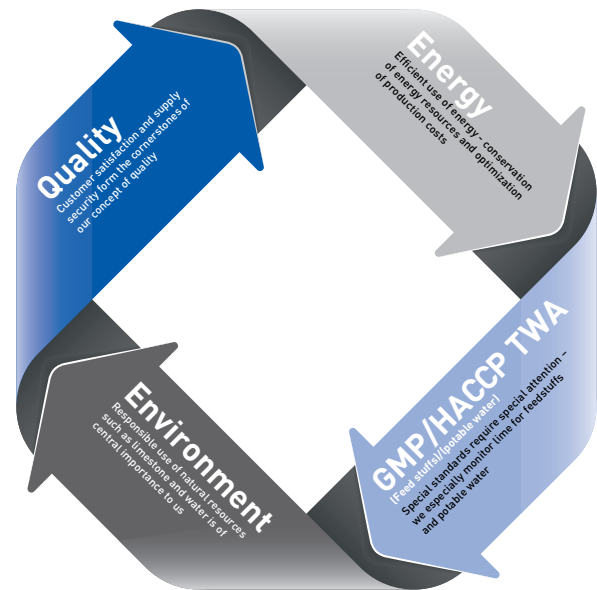
At the beginning of 2013 we introduced an integrated management system (F.I.M.S.) at Fels under the motto "one house, one system". Previously the environmental, energy and quality management systems together with management systems for feed stuffs (GMP), potable water (HACCP) and a register of hazardous substances had existed side by side. F.I.M.S. now offers an integrated system that bundles all of the management tasks and provides a framework for the management of key documents. "With F.I.M.S. we want to simplify how we work with the systems and render the documentation more transparent", says Hans-Peter Thomas, manager responsible for the project. During the course of a project that lasted several months, the existing systems were unified and consolidated into a 154-page management manual. Furthermore, a central instruction level was created for the factories and responsibility for management assigned via the manual, process and job descriptions.



Less complicated and clearer

The reasons for consolidating the systems are clear. Each system requires its own documentation along with the associated workload for maintenance and updating. Each system needs a manual, has its own work instructions, standard operating procedures and process descriptions which creates a complicated and confusing situation. The different management systems do however contain some overlapping areas: Responsibility and authority, training, auditing, documentation, control of documents and records together with management review procedures are applicable to all of the management systems.

But there are still further benefits: The standardized and stringent control of documents ensures that documents can be seamlessly traced. All management documents now also have a new layout for clear and secure document control. All processes and procedures are now clearly described. This will afford us success through transparency. There is furthermore a clear assignment of responsibilities and greater security has been gained for operational procedures. And as an incidental benefit, our management reviews have also become more conclusive.



The benefits of F.I.M.S.

- Responsibilities are clearly defined
- Information channels and communication with the relevant groups are automated
- Classification and hierarchical structure ensure that the most current version can be quickly found
- Documents have a standardized structure, are clearly presented and are uniquely and clearly identified
- Old revisions are removed automatically



First successful audits

The first TÜV audits became available just a short time after the introduction of F.I.M.S. The surveillance audits in Goslar and at our Czech site in Vitosov have already been successfully completed. In the meantime, our factories at Rübeland, Hornberg and Saal have successfully completed their external audits, while the Münchhof, Rüdersdorf and Niemeck plants have also undergone external auditing by TÜV – and achieved positive results. This fully concludes the consolidation of the quality, environmental and energy management systems. The new system has also immediately proven itself. It has for instance facilitated a significant reduction in the complexity of our management processes. This is due not least to the electronic documentation system roXtra, which ensures the compliant archiving of all documents. Our reporting quality standards now also fulfil the current requirements with ease.

Sustainability Strategy

Being sustainable means thinking and dealing responsibly over the long term. This principle forms the basis of our corporate policy – ultimately, the buildings constructed using our materials will outlast several generations and greatly influence the health and wellbeing of the people that live in them. Xella's tradition and corporate culture are synonymous with the preservation of values and the simultaneous pursuit of environmental and social progress.

Over the past several years we have increasingly dedicated ourselves to the topic of sustainability in an even more structured manner. For example, with a wide range of internal projects, a new organizational structure that raises our efforts in the field of sustainability to a whole new level and – not least – our comprehensive communication of issues relating to sustainability.

We always strive to set trends and provide an innovative boost for new technologies and improved standards in our sector. As one of just a few German building material manufacturers we undertake fundamental research in-house.

At our Research and Development Center we are involved in a wide range of projects that will underscore the long-term orientation of our company.

All of Xella's products must always fulfill the requirements relating to sustainability. That's why we never bring products to market that do not meet the criteria* laid down by the Xella Research and Development Center in terms of product safety, health protection and environmental compatibility – or that have not been approved by the center. And we are not talking about fulfilling statutory requirements here. At Xella, products that do not comply with our sustainability standards – perhaps because they contain legally permitted substances that may still be harmful to health or are otherwise questionable – will never make it to market.

But to Xella, sustainability means more than simply bringing energy-efficient and environmentally compatible products to market. It's also about production and

management, human resources, compliance and research as well as innovation and the environment. Sustainability is not only about saving energy – long-life products, recycling and certification aspects are of equal importance.

Mission and Vision of the Xella Group

"With our building materials and dry lining business units we are one of the leading international system providers for ecological and sustainable construction. The products made by our lime business unit, which have a multitude of uses in industrial, building and environmental applications, are essential to life in our modern world. The Xella Group's high quality portfolio of products and services is specifically geared towards our customer's individual requirements. A smoothly-flowing supply chain is a core component of our approach to quality for our customers and we are working continuously to improve our quality in cooperation with all of our business partners.

It is our employees that ensure these high standards. We aim to maintain long-term cooperation with our employees and encourage and support them in meeting our high quality requirements. We place great importance on the long-term development of business relationships with our partners. We leverage this close cooperation with them to continuously expand our product and service range. With our innovative solutions and competent staff we are ideally placed to profit from new opportunities and to actively shape the future. This also ensures that we remain an attractive proposition for our shareholders and future investors."

* Currently only for the building materials business unit.

Management Systems

Sustainability management

Xella constantly pursues the goal of developing better and more environmentally compatible processes and materials. Sustainability has consequently been an established practice at our company for many years. "We are committed to environmental protection and support social and cultural projects," is how our corporate philosophy puts it. But how do we practically implement our corporate responsibility in terms of specific action? And who is going to turn this into a sustainability strategy?

In 2011 Xella established a Sustainability Council. This comprises members of Xella International Holding's management and the managers of the business units. The council is supplemented by the manager of the Research and Development Center and directors of the Human Resources and Corporate Communications departments. The Sustainability Council, which meets twice each year, determines the sustainability strategy, takes all decisions relating to sustainability that affect the strategic orientation of the company, resolves key issues, and monitors compliance with the guidelines. Furthermore, Xella Holding also has a Sustainability Team which comprises representatives from the respective divisions such as Environmental Management, Energy Management, Human Resources, Controlling, Communications etc.

Alongside the fundamental objectives, i.e. the manufacture of environmentally compatible and energy-efficient building materials in the most resource-conserving manner possible, both of these bodies also discuss and decide upon special measures, e.g. reducing CO₂ emissions, introducing a new energy-saving policy, conserving water or establishing a system of key indicators. Proposals for subjects to be discussed by the Sustainability Council may come from either the workforce or the Sustainability Team – or even directly from the group's management. Employee representative bodies are also of course

able to influence Xella's sustainability management program. The corresponding qualification and expertise of those responsible for sustainability issues is ensured through training and continuing education, professional experience and participation at corresponding conferences, forums and symposia.

Product Responsibility

Xella accepts responsibility for its products in line with the Construction Products Regulation (CPR) which has been effective since 1 July 2013. This replaced the Construction Products Directive (CPD) which had been in-force since 1989. The overall objectives are to bring construction products into circulation, ensure their free movement and remove technical barriers to trade in construction products within the European Economic Area. The harmonization of technical specifications is intended to deliver uniform product and testing standards – and therefore harmonized performance specifications for construction products. The CPR regulates the conditions for bringing construction products into circulation and for ensuring harmonized standards. It also defines the standards for declaring performance and the CE marking of products.

Introduction of the CPR also changes the significance of CE marking that must be applied to all construction products for which a manufacturer has produced a declaration of performance. In future, by applying the CE marking, manufacturers will be documenting that they are responsible for conformity of the construction product with the declared performance and that they are in compliance with all applicable European legislation.

Sustainability vision			
Sustainability definition			
Sustainability guidelines (fields of action)			
1. Market <ul style="list-style-type: none"> ■ Energy efficiency ■ Environmental protection ■ Quality of life 	2. Processes <ul style="list-style-type: none"> ■ Resource conservation ■ Reduction of energy consumption ■ Emissions reduction ■ Occupational health, safety and environmental protection 	3. Staff <ul style="list-style-type: none"> ■ Training and continuing education ■ Motivation and support 	4. Compliance <ul style="list-style-type: none"> ■ Compliance and over compliance with legal standards ■ Occupational health and safety ■ Corporate governance
Sustainability goals, initiatives, and measures			

Energy management

Energy efficiency is of almost existential importance to Xella. For many years the responsible and economical use of energy has been the highest priority at our factories. In line with its energy policy, Xella has undertaken to reduce its specific energy consumption over the long term and to continuously improve energy efficiency. These goals are aligned with the European Energy Efficiency Directive which sets binding energy saving targets for EU Member States through to the year 2020.

These targets will be realized through the introduction and operation of, among others, an energy management system. In Germany, Fels has already implemented an energy management system that is certified to DIN ISO 50001 as part of its integrated management system (F.I.M.S.). This is currently being installed at the company's German calcium silicate block and autoclaved aerated concrete plants. The Head of Energy Management of the Xella Group is responsible for the necessary processes and measures. He is dependent upon close cooperation with the energy experts at the Central Energy Management department, the factory managers and their staff. To achieve an efficient energy management program it is also necessary for the staff to undergo continuous training. Xella therefore offers regular training sessions that deal with energy efficiency issues. To-date, 250 employees have already participated.

Innovation management

Xella has brought together exceptional ideas, a progressive spirit and future-oriented building materials to create an innovative company that sets itself apart from its competitors through its high-quality and energy-efficient products. So that creative processes can lead to the desired results, Xella has implemented an innovation management system to ensure the required structure. The Innovation Board is responsible for this. The board comprises representatives from the management, the four business units, the manager of the Research and Development Center, the Head of International Product Management and the Head of Innovation Management. The Innovation Board makes decisions on the strategic orientation of innovation management, the key elements and all aspects of innovation promotion at the Xella Group. The Head of Innovation Management coordinates innovation management activities throughout the group and organizes the annual Innovation Award.

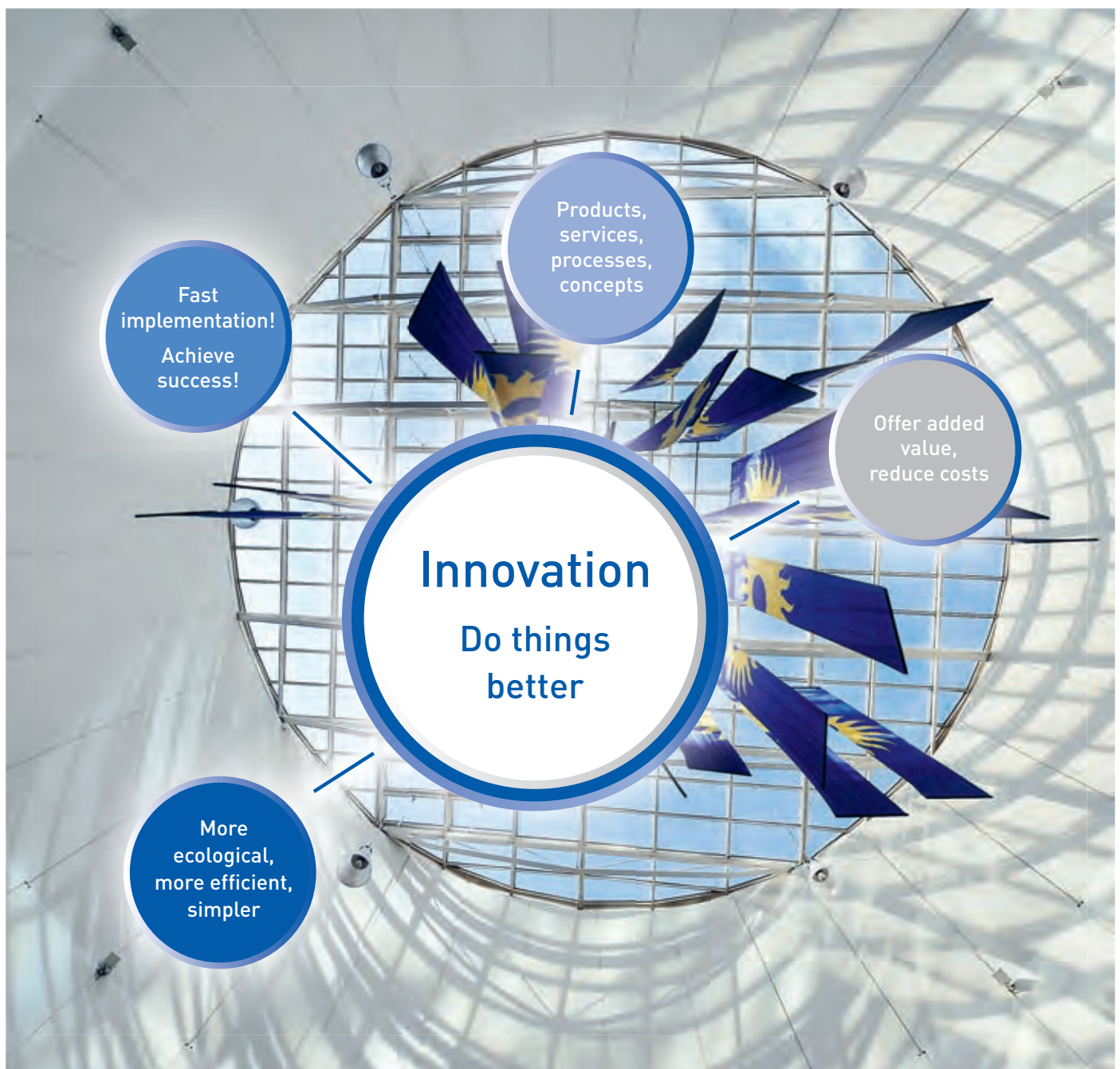
Furthermore, the individual brands also have local Innovation Teams (LIT) that drive the innovation process in the various regions and business units and deliver an overview of the regional innovation status on a quarterly basis. The Xella Holding Innovation Team comprises representatives from the group's central operations division such as Marketing, Process Engineering, IT, Controlling and Technology and Research.

This organizational structure ensures that good ideas do not “go under” and that the individual divisions of the company contribute their share to the innovation process.

Improvement management

Xella places great emphasis on allowing the ideas and improvement proposals of its employees to flow into the working organization and the production process.

In future we will also proactively support the inventiveness and innovative potential of our employees in Germany and abroad. Xella has introduced a company suggestions policy at its locations in Germany. This provides all employees with an opportunity to contribute their ideas on cost savings, occupational health and safety or for protecting health and the environment. The ideas for improvement are rewarded appropriately.



Acquisitions and Divestitures

Fermacell has acquired a new gypsum fiberboard production facility close to the city of Santander in northern Spain. At the beginning of 2012 we participated in a public auction of the newly constructed but not yet completed factory. The purchase price was 14.5 million euro. For repair work and bringing the plant up to full production capacity, a further eight million euro was invested. Approximately the same sum has been earmarked for expanding the factory over the coming years. Fermacell intends to manufacture up to twelve million square meters of gypsum

fiberboard panels per annum in Spain and create 60 new jobs there.

Xella's building material business unit has taken over an aerated concrete factory in the Czech city of Most. In addition, the remaining shares in the Blatzheim calcium silicate block factory were purchased for 6.6 million euro. Moreover, Xella was at the end of the year able to acquire one hundred percent ownership of the Dutch 'an Herwaarden' calcium silicate block factory through an exchange of shareholdings.

Dialog with Stakeholders

In order to strengthen the public's trust in our factories and products, the Xella Group relies on intensive dialog with neighbors, local politicians, the media, associations, investors, customers, suppliers, authorities and all other stakeholders that are either directly or indirectly affected by our operations.

Xella has been carrying out regular customer surveys for many years. This interaction between company and customer – termed customer dialog – takes place in a different country each year and it poses specific questions on a range of issues. Communication with our employees normally takes place via the intranet, through the pages of our employee newspaper "Milestones" or in the course of employee surveys. We usually seek direct dialog with other stakeholders, e.g. from the financial sector or with non-governmental organizations. For example, Xella held a so-called CSR breakfast for the first time in 2013. At the event, organized jointly by the Chamber of Industry and Commerce for the Lower Rhine Region and the Duisburg Business Development Agency, business enterprises from Duisburg met to discuss

responsible corporate governance. A lecture on "intelligent products and energy management innovations at Xella" rounded off the event.

It is also very important to us that we maintain a good relationship with our neighbors. Especially where environmentally sensitive production is concerned – such as at Fermacell or Fels, where noise or dust emissions occur – we prefer to maintain direct contact with residents, environmental campaign groups, public administration agencies, the police and fire service. This approach clearly pays dividends. Only by including neighbors and environmental campaign groups at an early stage were we able to construct the Ecoloop plant in an area close to a natural park (see page 64) without any form of protest.

Our stakeholders

■ Customers ■ Architects ■ Employees ■ Politicians and associations
 ■ Suppliers ■ NGOs ■ Science and research

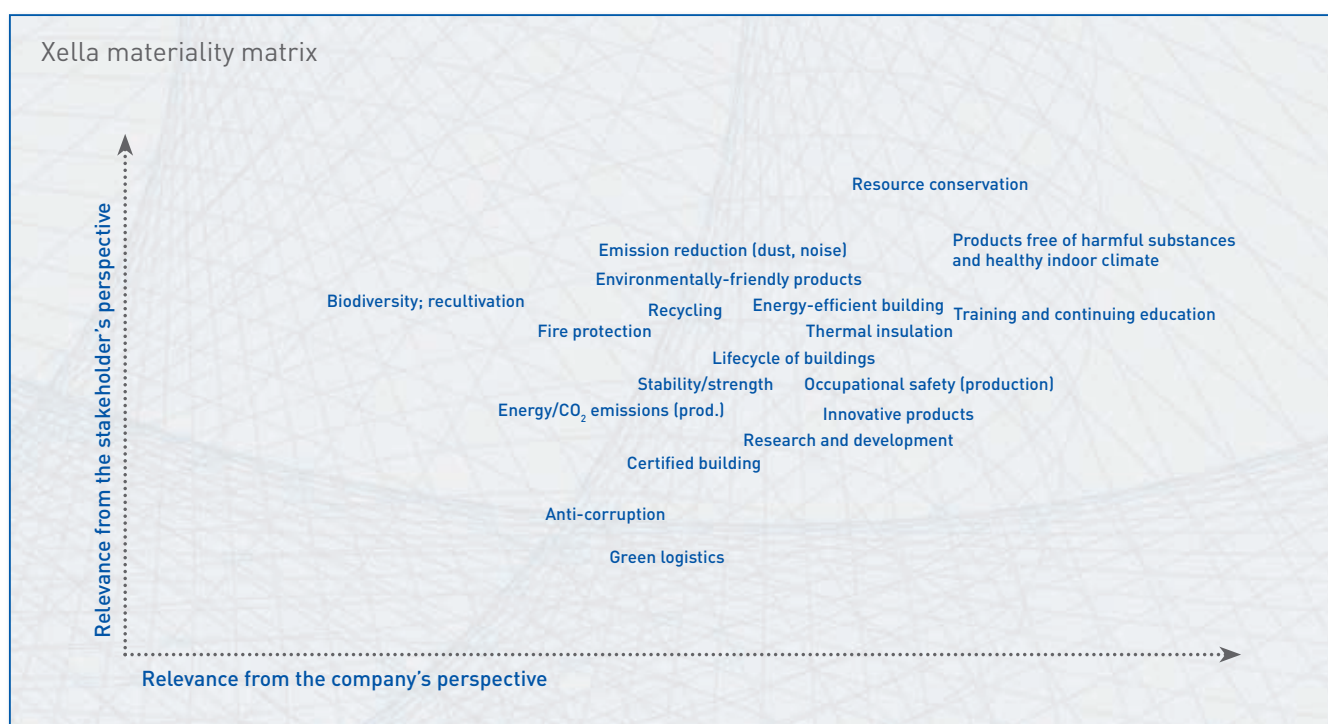
Research into the city of the future

Together with the Fraunhofer Institute for the Promotion of Applied Research, Xella is conducting research in the field of the future city – the “Morgenstadt” project. Xella’s system partner for the five-year research collaboration is the Fraunhofer Institute for Building Physics (IBP) in Stuttgart and Holzkirchen. The key objectives for participating in this program include the consolidation and expansion of Xella’s market position in the wall building materials sector through research and development. The Morgenstadt (future city) project represents one of the key future components of the German Federal Government’s future High-Tech Strategy 2020.

Xella was also represented at the “sb13 Conference” in Munich. This conference – the abbreviation “sb” stands for “sustainable building” – was organized by the Chair of Building Physics at the Technical University of Munich in cooperation with the Fraunhofer Institute for Building Physics and the Karlsruhe Institute of Technology. In addition to the initial greeting given by the CEO of Xella’s Board, Jan Buck-Emden, Xella employees gave two further lectures on the issues of sustainability and

recycling of autoclaved aerated concrete. The conference in Munich brought together architects, engineers, urban planners and scientists as well as representatives from the construction sector and politicians from over 20 nations. Among other issues, they discussed changes in energy use, funding concepts for sustainable building, sustainable regional and urban planning together with low-energy and energy-plus house concepts. As sponsor of the “sb13 Conference” Xella presented the “M1” energy-plus, masonry house.

In this Sustainability Report we have presented the results of the continuous dialog in the form of a materiality matrix (see illustration). This provides a direct comparison of the most important sustainability issues and their significance to Xella on the one side, while outlining their significance to further stakeholders on the other. These issues simultaneously form the core content of this Sustainability Report. All fields of action are important to us; however we are particularly concerned with the issues that appear in the right upper field of the matrix.





Memberships

Xella is a founding member of the “Stiftung 2°” Foundation, a climate protection initiative of German companies. Xella has furthermore been committed to the Deutsche Unternehmensinitiative Energieeffizienz (German Industry Initiative for Energy Efficiency, or DENEFF) since 2011 (see page 83). As a promoter of sustainable building, exchanging ideas, expertise, and knowledge with domestic and international partners is of paramount importance to us. Examples of our cooperation partners include France’s effinergie Institute and the iepd Passive House Institute in Slovenia. We also belong to a range of different institutions. Hebel for instance, is a member of the German Sustainable Building Council (Deutsche Gesellschaft für Nachhaltiges Bauen, DGNB). This competence platform which deals with the subject of sustainability in the built environment is neither ecologically nor economically oriented; its primary commitment lies in achieving social objectives. Ytong is a member of Econet China, a non-profit initiative set up by German industry. This information, networking and marketing platform which deals with the areas of building, energy and the environment is organized by the German International Chamber of Commerce. Xella Russia is a member of the Russian Green Building Council (RuGBC). This non-profit organization and member of the World Green Building Council is involved with the development and implementation of

ecological building methods. Xella Italia is a partner in the Casa Clima agency in Bozen, Italy. This public institution for the energy certification of buildings has already certified over 5,000 buildings in Italy. The Casa Clima agency focusses on the training and continuing education of all parties involved in construction. Xella Italia is also a partner in the Italian Association for Sound and Thermal Insulation in Buildings (ANIT) and the Gruppo Passive House Italia. This network supports passive house concepts in Italy. Xella Hungary cooperates with the Energiaklub, the Hungarian Institute of Energy Efficiency. Xella is furthermore represented in all of the relevant industrial associations through its foreign subsidiaries.



A hand holding a glass globe. Inside the globe, there is a vibrant green forest scene with tall trees and a clear sky. The background is a soft-focus green, suggesting an outdoor setting with foliage.

Brands

The eternal Cycle

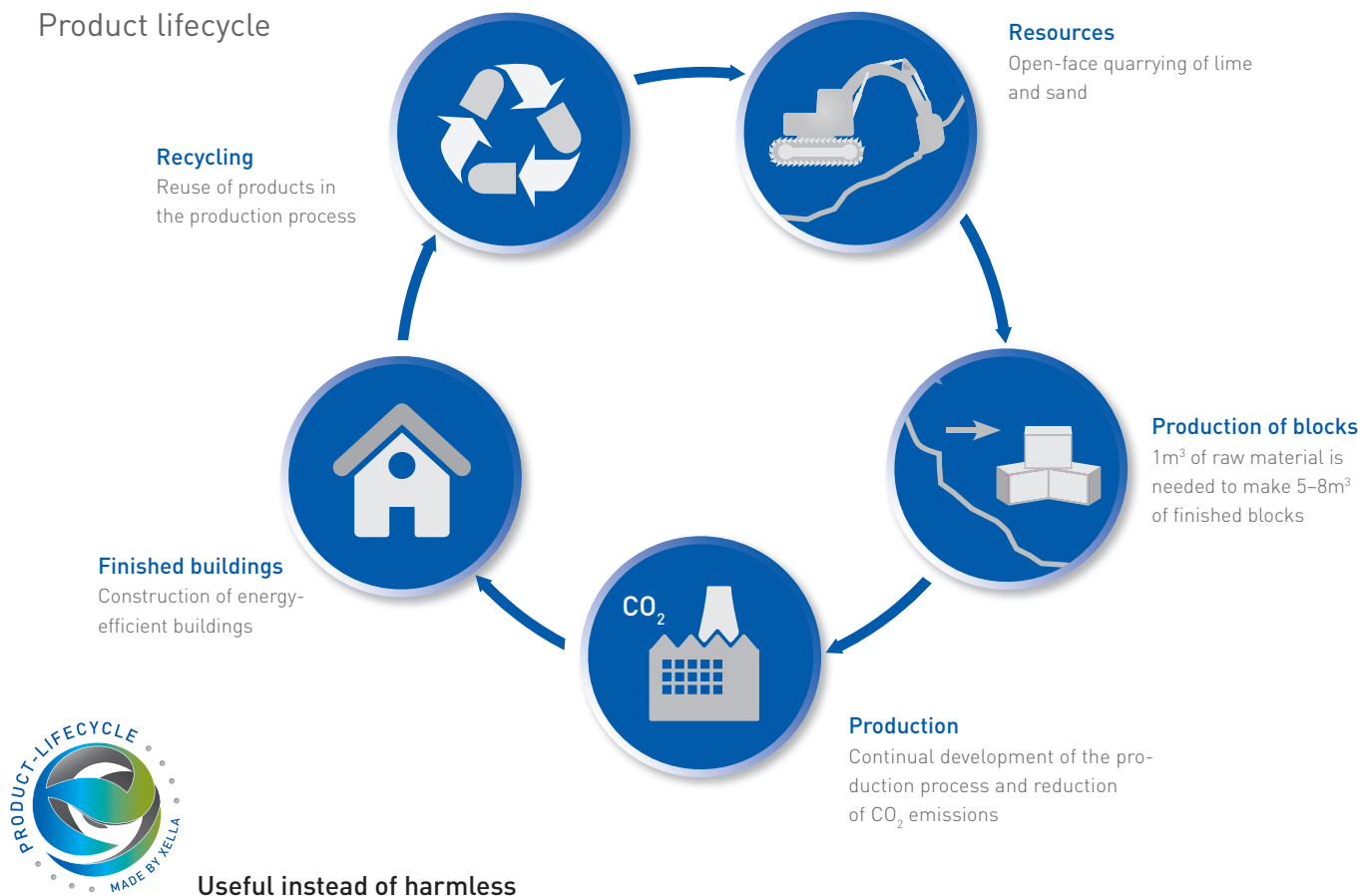
Humans leave behind a huge amount of waste that nature is unable to recycle. The raw materials that exist within this waste can therefore only be used once. In other words, they are only conceived for linear material flows – “from cradle to grave”. This means that a large amount of valuable and finite resources ends up in waste incineration plants and landfill sites – and is therefore irretrievably lost.

Over the long term we will be forced to bring our actions into line with the lifecycle principle of the natural environment around us. The solution is innovative and intelligent product design in which all of the materials used circulate within technical and biological cycles. In other words we must think in advance about what is going to happen in the future; we must think in terms of permanent product cycles – “from cradle to cradle”.

It is in Xella’s commercial and ecological interests to recycle as many of the raw materials used in production as possible. For this reason, our Sustainability Council has decided that all of the products manufactured by our brands Ytong, Silka, Multipor and Fermacell should conform to the requirements of the lifecycle principle. This means that these products must re-enter the raw material cycle so that they can be used in the manufacture of other products. For example, all of the production waste from our autoclaved aerated concrete and calcium silicate block factories can be re-used with this system. They may either be used as a basic material in the mixing process or ground into granulate and then processed into other products (see page 56).



Product lifecycle



Useful instead of harmless

But this doesn't go far enough: Our objective is to offer at least one product from each of our brands that meets the Cradle to Cradle criteria. Cradle to Cradle¹ is not an environmental protection concept in the conventional sense. It is far more a new way of doing business in which all products are dismantlable and materials and processes are optimized such that they are rendered not only harmless, but even become useful once the product's useful life has expired. In the same way as the biomass cycle – in which biomass is constantly converted by many living organisms into new building blocks or nutrients for new life – the industrial products manufactured by humans should also remain within a technical cycle or be reintegrated into the biological cycle as nutrients.

The concept behind this is to achieve a system where industrial consumer goods of a consistent quality circulate in closed-loop systems. A closed-loop system is important because materials can be used – even though they may pose problems to the environment – that are still irreplaceable in a large number of products. Such materials must be carefully selected and must also be capable of being easily broken down

again into their individual constituents. For example, the gypsum produced in the reprocessing plant at our factory in Wijchen using residual gypsum waste from building sites or demolished buildings conforms to this cyclical principle (see page 53). One hundred percent of this treated gypsum can be returned to Fermacell's gypsum fiberboard panel production cycle.



Certificate for Ytong and Multipor

Products which fulfil the Cradle to Cradle criteria and contain environmentally compatible and healthy products that can be re-used within closed-loop systems – in other words recyclable or compostable materials – can be tested and certified by organizations such as the Environmental Protection Encouragement Agency (EPEA) or the Cradle to Cradle Products Innovation Institute (C2CPII). The first product for which Xella received a Cradle to Cradle Certificate in 2011 was Ytong Energy+. This particularly energy-efficient composite block is formed like a sandwich from two layers of autoclaved aerated concrete with a core made of Multipor. Ytong and Multipor products are made primarily of sand, lime,

¹ Cradle to Cradle is a registered trademark.

Ytong Product Lifecycle



cement and water. They can be fully recycled and used in the manufacture of new building materials. In 2013 the Ytong and Multipor products also received certification.

It was also planned to certify Silka calcium silicate blocks and the Fermacell gypsum fiberboard panels. However, modified Cradle to Cradle criteria have prevented this. Before a certificate can be issued, companies must now demonstrate that they have contributed to the expansion of energy generated from renewable sources or, alternatively, produce renewables-based electricity themselves. Simply purchasing eco-electricity from existing sources is not sufficient. Furthermore, a strategy for improving the company's carbon footprint is also required. In this context, building materials are not considered to be a component of an end product (building) and its energy balance. On the contrary, the building material for which certification is sought must in itself exhibit an improved carbon footprint. This in turn impedes product developments in which CO₂ savings are achieved only when a building is taken into use, but for which higher CO₂ emissions arise during

production of the building material. In the face of these stricter criteria, we have decided not to pursue the certification of further products. Not at every plant the generation of energy or purchasing green electricity makes economic sense for Xella.

Not all products are equally suitable

One important requirement of the Cradle to Cradle principle clearly illustrates why building materials are generally not so well suited for certification – namely the requirement to buy as few products and materials as possible, but only to use them upon payment of a fee. By leasing them, the materials remain the property of the manufacturer and are returned to the manufacturer following a defined period of use. The benefit of this system is that the manufacturer can use higher quality materials without being forced to employ them sparingly, because they are returned for re-use. This is a desirable principle that can be practically implemented with cars or computers for example. But with building materials – that often remain for a century or more in a building where they are subject to various changes over time – it is either impossible or extremely difficult to implement.

Brands

Building Materials



Ytong

Ytong is one of the world's oldest and best known building material brands and is synonymous with autoclaved aerated concrete. Ytong building blocks have been manufactured industrially for over 85 years. Throughout the decades we have continually improved their quality and characteristics. Today, Ytong stands for highly efficient thermal insulation, optimum fire protection, excellent load-bearing abilities and easy recycling.

Aerated autoclaved concrete is primarily composed of the mineral natural materials lime, sand, cement, and water. Manufacturing the block requires low consumption of primary energy and its efficient resource balance is equally impressive: One cubic meter of raw material is sufficient to produce five cubic meters of autoclaved aerated concrete. From production of the raw materials through manufacture and use, right up to material recycling following the demolition of buildings – it is possible to achieve a closed raw material loop for Ytong blocks. The environmental product declaration on the basis of the international ISO 14025 standard confirms that the block is free of harmful substances, does not release any emissions that are harmful to health and exhibits an excellent eco balance.

0.065 5

Ytong Energy+ possesses one of the best insulation values for building materials, with a lambda value of 0.065 W/(mK).

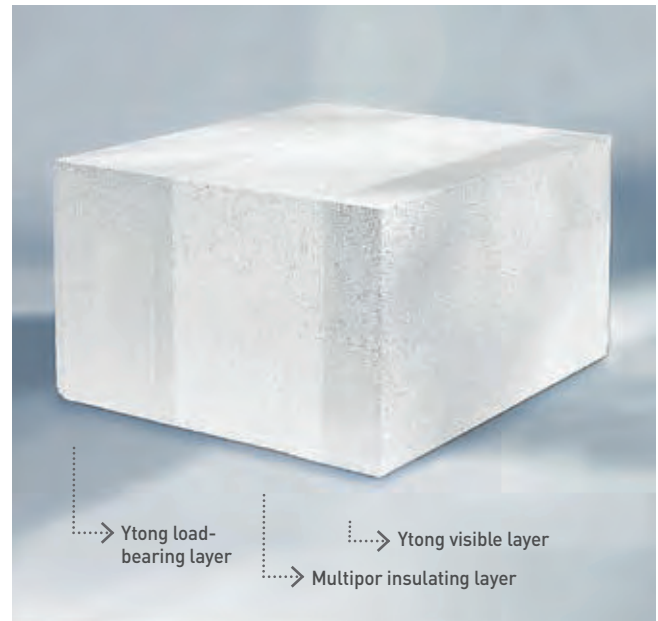
5 m³ of building materials are created from 1 m³ of raw materials.

A balanced indoor climate

Despite its low weight, Ytong autoclaved aerated concrete exhibits high strength with a corresponding load bearing capacity. The millions of air entrainments within the block give it one of the best thermal insulation values for solid building materials. This allows energy-saving exterior walls to be built without additional thermal insulation. The Ytong building block ensures an optimum relationship between temperature and air humidity. Thanks to its purely mineral structure, autoclaved aerated concrete is guaranteed to be non-flammable, completely free of harmful substances and therefore provides the highest level of fire protection and safety.

As the only manufacturer of autoclaved aerated concrete, Ytong provides the market with blocks that have a lambda value of 0.07 W/(mK) . This means that single-shell walls with a thickness of 36.5 cm already meet the energy standard of a KfW Efficiency House 55 even without additional thermal insulation. In addition to the classic Ytong building block, Xella offers a further block with above average thermal insulating properties: The Ytong Energy+. A house constructed with Energy+ blocks only consumes one liter of heating oil per square meter of exterior wall over a single heating season. The 40 cm thick Ytong Energy+ block achieves a U-value of $0.15 \text{ W/(m}^2\text{K)}$, thereby achieving the passive house standard without the need for additional insulation. All Ytong products are fully recyclable.

Ytong Energy+



Where the Y in Ytong came from

Energy and raw material shortages following World War I prompted the Swedish government to raise the reference values for thermal insulation. Lower energy consumption would make the country less dependent on imports. The breakthrough came in 1923 with the development of autoclaved aerated concrete. Six years later autoclaved aerated concrete was produced on an industrial scale for the first time in the southern Swedish town of Yxhult. A little later the original name, "Yxhults Anghärdade Gasbetong" became the world's first registered trademark for a building material. It was marketed globally under the brand name Ytong – and changed the construction industry sustainably.



Modern architecture in Bratislava, Slovakia: Ytong is perfectly suited for sophisticated structures built of natural materials

Multipor

Multipor is Xella's brand name for mineral insulating materials for use both indoors and outdoors. Mineral insulation panels from Multipor ensure excellent thermal insulation and a pleasant indoor climate with balanced temperature and air humidity in both newly constructed and renovated buildings. Multipor insulating materials are micro-biologically safe for use in buildings and prevent the formation of mold. They are manufactured in an environmentally friendly and energy saving process from sand, lime, cement and water – without the addition of plastics. Processing waste can be 100 per cent recycled.

The insulating effect of Multipor insulation boards results from millions of minute air entrainments inside the board's structure. These inhibit the transmission of heat and form a kind of mineral air-conditioning system, keeping rooms cool in summer and warm in winter. The insulation boards also exhibit capillary action, absorbing moisture that forms inside rooms or exterior walls, trapping it and releasing it at a uniform rate later on. Old buildings that have been insulated with Multipor meet the requirements of the European Energy Performance in Buildings Directive (EPBD).

In recognition of their outstanding environmental characteristics, Germany's Institute of Construction



Institut Bauen
und Umwelt e.V.

and the Environment (Institut für Bauen und Umwelt (IBU)) has awarded the Multipor mineral insulation boards the natureplus seal of quality, while the independent eco-Institut has declared Multipor to be a sustainable, future-oriented product. These

certifications confirm that the product is non-toxic, releases no emissions hazardous to health and possesses an excellent ecological balance – from the raw materials used through manufacture and right up to their disposal.



A little help from nature

Cologne's eco-INSTITUT has conferred its eco-Label on Multipor products in acknowledgement of their low environmental impact. Only mature products, whose components are non-toxic and environmentally friendly, are awarded this special seal of approval.



Interior insulation using Multipor: The listed façade of the Spichernhöfe historic building in Cologne

100

All processing waste is 100 per cent recyclable.

Silka

Silka is Xella's brand name for calcium silicate blocks. This very dense building material is manufactured from the natural raw materials lime, sand and water. It is used primarily in applications where thin wall constructions have to support high loads and a high level of noise insulation is needed at the same time. Thanks to their high bulk density, Silka calcium silicate blocks protect against noise from the outside, guaranteeing a quiet and relaxing living environment. As a result of its ability to store heat and moisture, this natural building material also contributes to a healthy indoor climate. The material's resistance to weather influences and frost – together with its non-flammability and secure, rapid processing – contributes to a high degree of safety.

The production process for Silka calcium silicate blocks is environmentally friendly and is not hazardous to health. Their manufacture requires comparatively little energy and no environmentally hazardous waste is generated.



Constructed using Silka calcium silicate elements: The Hofjägerpalais in Berlin

During both processing and disposal the material remains environmentally friendly and recyclable. The products' ecological attributes and excellent eco-balance are confirmed in the environmental product declaration issued by Germany's Institute of Construction and the Environment (EPD) in accordance with the ISO 14025 standard.

100

Silka Protect offers almost 100% protection against electromagnetic radiation.

110

Calcium silicate blocks have been industrially manufactured for over 110 years.

Hebel

The Hebel brand is particularly synonymous with large-format prefabricated compound units made of autoclaved aerated concrete. As far back as 1943 components for walls, ceilings and roofs had been manufactured industrially. With a brand awareness of 98 percent, Hebel – in addition to Ytong and Fermacell – is now one of the best known brands among the specialist target group. The Hebel components are supplied precast to the site where they only need to be installed. The products also offer maximum fire protection. They are used for large-scale business construction projects such as logistics centers, warehouses, production and administration facilities.

Hebel prefabricated compound units, as non-flammable class A1 building materials, inhibit the spread of fire. The aerated concrete releases neither smoke nor other gases and also provides an effective barrier against smoke and heat. At over six hours, Hebel walls offer a far higher level of fire protection than required by current standards.

The solid mineral building material is cost-effective in planning and installation, offers energy savings in use and delivers good noise insulation. Excellent thermal insulation guarantees permanently low energy consumption for heating and cooling and ensures a pleasant indoor climate in both summer and winter.



All Hebel products are certified through stringent testing procedures. Compliance with the production guidelines is carefully monitored in line with quality control. Industrial pre-assembly ensures consistent quality and saves time and effort on the construction site. Hebel products therefore offer a high degree of cost effectiveness and safety in the construction of large-scale industrial projects. In Central America, the autoclaved aerated concrete blocks are also marketed under the Hebel name. In some countries Hebel is also offered as a second brand of aerated concrete block for domestic construction.

Xella operates 13 autoclaved aerated concrete and 17 calcium silicate block factories in Germany. The building materials are furthermore manufactured at 43 production facilities in 18 additional countries including Austria, Belgium, Bosnia and Herzegovina, Bulgaria, China, the Czech Republic, France, Hungary, Italy, Kosovo, Mexico, the Netherlands, Poland, Romania, Russia, Serbia, Slovakia and Slovenia.



Dr. Oetker production facility in Oerlinghausen

6

The fire-resistance rating of Hebel complex partition wall panels is at least 6 hours.

70

The first Hebel factory was opened 70 years ago.

Brands

Dry Lining



Fermacell

Fermacell is Xella's brand name for dry lining products. To make our gypsum fiberboard panels – that have been on the market in Germany since 1971 – gypsum and fibers from recycled paper are mixed with water, pressed into stable boards, dried and then cut. Fermacell gypsum fiberboards can be universally used as building, wet room or fire protection boards and are also suitable for constructing walls and ceilings.

Special gypsum fiberboard flooring elements are available for constructing heavy duty floors. The boards and elements are extremely strong, can be fitted very quickly, provide efficient noise and fire protection and also ensure a pleasant indoor climate. A high proportion of macropores in the gypsum's core allows the boards to absorb excess humidity from the air and release it again later, when the indoor air is dry – making a significant contribution to environmentally aware and healthy living. The independent eco-Institut has also confirmed the environmental sustainability of Fermacell products.

A particularly occupant-friendly variant is the innovative Fermacell green-line gypsum fiberboard. These boards contain a special keratin-based coating on both sides. This absorbs toxins such as formaldehyde and other volatile organic compounds (VOCs) from the room air and permanently neutralizes them.



40

For over 40 years, the Fermacell brand has been synonymous with high-quality, environmentally-friendly dry lining.



New perspectives for classic dry lining: Highly moisture resistant Powerpanel H₂O lightweight concrete construction board

The Firepanel A1 gypsum fiberboard represents the pinnacle of Fermacell's fire protection expertise. Firepanel A1 possesses all the well-known properties of traditional Fermacell gypsum fiberboards – and offers even better fire protection qualities for both building materials and elements. The boards have been classified as A1 building materials – the highest European class. For particularly stringent requirements relating to fire and moisture protection, Fermacell has developed the Powerpanel H₂O cement-bonded waterproof dry lining panels. These offer the optimum solution for rooms with high moisture resistance requirements such as sanitary facilities, wellness rooms and indoor swimming pools. Powerpanel H₂O further-

more serves as a cladding panel for exterior back-ventilated curtain façades and suspended ceilings. On the other hand, Powerpanel HD is used as a lath construction in exterior timber panel building applications. This panel impresses with its static load capabilities and weather protection properties.

Gypsum fiberboards are manufactured in Germany at Münchhof and Siglingen and in Wijchen, the Netherlands. A new gypsum fiberboard factory was opened in 2013 close to the northern Spanish city of Santander. Fermacell cement-bonded dry lining panels come from Calbe in Saxony-Anhalt, Germany.

Fermacell Aestuver

Fermacell Aestuver, one of the leading brands in glass fiber reinforced concrete (GFRC) technology, offers a wide choice of integrated solutions for preventive fire protection in buildings. These include a comprehensive range of tested construction elements with corresponding verifications of applicability and/or approvals (national technical approvals/general building inspectorate test certificates). Examples of these are fire-resistant linings for supporting frameworks, wall and ceiling structures, stand-alone ventilation ducts and solutions for the safe design of escape and rescue routes.

Aestuver fire protection boards, also well-proven over many years, are also used in particular for subterranean

traffic infrastructure projects. The boards are non-combustible, cement-bonded, lightweight GFRC boards classified as A1 building materials for highly specialist applications. They are waterproof, frost-resistant and able to withstand a high degree of bending stress and abrasion. At the same time, the composition of the boards – which includes no combustible components – prevents the release of toxic or visibility-reducing gases should fire break out. In the area of electrical installations Aestuver offers a complete system of ready-to-install cable trunking in a range of fire resistance ratings. These include products for firestop bulkheads (pipe/cable), coatings and joints.



Greater safety for traffic infrastructure: Fire protection boards in the city of Essen subway system

Brands

Lime





Fels

Fels is Xella's brand name for its high quality lime products and mineral compounds. The second-largest German lime producer, Fels operates seven lime plants, a dolomite quarry and a mortar factory in Germany. The company also operates a lime plant in Vitosov, Czech Republic, and in Tovarkovo, Russia. Fels quarries limestone of high purity, quality and homogeneity from its own raw material deposits, which is then refined into high-quality lime, lime hydrate, limestone and lime compounds.

We supply some five million tons of our lime products to customers from a range of industries. These include the steel industry, environmental protection and railroad sectors. Lime and limestone products are also used in the chemicals, civil engineering, agricultural and forestry sectors – and in further important industrial applications.

Environmental protection is one of the largest areas of application for lime from Fels. Power stations, waste incineration plants and other industrial plants are supplied with over one million tons of high quality limestone products for air pollution control each year. Lime is also indispensable for wastewater treatment and potable water production. The lakes left behind by open-face mining operations in the former coal producing areas of East Germany are undergoing long-term restoration using lime. In civil engineering, lime is an important component used in soil reinforcement, stabilization and strengthening measures to make roads more resistant to water and frost damage – and therefore more durable. Residual products from the refining of crude oil are also treated with lime, for instance scavenging sludge from boreholes. Special lime products are also used to neutralize acids, bind heavy metals and support the degradation of pollutants.

Fels is also a key raw material supplier for the manufacture of autoclaved aerated concrete and calcium silicate blocks. As a natural raw material, lime makes a decisive contribution to the durability and sustainability of building materials. Thanks to its excellent binding capacity and basicity, it is also effectively used in a wide range of environmental applications.

1.5

Fels supplies over 1.5 million tons of lime and limestone products a year for a large number of key environmental applications including air pollution control, potable water production, wastewater treatment, renaturation of the lakes left behind by open-face mining operations and for countering the effects of acid rain.

Brands

Gas Generation





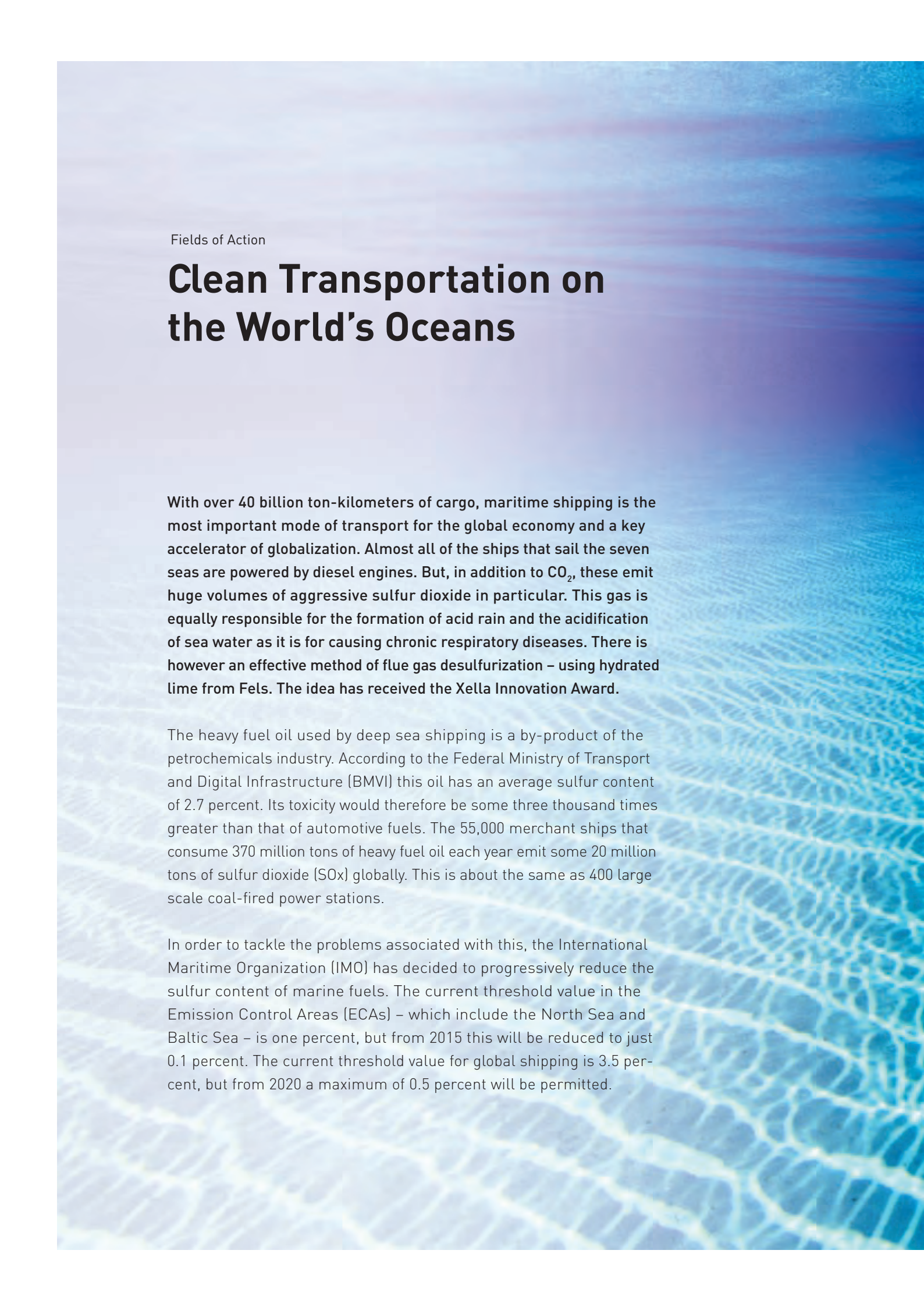
Ecoloop

Ecoloop is Xella's brand name for the generation of gas from waste material. The patented Ecoloop process allows the ecologically and economically beneficial conversion of residual materials into pure synthetic gas (syngas). This syngas can be used in industrial processes as a substitute for fossil fuels such as natural gas.

The use of Ecoloop therefore protects natural resources and even generates a triple value contribution: Energy savings are achieved through the significantly lower production cost of the syngas compared with fossil fuels. Disposal costs are reduced because Ecoloop represents the most cost-efficient reprocessing option. And for specific applications additional income is obtained through the recovery of valuable materials such as metals and phosphor.

Examples of useful residual waste products include plastics containing chlorine that have received little processing, fractions of household waste or residual products from automobile recycling. However, sewage sludge and sulfurous fossil fuels that cannot be used in conventional combustion processes can also be utilized. Ecoloop can therefore efficiently reprocess residuals that have no better or more ecological use.

In addition to conserving fossil fuels and solving recycling problems, the Ecoloop process has further positive effects on sustainability – in particular when compared to traditional means of disposal using thermal treatment. Ecoloop binds the chlorine found in residual waste to the lime and functions as a “chlorine sink”. Furthermore, as a result of binding with lime, the formation of dioxins and furans is prevented, making flue gas scrubbing unnecessary. The whole process is also a closed-loop system with no environmentally damaging emissions or negative effects on the ground and water. Finally, Ecoloop achieves a higher thermal efficiency compared with other processes, which means that a given amount of energy can be generated from a lower volume of residual waste – with a consequent reduction in CO₂ emissions. The degree to which the Ecoloop process is environmentally friendly is highlighted by the awards it has received: The German Innovation Prize for Climate and the Environment (IKU) and the Hugo Junkers Innovation Prize. The Ecoloop plant is located at the Fels Kaltes Tal site and is currently still at the trial stage.



Fields of Action

Clean Transportation on the World's Oceans

With over 40 billion ton-kilometers of cargo, maritime shipping is the most important mode of transport for the global economy and a key accelerator of globalization. Almost all of the ships that sail the seven seas are powered by diesel engines. But, in addition to CO₂, these emit huge volumes of aggressive sulfur dioxide in particular. This gas is equally responsible for the formation of acid rain and the acidification of sea water as it is for causing chronic respiratory diseases. There is however an effective method of flue gas desulfurization – using hydrated lime from Fels. The idea has received the Xella Innovation Award.

The heavy fuel oil used by deep sea shipping is a by-product of the petrochemicals industry. According to the Federal Ministry of Transport and Digital Infrastructure (BMVI) this oil has an average sulfur content of 2.7 percent. Its toxicity would therefore be some three thousand times greater than that of automotive fuels. The 55,000 merchant ships that consume 370 million tons of heavy fuel oil each year emit some 20 million tons of sulfur dioxide (SO_x) globally. This is about the same as 400 large scale coal-fired power stations.

In order to tackle the problems associated with this, the International Maritime Organization (IMO) has decided to progressively reduce the sulfur content of marine fuels. The current threshold value in the Emission Control Areas (ECAs) – which include the North Sea and Baltic Sea – is one percent, but from 2015 this will be reduced to just 0.1 percent. The current threshold value for global shipping is 3.5 percent, but from 2020 a maximum of 0.5 percent will be permitted.

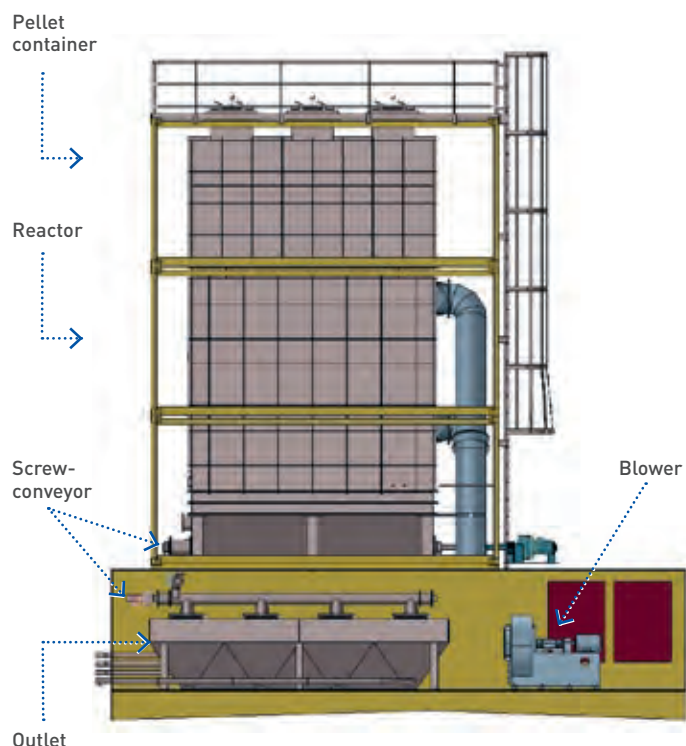


Additional costs of 250 euro per ton of fuel

But this imposes huge costs on shipping companies because low-sulfur fuels are considerably more expensive. The heavy fuel oil (HFO) used to-date costs approx. 400 euro per ton while reduced-sulfur marine gas oil (MGO) currently costs approx. 650 euro. This means that the proportion of overall costs attributable to fuel will increase from the current 50 percent to 70 percent of overall operating costs. For a 10 MW ship this would mean additional costs of up to 3 million euro per annum.

While the European Union has stipulated the use of low-sulfur fuels for seagoing vessels from 2015, it is still permissible to use high-sulfur heavy fuel oil if the SOx threshold values can be maintained by using an efficient exhaust gas cleaning system. Currently, two

Dry EGCS process diagram



European Emission Control Area (ECA)

exhaust gas cleaning systems are in use: The dry scrubbing process (dry EGCS) and the wet scrubbing system that utilizes sodium hydroxide solution. The dry EGCS process – which is based on dry exhaust gas cleaning using hydrated lime pellets in a packed bed filter – is more advantageous because of its lower susceptibility to failure and comparatively low acquisition and operating cost. For this exhaust gas cleaning system, which is certified by Germanische Lloyd, the hydrated lime pellets (NautiCal) from Fels are the optimum absorbing material. These specially developed pellets take the form of a granulate with a grain



NautiCal hydrated lime pellets from Fels: Small size – big effect



For exhaust gas cleaning on the seven seas: NautiCal from Fels

size of two to six millimeters. The spent absorbing material is returned and can be used in other sectors of industry. The first dry EGCS system loaded with Fels NautiCal has been successfully commissioned on a new ConRo ship (roll-on/roll-off loading).

The excellent separation efficiency of NautiCal has now been confirmed by independent testing institutes. With its myriad benefits, it's no wonder that we have given this innovative product from Fels the Xella Innovation Award 2012.

Fields of Action

Market



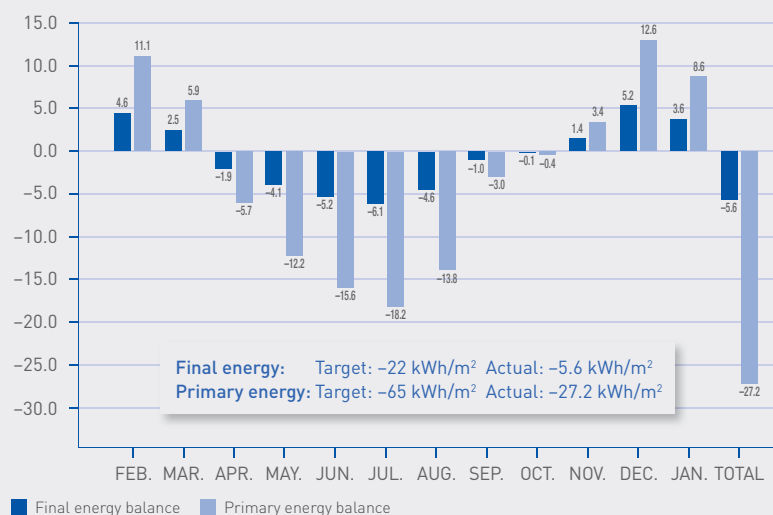
Innovations

Innovative products and technologies can help reduce environmental pollution because their use conserves raw materials and lowers energy consumption. Innovative strength is also a decisive driver of competitiveness. Being innovative needs ideas – and these are found in the minds of our employees.

Each individual at Xella is called upon to seek potential optimizations and look beyond the horizons of their own departments. Since 2007 we have been honoring excellent ideas with the Xella Innovation Award. This recognizes promising new products, services, processes or sales and marketing concepts such as Fels NautiCal, the “M1 house” or the Fels agricultural strategy.

Over a period of three years, Xella and six partner companies from the architecture, home construction and building technology sectors developed and built the first energy-plus masonry house. The “M1” is a model project under the research initiative of the German Federal Office of Construction and Regional Planning and is part of the Efficiency House Plus network. Through this network the Federal Ministry of Transport, Building and Urban Development sponsors model projects that fulfil the efficiency house standard.

“M1 house”: Final energy and primary energy balance (kWh/m²)



The findings gained over a period of two years are intended to demonstrate the suitability for everyday use of the house and its component parts. These include the Ytong Energy+ building material which was used in this project for the first time in Germany. This solid mineral building block – which has already been used successfully in Denmark for two years – gets its excellent thermal insulation properties from a combination of two layers of autoclaved aerated concrete and a core made of thermally insulating Multipor. At a wall thickness of 40 cm the block exhibits an equivalent lambda value of 0.06 W/(mK) and achieves the intended U-value of 0.15 W/(m² K).



The "M1 house" received the Energy Award in the category "Energy house of the year". The winners of the Energy Award are selected annually by a forum of energy industry experts from the Energy Academy.

The "EnergieWertHaus" (energy-value house) in the Rhine Region's city of Rösrath achieves new benchmarks and has received the 2012 RWE Climate Protection Award. This award recognizes initiatives for greater energy efficiency and better environmental conditions in local municipalities. This detached family house, developed jointly by Xella and heating system manufacturer Vaillant, impresses with its energy concept in which thermal insulation and heating technology are optimally dimensioned. Its energy consumption, which is 30 percent below the statutory requirements, even beats the requirements for a passive house.

New Ytong block

Ytong Slovenia has developed a pre-fabricated formwork block for constructing house and apartment partition walls. The autoclaved aerated concrete block fulfils both the statutory guide values for noise insulation and exhibits a thermal conductivity coefficient of between 0.70 and 0.90 W/(m² K) for thermal insulation. This innovative product is intended to diversify our range and strengthen our own market position. The block is currently undergoing an STS inspection (Slovenian Technical Approval) prior to its market launch.

Individual renovation solutions

Ytong has launched a complete system of Ytong, Multipor and other renovation components on the French market. Renovation is a growing market in Europe. In France there is a particularly high proportion of building stock from a time when there were no statutory requirements for thermal insulation. The renovation concept is oriented on the building stock in question (age, material, thermal insulation etc.) and an individual "toolbox" is prepared for each specific project. In 2014 Xella France will accelerate marketing of its "Ytong Renovation Solutions".



Modular, recyclable building concept

In cooperation with the Technical University of Dresden and industrial partners, Xella has developed a recyclable modular building concept for buildings that uses mineral materials. This system is flexible in application but stable at the same time. The consumption of primary energy during production of the components is very low, the modules are lightweight and recyclable and buildings constructed from them are highly energy-efficient. A further benefit of this system is that buildings can be constructed quickly – irrespective of the weather. Research work on the new modular building system is now more or less complete.

Fels is intensifying its focus on agriculture

The use of lime and limestone products in the agricultural sector has proven itself over centuries in a variety of ways. Lime helps prevent soil erosion and protects against silting of arable farmland, has a positive effect

on soil reaction, neutralizes and promotes humus formation. Lime also has hygienic properties as a result of its antibacterial effect.

Liming adds calcium and magnesium to the soil, both of which are essential nutrients required for healthy plant growth. Fels "Mischkalk 50 feucht" (Compound lime fertilizer 50 moist), a combination of super-fine lime-stone enriched with clay minerals and highly reactive Fels quicklime, improves yields quickly and sustainably. For instance, tests carried out in agricultural operations (sugar beet cultivation) in the vicinity of Goslar resulted in a growth advantage of 55 percent versus the non-limed control sample. Thanks to the moist-crumbliness of lime, the fertilizer can be spread without producing dust. Nor does the product require expensive silo storage.

Thanks to its alkaline pH value and antimicrobial effect, lime is also the preferred substance for use in animal stall hygiene and disease control. In agriculture, animal stall hygiene is of fundamental importance to animal health and maintaining a good stall climate. Where there is a high density of animals there is also a particular risk of infectious diseases. A highly effective method for dairy herds is the lime-straw mattress, which is a mixture of Fels mattress lime and straw. Fungi, bacteria, viruses and small insects don't feel comfortable on this alkaline base. This reduces the risk of dairy cattle developing inflammation of the udder for instance. A further benefit is that the calcium carbonate contained in the mattress binds moisture better than straw, which means that less straw is actually required. The use of lime for hygiene purposes reduces infestations, allows the use of fewer drugs, produces less waste and therefore ensures a higher yield.

Energy-efficient Building Materials

Energy efficiency is one of the dominant issues in the building materials industry. Xella is working constantly on optimizing the characteristics of its products, thereby protecting the environment and conserving resources. The thermal insulation properties of building materials make a particularly significant contribution to a building's energy balance.

The European Energy Efficiency Directive means that the energy efficiency standards for buildings will become more stringent and from 2021 the European Union will introduce requirements for the "nearly zero energy house". This also means that building materials will be subject to higher expectations. Today, Xella already offers cost effective products that exhibit the threshold values of tomorrow. With the concept of a Multipor mineral insulation board with a thermal conductivity of 0.030 W/(mK) or the Ytong Energy+ building block we are not only

demonstrating our innovative strength, we are also showing what is possible in the area of low-energy buildings of masonry construction.

Low-energy solutions for new buildings

The Ytong PP 1.6-0.25 with a lambda value of 0.07 W/(mK) offers the best insulation values for a homogeneous building material. Using these blocks, even single-shell walls with a thickness of 36.5 cm already meet the energy standard of a KfW Efficiency House 55 without additional thermal insulation. But the KfW Efficiency House standard is even more ambitious than the requirements of the German Energy Conservation Act. With a wall thickness of 48 cm a U-value of 0.14 W/(m² K) is achieved for the exterior walls – as good as that of a passive house. By building walls using autoclaved aerated concrete it is possible to achieve the highest standard currently specified by the KfW – without the use of additional insulating materials.

Huge potential for modernization

Over 80 percent of the energy consumed by households is used for heating. But it's not only energy efficiency that is to be increased by 2020 in the European Union – energy consumption and CO₂ emissions are each to be reduced by 20 percent as well. More so than new construction, the many buildings in need of modernization offer a particularly huge potential for saving energy. Older buildings frequently exhibit poor or even defective thermal insulation. Insufficient thermal insulation of external parts of the building leads to increased energy consumption in winter and to overly high interior temperatures in summer.

This is exactly where Multipor plays its part: Multipor mineral insulation boards are particularly suitable for the interior insulation of exterior façades. Using this insulation system that is open to vapor diffusion, the thermal insulation of existing building stock can be improved to the extent that the requirements of the Energy Conservation Act are met. The Multipor mineral insulation board is a siliceous thermal insulating material and can be used without fitting a complex and fault-prone moisture barrier. The thermal insulation value is maintained and the moisture balance of the living space is regulated in a natural manner. Condensate is absorbed through the walls of the closed-cell, thermally insulating air entrainments within the insulation boards, and the moisture is released back to the room air later, as the mineral

material dries naturally. Multipor contains no contaminants, is fully recyclable and does not have to be disposed of as hazardous waste. The mineral insulation boards are manufactured from lime, sand, cement and water under steam pressure in a process that is environmentally friendly and resource-conserving. Ecological compatibility is evidenced in the form of an environmental product declaration (EPD). Multipor has also been certified by the German Institute of Construction and the Environment (IBU) and the German eco-Institut. It also received the natureplus seal of quality from the International Association for Future-oriented Building and Accommodation. The eco-Institut only certifies building products, floor coverings, mattresses, bedding and furniture that meet the most stringent contaminant and emission requirements. Multipor has also received the natureplus seal of quality from the International Association for Future-oriented Building and Accommodation. Both Multipor mineral insulation boards and the Multipor light and reinforcement mortar have achieved the A+ standard because they contain no volatile organic compounds (VOC).



Multipor for the optimum interior insulation of historic buildings:
The coach house of Schloss Lieser (Lieser Castle) in the Mosel valley

A permanently pleasant climate

Irrespective of whether it's 40 degrees Celsius outside or if winter temperatures prevail, the Xella passive house in the Italian town of Colorno ensures a constant, pleasant indoor climate – and saves energy. The building was constructed using the 30 cm thick Ytong Sismico block ($d=575 \text{ kg/m}^3$) and the Multipor ETICS mineral insulation board (26 cm wide). This allows a thermal transmission coefficient of $0.13 \text{ W/(m}^2 \text{ K)}$ and air tightness (n_{50}) of 0.5 h^{-1} to be achieved. In comparison with conventional buildings, passive houses consume some 80 to 90 percent less energy. The "Passive house certificate" of Italy's Technical Building Physics Center confirms that the house

meets the strict ecological and economic requirements of passive building.

Energy-efficient modernization

The Fermacell loft insulation and cellar ceiling insulation element N+F offers outstanding thermal insulation properties for lofts. The German Energy Conservation Act prescribes a minimum level of thermal insulation between the heated areas of a building and unheated roof spaces. Specifically, this means that either the roof or the ceiling of the uppermost floor must be insulated. The Fermacell loft insulation element N+F comprises a 10 mm gypsum fiberboard panel onto which pressure-resistant EPS insulating boards with a k-value of 031 or 035 are laminated. In the basement, Fermacell N+F cellar ceiling insulation elements ensure perfect thermal insulation. The 120 mm N+F element with a k-value of 035 and insulation thickness of 110 mm already meets the thermal insulation requirements of the German Energy Conservation Act when used on 0.30 W/(m²K) concrete ceilings.

Effective fire protection

Fermacell is the first choice when it comes to effective fire protection in timber construction. Take the modernization of a building in Hamburg as an example: Six old apartment blocks were extended by one or two new floors and modernized to make them energy-efficient at the same time. The objective was to almost double the living space while halving the annual CO₂ emissions, without significantly affecting the surrounding green areas, tree stock or open-air and play areas. The building works were largely carried out using light wooden frame construction methods for structural reasons. The increased height of the building resulted in its classification in building class 4, bringing corresponding fire-safety requirements. It was possible to meet the fire protection requirements using Fermacell gypsum fiberboard panels.

All of the building's interior and exterior walls were clad over an area of 32,000 m² with a double layer of Fermacell gypsum fiberboard panels (building material class A2) and insulated using stone wool. The floors were com-



Effective fire protection for timber construction: Houses in Alsterdorf, Hamburg

pleted with 5,000 m² of Fermacell flooring elements in combination with mineral fiber insulation and Fermacell levelling fill to ensure a high degree of impact sound and thermal insulation. Wet rooms were finished using Fermacell Powerpanel H₂O (wall) wet room boards and Powerpanel TE (floor). Due to the materials, the scale and the new structure set on top, the residential development was nicknamed the "tree house". The project won the 2010 "Bauen im Bestand" (building redevelopment) architecture prize.

The highest level of structural fire protection (building material class A1) is offered by the fire protection boards from Fermacell Aestuver, one of the leading brands in the sector of glass fiber reinforced concrete technology. Aestuver fire protection boards have proven themselves for many years, for instance in subterranean traffic infrastructure applications. Even under fire load according to the Dutch RWS curve, the panel's suitability for this use has been demonstrated at temperatures of up to 1,350 degrees Celsius. Instead of cellulose or synthetic fibers, alkali-resistant glass fibers are used to reinforce Aestuver lightweight glass fiber reinforced concrete. In addition to their non-combustibility, these cement-bonded boards are waterproof, frost-resistant and are able to withstand a high degree of bending stress and

abrasion. They are also easy to install. The fire protection cladding is suitable for supporting frameworks, wall and ceiling structures, stand-alone ventilation ducts and solutions for the safe design of escape and

rescue routes. The eco-Institut has validated the high degree of environmental compatibility of Fermacell products by awarding them the eco-Label.



Energy-efficient Building Concepts

With its Energy Concept 2012, the German Federal Government has paved the way for an energy revolution. Some 40 percent of overall final energy is used in buildings. In order to achieve the energy and climate policy objectives, energy consumption must therefore be reduced. In addition to the construction of energy-efficient new buildings, the energy-efficient modernization of the more than 19 million buildings in Germany is highly significant.

The zero challenge

Xella is supporting new concepts for zero and low energy houses. These include the "M1 house", which generates more energy than it consumes (see page 39). The "Zero Challenge" architecture competition, which Xella has launched in five European countries, is aimed at finding the best concept for a two-storey single-family home. The requirement for entry is that building and insulation materials from Ytong and Multipor are used and the project meets aesthetic, commercial and energy-saving criteria. All energy-efficiency considerations stipulated in the EU guidelines from 2021 also had to be taken into consideration in the "Zero Challenge", such as the use of natural or

one hundred percent recyclable building materials. Cutting edge technologies should also be used and a "smart house" system, that facilitates control of the building via a computer or mobile telephone, should be the goal. The winning house, from the Hungarian planning office Arch-Studio, was selected from 85 entries. It not only meets the required criteria, but also leverages the properties of Xella products to optimum effect. It is planned to construct the design in the "Blaue Lagune" (Blue Lagoon) show house park in Vienna and place it on the real estate market.

Low energy house for Bosnia and Herzegovina

A Ytong low energy house has been constructed in the Bosnian city of Tuzla for demonstration purposes. This made it possible to show interested members of the public all the benefits of the Ytong building system – and the associated living comforts. The show house stood for ten months in a well frequented location in the city.



Generates more electricity than it consumes: The "M1 house"

Healthy Living



Ideal for healthy living: Interior insulation using clay and Multipor. This example shows a half-timbered house in Soest

Homeowners that build or renovate primarily wish to create an environment where they can live healthily over the long term. Every building should offer optimum living conditions. But healthy living means that low-emission building materials are necessary. Ytong, Silka, Multipor and Fermacell score here in every respect.

The renaissance of clay

An absolutely ideal combination for healthy living and energy-efficient modernization is the mineral insulation board and clay mortar from Multipor. Both materials complement each other optimally thanks to their building physics characteristics. The permeable insulating system does not need a moisture barrier, is free of toxic substances and exhibits good insulating performance with a lambda value of 0.042 W/(mK). For this reason it has

been used as interior insulation for the modernization of a listed half-timbered house from the late 18th century. In particular, special features had to be taken into consideration in order to protect the building's structural wooden frame. It was also necessary to prevent moisture damage because half-timbered façades are never completely resistant to driving rain. The capillary active insulation material from Multipor ensures that moisture damage does not occur. Water absorbed by the insulation boards evaporates into the room. This results in the best possible interior climate, good thermal insulation and protection of the historic half-timbered structure that is worthy of preservation.

In keeping with the rediscovery of clay as a building material, Fermacell offers a clay construction board that

comprises a gypsum fiberboard panel onto which a thin layer of clay has been applied. With its ability to absorb moisture and then release it later, the clay makes a key contribution to creating a healthy interior climate and also offers effective protection against the formation of mold. Because of the high degree of pre-fabrication, the panels can be easily fitted using conventional dry-lining methods. Rooms are ready for use after just three days, because no long drying times are involved.

Multi-generation house for healthy living

Dry lining solutions using Fermacell greenline gypsum fiberboard panels are ideal for healthy living. These panels bind toxins in indoor air, such as VOCs, and neutralize them completely. These characteristics result from a double-sided coating of a specific keratin-based compound. Toxin molecules such as aldehydes and ketones are deposited on the wall surface (physisorption, reversible) and then penetrate into deeper layers (diffusion) where they are chemically bonded and converted (chemisorption, irreversible) so they can no longer be returned to the room air. This effect is permanent and even works beneath paint layers, wallpaper and carpets.

Because the toxins are broken down, Fermacell greenline gypsum fiberboard panels should be considered an absolutely harmless building material when carrying out subsequent renovation work. But the panels don't only bind toxins – they are themselves low-emission products. This is because they are manufactured in an environmentally friendly process that uses only recycled paper, gypsum and water. Their mode of action and environmental compatibility were comprehensively tested and confirmed before market launch, among others by the independent eco-Institut.

The plans for a multi-generation house in Hassloch, in which Fermacell greenline gypsum fiberboard panels were used for the interior fitting, were primarily oriented on the strict healthy housing requirements of the Sentinel Haus Institut (SHI).

This institute, which Xella has partnered for several years, has developed clearly defined and verifiable rules. The SHI considers itself as a kind of guard or sentinel that protects buildings from toxins. All building materials that can affect the indoor air are tested to ensure they are harmless to health before they are fitted. This check encompasses the composition of materials and any potential emissions that could be harmful to health. Once the building is complete a specialist undertakes measurements of the room air to confirm successful compliance with the strict criteria.

Effective noise insulation

A high degree of exposure to noise can cause chronic symptoms. This makes good noise insulation exceptionally important. The revised Directive 4100 (sound insulation in building construction) of the Verein Deutscher Ingenieure (Association of German Engineers – VDI) has caused demand for sound absorbing building blocks to rise. The Silka Protect calcium silicate block achieves a bulk density class of up to 3.0 and therefore possesses exceptionally high protective properties in terms of noise and electromagnetic radiation.

Fermacell developed the 2 E 35 dry flooring element especially for use in badly soundproofed apartments in the former port workers residential area of Hamburg's "Weltquartier" (global neighborhood). During the course of renovation work the thin partition ceilings of the apartments were upgraded in terms of their sound insulation. In addition to the thin ceilings, the low height of the rooms in this old building presented a particular problem. The dry flooring element, which offers significantly better performance than the limit values, comprises two bonded 12.5 mm gypsum fiberboard panels onto which a 20 mm layer of highly compressed mineral wool is laminated. This element was especially conceived to reduce impact sound on solid ceilings and achieves an improvement in impact sound of 27 db. In conjunction with the Fermacell levelling fill (≥ 20 mm) that was also used in Hamburg, it is even possible to reduce the noise level by 31 dB.

Environmental Protection

Lime is one of the most important and versatile industrial raw materials that exist. But it is still largely unknown that many high-tech products and environmental protection measures would be completely unimaginable without lime. This is why Fels has been expanding its market share and expertise in the sector of environmental applications for years now. One of the most important and largest environmental protection projects in which Fels is involved is the rehabilitation of lakes in the lignite mining areas of the Lusatia Region, central Germany and in Brandenburg. In these former open-face mining areas the highly over acidified groundwater – resulting from the exposure of minerals such as pyrite and marcasite during mining operations – has been neutralized since 2011 using Fels lime, in order to ensure a biologically balanced water regime. Only in this way will plants and animals be able to recolonize the lakes and surrounding areas.

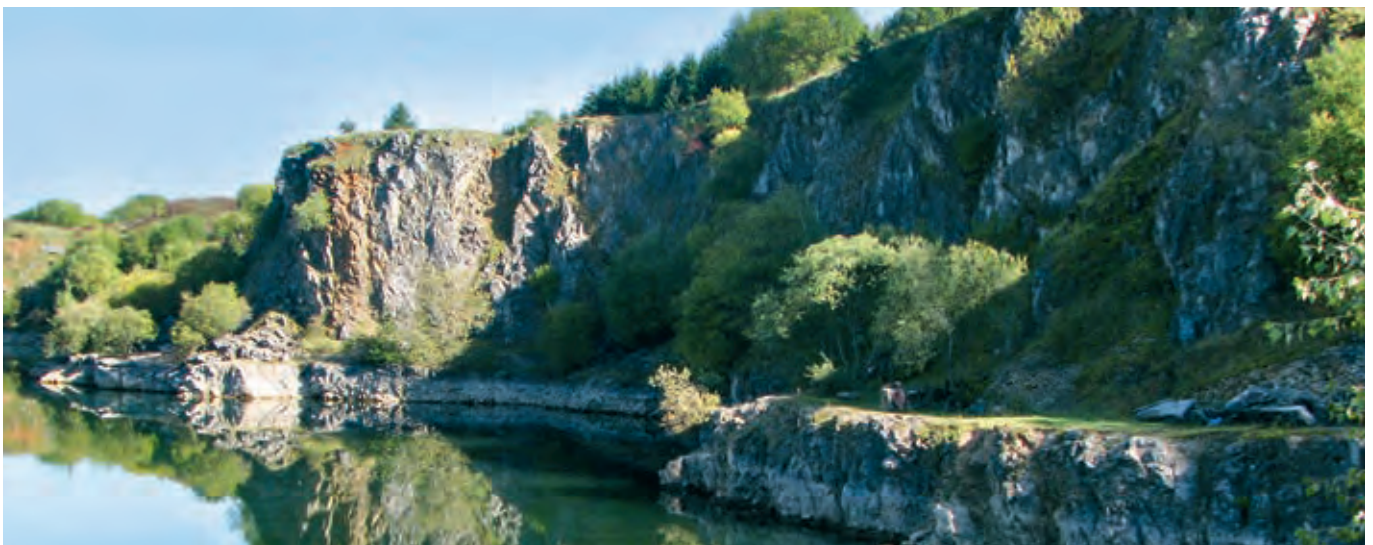


The Mitteldeutsche Bergbau-Verwaltungs-gesellschaft (Central German Mining Administration Company - LMBV) was recently presented a concept for the after treatment of the Scheibesee lake at the former open-face site.

Waste water treatment using lime

Fels lime products also play a key role in the conditioning and increasingly important sanitizing of sewage sludge. Fels application technicians lead the way in Europe in adjusting sewage plant pH values for the purpose of stabilizing the biological wastewater treatment process, neutralizing acids and separating pollutants. For instance, one large-scale municipal wastewater treatment plant has been buying up to 2,000 tons of dry hydrate for producing lime mixture and 1,200 tons of quicklime annually from Fels for the past 14 years. The wastewater treatment plant purifies wastewater from a population equivalent of 400,000. In addition to wastewater from private households, this also includes industrial and commercial wastewater. Over 260 wastewater treatment plants throughout Germany use lime from Fels. This generally involves regional deliveries.

Lime ensures low emissions when it comes to cleaning exhaust gases at flue gas desulfurization installations in power plants, waste incineration plants and industrial enterprises. Special lime mixtures reduce the volume of acidic gases and absorb mercury, dioxins and furans. Even low volumes of hydrate are sufficient for thorough cleaning of the waste gas streams while only a small amount of residue remains to be disposed of. Fels delivers well over one million tons of high-quality lime products annually for these applications alone.



Water from karst sources shapes the lake landscape: The "blue lagoon" at the Hornberg lime works

Decontaminating soil and improving yield

Highly contaminated soil can also be rehabilitated using the lime hydrates and associated technologies that we have developed in-house. We offer special lime products for neutralizing acids and binding heavy metals which can also be used to foster the degradation of toxins in crude oil refining residues or scavenging sludge from oil wells. Soils and sludges are solidified and thereby rendered suitable for transportation to the disposal site.



Valuable raw materials are created from critical waste

The issue of raw material conservation and the question of safe disposal of raw materials have rapidly gained in significance over recent years. Almost all raw materials are in greater demand worldwide than ever before. At the same time the volume of waste and other residual materials is growing exponentially. We need to break this vicious cycle and – following nature's lead – close the raw material loop far more frequently. Waste and residual materials must as a matter of principle be processed into new raw materials. This is what happens with Ecoloop. This innovative process, which Fels helped to develop, makes it possible to produce a new source material from waste and residual materials that are otherwise very difficult to recycle. For instance the conversion of carbon carriers into highly pure synthesis gas (see page 64) with the help of lime. These substances include solid biomasses such as chlorine-containing plastics and deadwood. Ecoloop will help many companies reduce their use of fossil fuels (coal, oil gas) and improve their CO₂ balance over the long term. The technology can be transferred with almost no limitations to industrial applications worldwide. If it is possible to achieve sustainable technical and commercial success, Ecoloop could become a new field of business for Xella over the long term.

Big bags for building site waste

There is great potential for recycling residual Ytong autoclaved aerated concrete and Multipor from building sites. This high quality material can be reused in production processes as a replacement for sand. We have developed special yellow bags – the Ytong and Multipor Big Bags – for collecting the material and these will prove themselves in practice. The bags are currently undergoing suitability testing. One bag has a capacity of some 0.8 m³. After use the Ytong and Multipor Big Bags will be recycled again and new plastic products produced from them.

Research and Development

Xella runs its own Research and Development Center which is located close to Berlin. The Xella Research and Development Center is responsible for basic research, product development and quality monitoring. This is the starting point for new momentum in the development of sustainable products and efficient building technologies – and where new climate protection and healthy living ideas are born. The center's staff is continuously working on further innovations in the area of energy-efficiency. In particular, the full potential of Ytong autoclaved aerated concrete is far from exhausted and will facilitate further improvements in the thermal insulation of buildings with systematic continuation of research. The center furthermore ensures that domestic and European initial approvals for building products and methods are issued. It also assumes responsibility for representing technical interests on national and international standards committees and trade associations. The Research and Development Center is accredited by the Deutsche Akkreditierungsstelle (German Accreditation Body – DAkkS) in accordance with the international ISO 17025 testing standard for various areas of building material testing. The center is subject to an annual independent audit.

Developing sustainable products and technologies

The Xella Research and Development Center tests all raw materials needed in production for their suitability and purity. By doing so, we ensure that no toxic or unhealthy substances can contaminate processes or products. Our products are developed in cooperation with scientists and technicians and subjected to complicated testing procedures. The foundations of our research are based on the three specialist areas:

1. Research into innovative products, processes and alternative technologies which encompasses analytics, pilot plants, a mortar laboratory and building material testing. This is where fundamental research is undertaken, innovative products and alternative technologies are researched and their application investigated.



2. Applied research which is concerned with component testing and development together with suitability testing of plaster, mortar and composite thermal insulation systems.
3. The building physics department which is involved with research into finding the right technologies for better building over the long term. The core subjects of building physics research are heat, moisture, fire protection and noise insulation.

The testing center ensures that internal quality guidelines for products are complied with and assured and that only building products are brought to market that meet national and European requirements.

Knowledge Transfer

Xella has for several years been training and supporting young specialists by providing finance and sharing knowledge. To this end Xella supports various educational institutions, organizes competitions and sponsors selected projects.

Two events – one objective

An annual series of events takes place at various Xella sites throughout Germany with the spring and fall forums. These provide an opportunity to inform primarily planners and architects about current modernization (spring) and new building (fall) issues. Customers are also educated on the latest standards, changes and developments. During the course of such meetings high-profile speakers deliver presentations on current industry issues. To-date some 400 participants have attended the spring events and over 1,800 attended the fall events at the six respective locations. These events are not only successful customer loyalty initiatives for Xella; they also drive the dissemination of specialist knowledge.

“Build in accordance with the new Energy Conservation Act and shape resource efficiency today and tomorrow!”

Motto of the 2012 fall forum

“Successful and sustainable modernization”

Motto of the 2013 spring forum

Energy consultants recertified

Energy consulting has not only become a huge field of activity as a result of official energy policy. After all, almost 40 percent of European energy consumption is attributable to buildings. Since 2009 over 300 Xella employees in Europe have undergone training as energy consultants during four-day courses held at Xella's in-house Research and Development Center. Upon completion of the course their knowledge of heating and building technology, moisture and mold, noise insulation and energy consumption is certified by the testing and certification agency "DEKRA". The consultants prepare complex calculations



relating to energy efficiency and thermal bridges and act as expert partners to their customers, offering specialist skills that extend far beyond the limits of straightforward product knowledge. Technical advances and new directives makes recertification every three years a formal requirement.

Our German energy consultants – which include almost all of our sales staff – have already completed their recertification. Advanced training courses for their international colleagues will be held through 2014. The same applies to over 100 customers that have also successfully completed training.

Symposium for better quality of life

At the beginning of 2012 Xella invited architects and civil engineers from Bosnia-Herzegovina to attend the international “Modern approaches to energy efficiency in architecture and civil engineering” symposium in Sarajevo. 300 participants learned about current trends in civil engineering and various building materials for achieving future energy efficiency standards – up to and including the passive house standard. The objective was to make people in Bosnia-Herzegovina more aware of how a better quality of life is possible through energy-efficient houses. A panel discussion was also held, in addition to specialist presentations on energy efficiency, passive building principles, the application of new technologies at the project planning stage of modern buildings and specific project planning problems. Interested parties were also able to follow the presentations and discussions live on the Internet.

Roadshow through the Puszta

In Hungary Xella organized a country-wide roadshow in cooperation with six construction companies. Seven events were held overall. Alongside smaller product presentations the company also gave lectures on subjects such as responsible architecture, the lifecycle analysis of buildings and the characteristics of ecological buildings. All of the information was

illustrated with the help of a model house. Overall, the roadshow attracted between 1,000 and 1,500 visiting architects and engineers. In Poland Xella is supporting a program for women who are building houses – or want to do so. The objective here is to raise their awareness of the building process to a higher level and incorporate them into that process. To this end, small scale informal meetings were held at cafes. The discussions – which dealt with the topic of how to specifically prepare for building energy-efficient homes – were led by teams of experts. To-date 120 women have already attended at six meetings. After the meetings many participants asked local experts to provide help with their own houses. Meetings were also organized for facility managers and renovators of apartment blocks. The subject here was how to use interior insulation in old buildings where external insulation is not an option. A total of 300 participants at five events was a great success for us.

Award-winning product navigator

The German Sustainable Building Council (DGNB) has developed an exceptional tool that provides all parties involved in the product selection process – from engineers through architects, planners and construction companies right through to investors and auditors – with all of the key information they require in a fully transparent manner: The “DGNB Product Navigator”. As one of the first suppliers involved, Hebel received the “DGNB Navigator Label” for the outstanding quality of its database. The Navigator is intended to guide users through the relevant product data, document the product quality in terms of sustainability standards and provide the target groups with specific product recommendations.

Fields of Action

Processes



Recycling with Quality



Gypsum fiberboard residues generated on construction sites can be reintegrated into the production process.

For this purpose, a recycling plant was built in just nine months – during ongoing production – at the Fermacell factory in the Dutch town of Wijchen. This plant reprocesses residual gypsum waste from construction sites or demolished buildings so that it can be reintegrated into the production cycle.

Gypsum is nearly one hundred percent recyclable without any loss in quality. The approximately 15,000 tons of gypsum recycled at Wijchen already equates to 15 percent of our processed raw materials. The plan is to increase this to at least 20 percent. All parties involved profit from gypsum recycling: Construction companies have less waste to dispose of while Fermacell pays 30 percent less for the raw material and also saves transportation costs for fresh gypsum.

Despite an investment of over one million euro, the recycling plant will probably take just 18 months to amortize. Fermacell primarily uses FDG gypsum obtained from flue gas desulfurization plants at power stations, which is of above average purity. FDG gypsum can be mixed with recycled gypsum and paper fibers from recycled paper, before being processed into Fermacell gypsum fiberboard panels. It is likely that we will now only need to purchase a small volume of additional gypsum this year, thanks to the new plant in Wijchen.

Resource Conservation

In the context of sustainability, natural and in particular renewable raw materials are advantageous. However, the general rule is that the fewer resources taken from nature and the more products that are reprocessed into raw materials at the end of their lifecycle, the more sustainable is the overall value-added process. Xella has set itself the objective of closing the raw material loop as often as possible in terms of its production processes and the products themselves.

The most important components of all Xella products are natural raw materials. Sand, lime, cement and water form the basis of Ytong autoclaved aerated concrete, Silka calcium silicate blocks, Multipor mineral insulation boards and Hebel compound units. Fermacell uses paper fibers, gypsum, cement and other mineral aggregates. These basic materials are found everywhere in nature and are extracted naturally. Wherever possible we use secondary raw materials and endeavor to apply the Cradle to Cradle principle (see page 16).

Further reducing bulk density

Xella has been involved for many years in researching how to reduce the bulk density of Ytong autoclaved aerated concrete. This would offer two decisive advantages: Improved insulation and lower weight. Air is the

best medium for insulating exterior walls. The greater the number of air entrainments in aerated concrete, the better its thermal insulating properties.

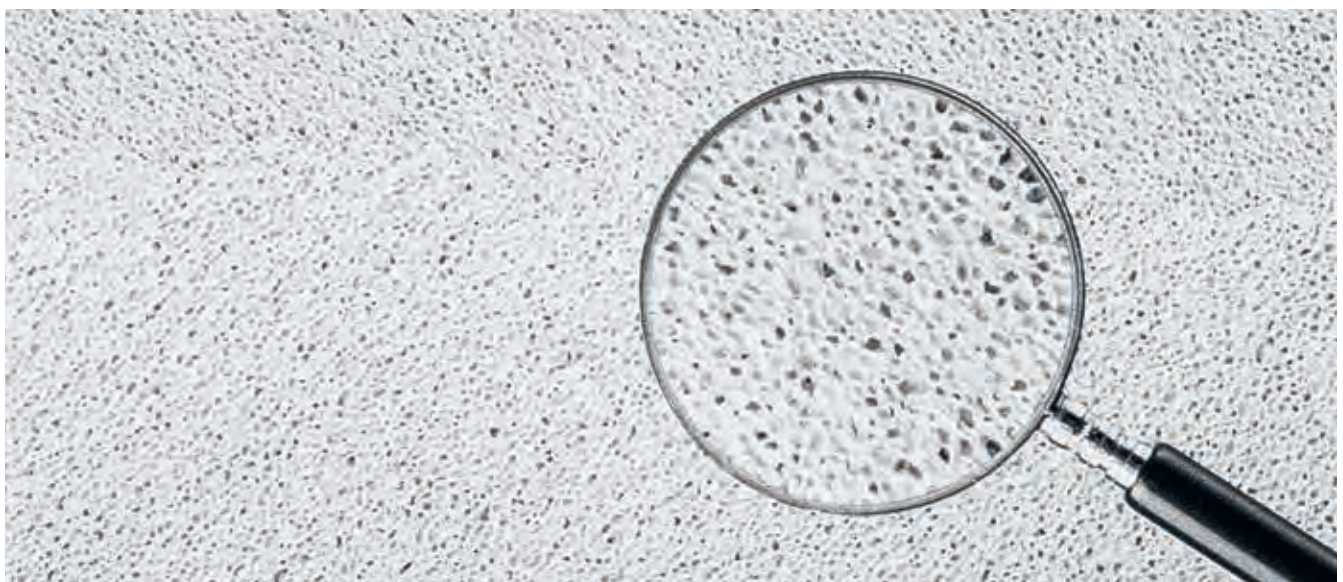
At a bulk density of 250 (kg/m³) for the Ytong block this equates to 0.07 W/(m² K) – one of the best insulation values for solid construction materials. A low bulk density also ensures lower weight. This means that the building material is easier to work with, saves energy during transportation and consumes fewer raw materials.

Fly Ash as a Secondary Raw Material?

Fly ash, which is produced in power stations as an anorganic concentrate of non-flammable impurities in coal, is a very common secondary raw material. However, for quality assurance reasons, Xella uses no fly ash at its autoclaved aerated concrete plants.

Negative impact on the quality of autoclaved aerated concrete:

- A high proportion of SiO₂ affects the strength and shrinkage properties
- Quality fluctuations make achieving uniform product quality difficult
- High quality fly ash is expensive and rare
- Dark coloration
- Possible contamination with pollutants



But the blocks may not exhibit any shortcomings in terms of their structural loading – the stability and load-bearing strength of the walls must still be guaranteed. This reflects the importance of product development. The exact opposite is true in the case of Silka calcium silicate blocks for interior walls. These must offer the highest possible bulk density while not becoming overly voluminous. This is the only way to achieve a high level of sound insulation in the smallest space.



Gypsum waste as a new raw material source

Gypsum fiberboard from Fermacell is manufactured from gypsum, recycled paper fibers and water – without the addition of binders – in a resource-conserving process. No waste is generated within the manufacturing process; the raw materials

remain within a practically endless cycle of use (Cradle to Cradle) while production-related waste products and wastewater are fully reintegrated into the manufacturing process.

Although the gypsum needed to manufacture the boards does occur naturally, we primarily use FDG gypsum which is a by-product of the flue gas desulfurization process at power stations. Tests have confirmed that FDG gypsum possesses the same mineralogical structures as naturally occurring raw materials and is even of above average purity. During the coal burning process, flue gases are generated that are subsequently desulfurized using lime. The material cycle is perfectly complemented with the use of recycled paper to manufacture Fermacell gypsum fiberboards. Fermacell Aestuver fire protection boards utilize recovered glass in the form of foam glass, reducing product weight and therefore transportation costs.

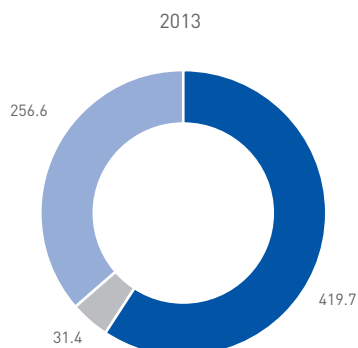


Comprising solely gypsum, recycled paper fibers and water: Gypsum fiberboards from Fermacell

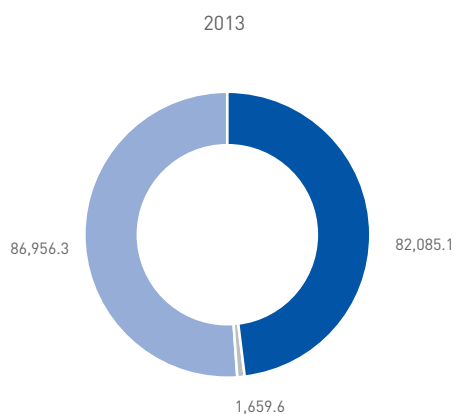
Aerated concrete granulate for feline hygiene

All production waste from Xella's aerated concrete and calcium silicate block factories can be reused. Residual waste material, for instance from the modeling process, is returned to the mixing process. Already hardened production waste is ground into granulate or returned to the mixer in crushed form, along with any dust produced in the process. At the Alzenau factory for example, some 100,000 tons of demolished aerated concrete is processed into 25,000 tons of granulate each year. Depending upon its quality, Ytong granulate from Germany is marketed as a levelling fill for floors, an oil binding agent or as cat litter, and has received an Environmental Product Declaration (EPD) for environmentally friendly products.

Total weight of hazardous waste (in t)



Total weight of non-hazardous waste (in t)



■ Building materials ■ Dry lining ■ Lime



For the love of animals

The Xella company SILIKALZIT sells 60,000 tons of aerated concrete granulate each year. In addition to litter for animal hygiene, its product range includes various binding agents for oil and chemicals

released during fires and oil spills, chemical accidents and industrial leaks, together with agents for changing the consistency of fluids or viscous substances. Furthermore, calcium silicate hydrate, from which aerated concrete is made, is also suitable for preventing long-term consequences for nature and the environment, e.g. through soil or water contamination. Of the 90,000 tons of aerated concrete waste that Xella processes into granulate each year, SILIKALZIT markets 41,000 tons for animal hygiene products alone.

In addition to the marketing of aerated concrete granulate, SILIKALZIT has a further recycling market in its sights: Phosphate. Large amounts of this essential salt are found in sewage sludge, but it has to-date been impossible to extract them. SILIKALZIT is currently investigating whether phosphate can be recycled using a process it has developed together with the University of Darmstadt. These investigations are now at the testing stage.



Conserving process water

The water needed to manufacture autoclaved aerated concrete mostly comes from wells located directly on-site. This water is used both for mixing raw materials and generating process steam. A large proportion of this steam, which is used for pressure hardening, condenses and is channeled back into the mixer. Our production plant therefore allows almost one hundred percent of this condensate to be recovered and recycled.

The condensate is also used for other applications, for instance in our sanitary facilities. At some of our factories the condensate is treated and fed into the local drainage system. Rainwater – as well as ground and fissure water from quarries – is also used in production and for washing processes. The cooling water required for saws is repeatedly used in a closed loop.

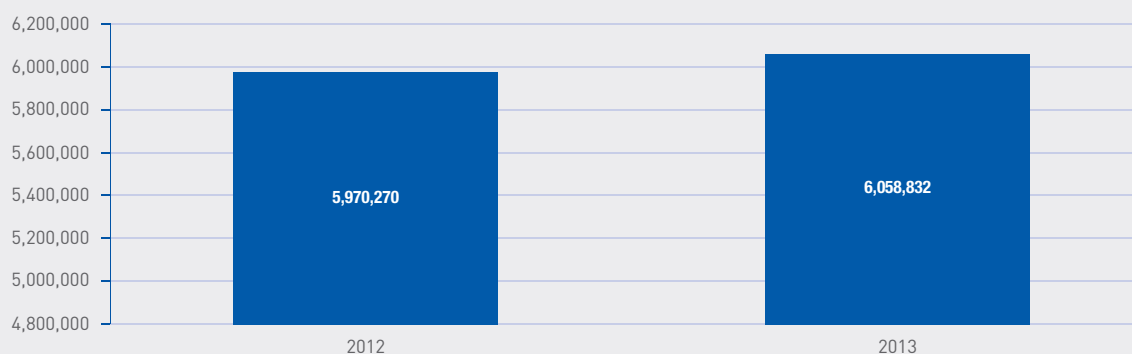
Resource-efficient processing of limestone

The lime is quarried, transported and then classified according to its intended application. This allows all processes to be operated in the most energy and resource-efficient manner possible. The required fresh water is extracted from either natural streams or on-site wells.

Lime products from Fels are fired in industrial kilns which, thanks to optimized combustion processes and waste heat recovery, achieve thermal efficiencies of up to 85 percent. Systematic noise reduction programs are implemented at all Fels factories with the objective of decreasing noise emissions. Using digital models it has been possible to identify – and significantly reduce – the main sources of noise affecting our neighbors.



Water consumption (in m³)



■ Xella Group



The Closed-Loop System in Focus

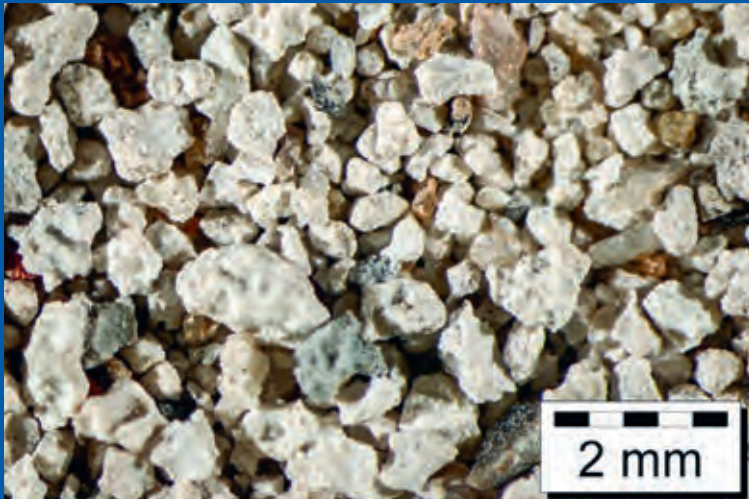
According to the German Federal Office of Statistics, of the some 386 million total tons of waste that accrued in Germany during 2011, construction and demolition waste accounted for almost 200 million tons. This can be classified into the material groups mineral construction waste, road construction waste and building site waste. These include aerated concrete and gypsum-based construction waste. A large proportion of these waste materials can be re-used as aggregates in recycled building materials, e.g. for road building, in the manufacture of asphalt and concrete or in landfill site construction. However, some building site waste still remains to be disposed of.

With this inconceivable volume of waste it quickly becomes clear that, in terms of a resource-conserving approach, the issue of recycling is particularly significant to the building materials industry. We are not so much concerned here with so-called downcycling – in which the treated rubble is re-used for a different purpose, e.g. road building – but with recycling the waste as autoclaved aerated concrete. Xella has decided to set itself the objective of closing the material loop for autoclaved aerated concrete.

70 percent recycling from 2020

This is our response to the European Waste Framework Directive, pursuant to which at least 70 percent of all construction and demolition waste must be recycled after 2020. It must furthermore be expected that building material manufacturers will be faced with a take-back obligation for building materials once this directive enters into effect. The challenge is huge: In order to be able to re-use or recycle building materials they must first meet the corresponding requirements relating to their grade of purity. In particular, they may not contain





contaminants and should where possible be free of foreign substances. Bitumen residues from old roofing sealants, for example, would cause unattractive discoloration in new autoclaved aerated concrete. Old nails, screws, anchors etc., are even worse – because they can cause manufacturing defects.

In line with the “Disposing and recycling of autoclaved aerated concrete” project run by the Xella Research and Development Center in Brück near Berlin, we have been investigating since 2011 how and in what quantities residual autoclaved aerated concrete from demolished buildings or landfills can be recycled for producing new autoclaved aerated concrete. Around 10 percent – and even up to 15 percent, depending upon its quality – of the pure autoclaved aerated concrete from landfills can be recycled for new production. Today, unsaleable production waste from Xella’s autoclaved aerated concrete plants is already being treated and fully reintegrated into the production cycle.

The quality of the waste is the decisive factor

The decisive factor for successful recycling is therefore primarily the quality of the autoclaved aerated concrete recyclate. This is carefully analyzed before the material is reintroduced into the production cycle. The Research and Development Center is therefore undertaking a pilot study to investigate the chemical and mineralogical composition of the supplied building waste. Among others, this study focuses on the analysis of grain sizes, the heavy metal, polycyclic aromatic hydrocarbon (PAH), bitumen, sulfate and total organic carbon (TOC) content. Even if valid results will only become available in several years’ time, we can already conclude that autoclaved aerated concrete waste is fundamentally suitable for recycling.

Energy Efficiency

Over ten years ago Xella started to introduce a professional energy management system at its factories in order to identify and implement energy saving measures. Despite the effort involved in organization and logistics, this has been a worthwhile undertaking. Even considering the advances that have already been made, further potential for savings is consistently being uncovered. Making just small changes can often have a large impact.

Although we have managed to reduce direct energy consumption in 2013 by 13.74 percent compared to 2011, production at the building material business unit decreased by only 7.9 percent. This was achieved through a range of individual measures such as more efficient use of steam and better heat recovery during the production process. Investments made in energy-efficient machines and plant also paid off in this respect.

Eastern Europe in focus

The new European Energy Efficiency Directive adopted by the European Parliament stipulates binding energy saving targets for energy consumers in the Member States by 2020 and requires large corporations – including Xella – to conduct energy audits every four years. In other words, they must carry out a review of their energy status. This requirement is not yet binding because it must still be transposed into national legislation. In the meantime however, Xella has been performing its own audits. Initially the western European factories were inspected and their energy use optimized. Now the focus has shifted to Eastern Europe. Special energy assessment programs have been developed so that the sites can be subjected to a standardized energy efficiency audit. The result of this assessment – the energy status – is presented for each factory in the form of the Xella Energy Pass, specifically developed in-house for this purpose.

The modernized Xella factories include the Polish autoclaved aerated concrete factory in Milicz, where a new steam generating plant has been installed. During the course of its replacement it made sense to convert the plant from a coal to a natural gas-fired system. In

addition to substantially lower fuel costs, natural gas is also much more efficient and therefore emits significantly less CO₂. The results of this investment are clear to see: It has been possible to reduce the specific energy consumption of the factory by 66 percent and the CO₂ emissions by as much as 80 percent. This saves the equivalent of some 10,000 tons of CO₂ annually.

A roof that saves energy

Lightweight roofs also play their part in saving energy at Xella. Arched roofs have been installed at our Alzenau and Rotenburg sites following a suggestion by an employee. These roofs enable some 3,000 tons of demolished aerated concrete waste to be stored in dry conditions, protected from rain and snow. But their open construction brings even bigger benefits by allowing the sun and wind to reduce the residual moisture in the aerated concrete granulate. Our dryers now consume some 70 kilowatt-hours less energy per ton. This reduces costs by around five percent and protects the environment through lower CO₂ emissions. It has also been possible to increase granulate production as a result of the dry raw material.

Multiple use of steam

Ytong and Silka blocks are hardened at temperatures of 190 degrees Celsius in hardening chambers (autoclaves). The steam necessary for this requires a large amount of energy to generate and is used multiple times by being directly channeled from autoclave to autoclave or temporarily stored for use as required. Furthermore, waste heat from the autoclaves is routed through heat exchangers and employed to heat the process water, thereby saving energy. If its energy level is no longer sufficient for production, the waste heat is used for indoor heating purposes. This allows us to save some three million kilowatt-hours of primary energy annually in Germany alone – equivalent to heating 100 single-family homes for one year. The reduced consumption of natural gas saves approximately 600 tons of CO₂ emissions.



Feasibility of generating energy in-house

Xella is currently assessing the feasibility of generating energy in-house at four sites. However, the viability of this depends upon four different factors – including the cost of energy. We are completing calculations among others on the installation of three combined heat and power plants (CHP) and the feasibility study for the factory at Calbe is at a relatively advanced stage. There, the existing heat supply could be effectively supplemented by a CHP plant. The simultaneous generation of heat and electricity is particularly productive and

environmentally friendly because of the higher overall efficiency achieved. Depending upon the size of the plant the efficiency of generating electricity in this way lies between 25 and 50 percent. By utilizing the waste heat close to where it is generated, combined heat and power plants can achieve savings in primary energy of up to 40 percent. We are also studying the feasibility of generating electricity using a micro gas turbine at a fourth site.

Logistics

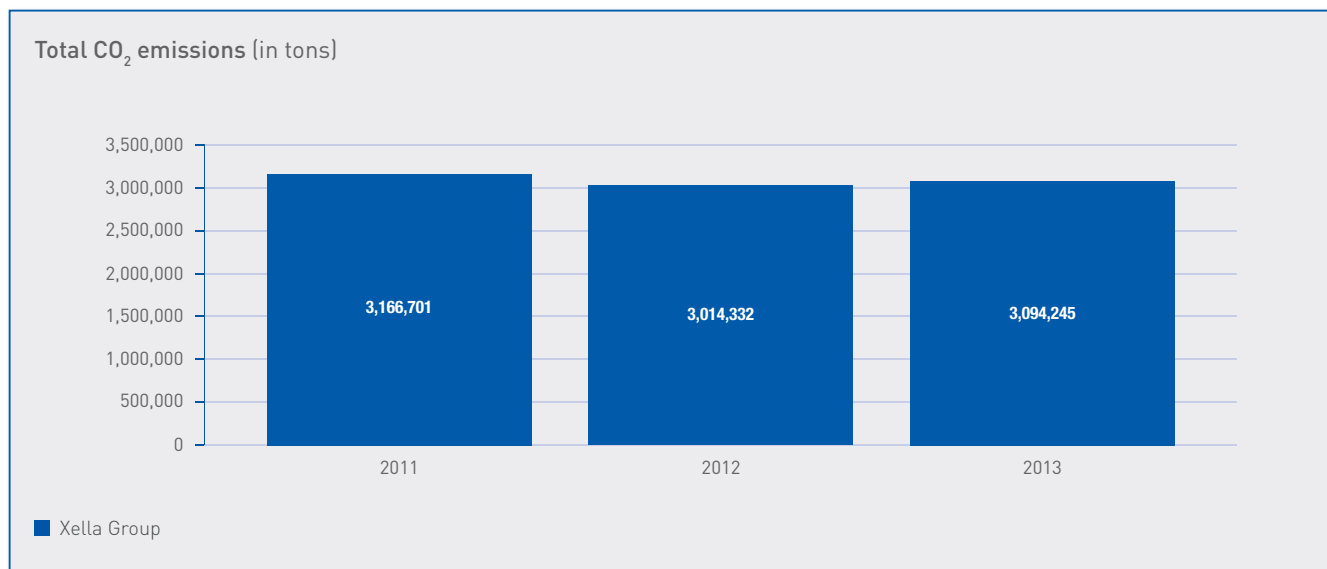
Xella relies on energy-efficient modes of transport and short transportation distances in order to protect the environment and save costs. This already starts with the selection of a production site. The necessary raw materials should where possible be sourced from regional suppliers a short distance away. Lime and cement usually have to be transported over 50 to 150 km to the respective Xella production facility. Sand is normally sourced from the immediate vicinity of the factories.

Environmentally friendly transport over short distances

But it's not just about the distance over which the raw materials travel: The transportation distance of the

finished products to the customers should be kept as short as possible too. The average distance is between 50 km and 200 km. Whenever possible and where appropriate, we ship using environmentally friendly rail or – in the case of the Fermacell factory in Wijchen, the Netherlands – by ship.

Xella is increasingly using rail transport in place of trucks. For example, the 1,380 km rail journey from Ostroleka in Poland to Kumla in Sweden has reduced CO₂ emissions by 16 percent compared with sending the shipments by road. Supplying our Swedish warehouse in Hallsberg by rail saves at least 400 tons of CO₂ emissions per annum and by expanding in intermodal transportation using



a combination of rail and road haulage from the Netherlands and from the Harz region in Germany to Italy, we have been able to reduce CO₂ emissions by 500 tons per annum.

Mortar shipments from the Netherlands and Multipor deliveries from Cologne to our Pontenure factory in Italy were previously completed by road alone. Now, the pallets are transported by truck to the rail terminal in Belgium or Cologne from where the semitrailers or swap bodies are transported by train to Gallarate or Domodossola in Italy. They are then unloaded and continue their journey by road to Pontenure. This equates to just 240 km by truck – instead of 1,100 km – for mortar, and 130 km instead of 890 km for the Multipor shipments. The resulting benefits are not only a 60 percent or 800 kg/truck reduction in CO₂ emissions (for mortar) and a 68 percent or 540 kg/truck reduction (for Multipor), but transportation costs are reduced too.

For domestic sales in southern Italy we now also use rail transport from our Pontenure site to Bari and Naples, instead of importing materials by truck and ship from Bulgaria. Following a short journey by truck from Pontenure to the rail terminal in Parma, the pallets are transshipped from rail to truck and delivered to customers. This means that the distance travelled by road is only 50 km instead of up to 800 km. It has allowed us to reduce our shipping costs by over 10 percent. CO₂ reductions amount to minus 81 percent or two tons/truck to Bari and minus 83 percent or 2.15 tons/truck to Naples.

The “Green Harz” project

Since 2005 Fels-Werke GmbH, in cooperation with the “Havelländische Eisenbahn” railroad company (HVLE), has been operating the “Rübelandbahn” railroad in Germany’s Harz Mountain region entirely under its own management. Over two million tons of lime and limestone are transported over the almost 15 km long line each year, representing more than 60 percent of all Fels shipments in the Oberharz (Upper Harz) area. This means that we have been able to further increase the volume of goods we transport by rail compared with road transportation and make an additional contribution to protecting the environment.

But we do not intend to stop here. In line with the Eco Rail Innovation initiative, which is aimed at strengthening railroad traffic from both a commercial and ecological perspective, Fels – together with partners in the storage technology and production sectors – has launched the “Green Harz” project. The objective is to operate trains on the traditional railroad with no CO₂ emissions at all. The basic principle is to convert the braking energy created as a result of the exceptional downhill gradients into electricity, store it and then use all of this energy to power the next train journey. This offers huge potential – depending upon the railroad technology employed. Furthermore, recovering energy in this way also saves up to 700 tons of CO₂ per annum. In a second stage, it would be possible to generate the remaining traction current solely from renewable sources. This would then make the railroad fully CO₂ neutral.

Environmental Protection and Biodiversity

The open-face quarrying of limestone and its processing in grinding facilities and lime kilns are a considerable intervention in nature and the environment. Fels ensures that every open-face quarrying area is “handed back to nature” again once limestone quarrying has finished. But the huge holes are not simply filled with spoil or waste. To obtain an open-face quarrying permit the applicant must agree to the subsequent renaturation of the site. This could potentially only take place decades or even centuries later – because the lime industry must plan for the long term.



Limestone quarrying since 1938: Open-face quarry in the Harz region

Minimizing the environmental footprint of limestone quarrying

Limestone has been quarried at the Winterberg open-face site since 1938. The permitted reserves are still sufficient to continue operations through 2040. Over the past 75 years the workers have not just quarried limestone from the mountain, but also unusable material called spoil. The spoil tip created is now 800 meters long and almost 35 meters high. While nature has been slowly reclaiming the tip since the 1970s, human help is required to ensure proper renaturation. Topsoil must be spread on the tip so that green shoots can again take root. Even the maximum gradient of slopes is stipulated in detail. Currently an area of spoil tip measuring almost 190,000 square meters is undergoing regeneration here.

Niches are driven into the steep walls of the quarries that birds can use as safe nesting places. Bats are making themselves at home in these caves too. With no active assistance at all, eagle owls have secured

their hunting ground despite ongoing quarrying operations. The steep sides prevent other predators from feeling too comfortable. Lizards can also be found here. At the former Hornberg open-face site groundwater (from karst sources) has already filled the depression. This flooding has resulted in an increase in biodiversity in the area because different landscapes are formed – not simply rocky territories and open spaces.

Renaturation using innovative processes

Fels not only provides lime for the renaturation of the newly created lake landscape in Lusatia and the central German lake district; the company has also developed an innovative neutralization process with the submerged floating pipeline with nozzles (German: GSD, “Getauchte Schwimmleitung mit Düsen”). The water in the former open-face lignite mines is extremely acidic as a result of its reaction with exposed minerals. In this process a lime mixture that increases the water’s pH value and ensures lower acidity, is pumped under high pressure into the lakes via a pipeline (GSD) that runs beneath the surface of the water. The degree of success is measurable. Before this process commenced in 2011 the pH value was still around 2.9. However measurements made in 2012 indicate that the pH value has already increased to between 5.5 and 7.0. The reason the pH value is not even higher is because groundwater and water from surrounding rivers continues to flow into the lakes. Introducing the lime is a major logistical challenge for the specialists from Fels. After all, some 100 million cubic meters of water will need to be regularly treated with lime for many years to come.



Lime mixture is pumped from the GSD pipeline into water in the open-face mine

Lime binds many toxins

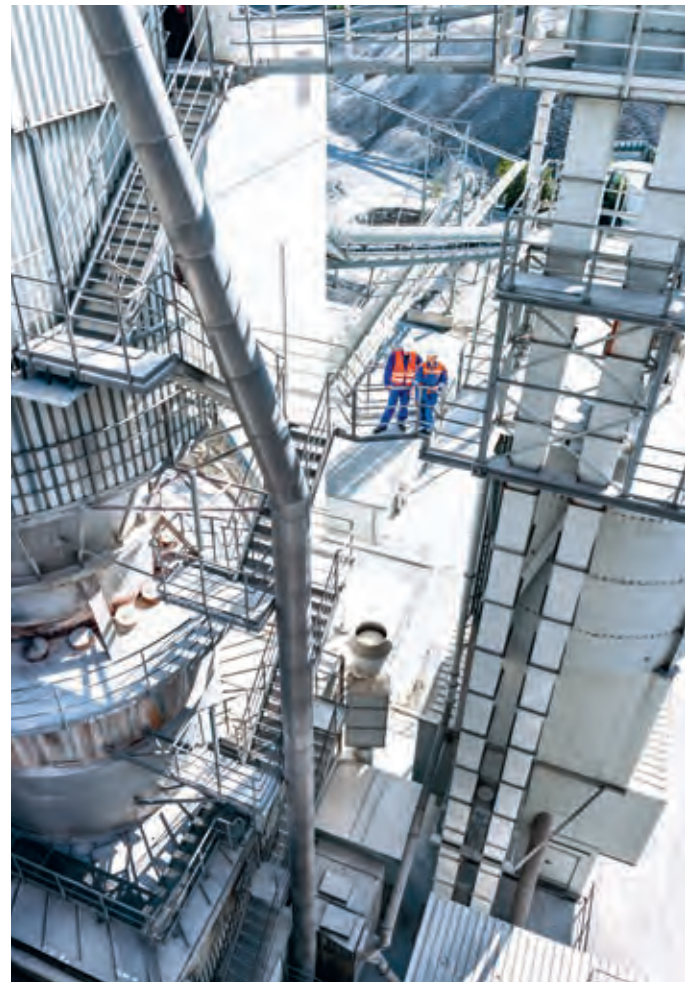
Lime is used in the wastewater treatment process for two different purposes: Lime mixture produced from dry hydrate serves to maintain the pH value in clarification tanks at a neutral level, otherwise the required metabolic activity of the bacteria in these tanks will not take place. Wastewater naturally contains a large amount of organic material – and therefore carbon. At the treatment plant the water is enriched with so-called activated sludge and the microorganisms in this sludge break down the carbon. This forms carbonic acid which is neutralized with around 40 grams of lime mixture per 1,000 liters of water. The lime supplied by Fels is sufficient for treating 50 million cubic meters of water annually. Quicklime is furthermore used for disinfecting and drying the sewage sludge. This prevents the risk of infection e.g. with salmonella, and creates a granular “crumbly” sludge consistency. Because the sewage sludge is used as a fertilizer, the lime content also provides an effective treatment for acidic soil.

Clean energy not environmental pollution

The special toxin-binding characteristics of lime are also used in the award-winning Ecoloop process which generates synthetic gas from residual or waste materials that contain carbon (plastics, biological waste etc.). In this innovative process, aggressive substances such as the hydrogen chlorides released from plastic waste during normal production are immediately bound to the very large lime surplus as soon as they are formed. Because no combustion takes place inside the reactor – just gasification – harmful toxins such as dioxins or furans are not even produced in the first place. These poisons are only formed when carbon is burned in the presence of oxygen. Flue gases, that require complex cleaning, are not generated at all in the Ecoloop process.

The core element of Ecoloop is the generation of pure gas through the synthesis or thermal cracking of carbon carriers in a closed-loop system with the addition of lime (see illustration on page 65). The synthetic gas produced is a mixture of methane, hydrogen and carbon monoxide

and can be used as a full substitute for fossil fuels in industrial applications, for the highly efficient generation of electricity and in future as a chemical raw material for production purposes. The 32 megawatt pilot plant located at the Kaltes Tal lime works in the Harz region of Germany is at the final stages of commissioning and therefore undergoing trial operation. The synthetic gas will be used as a regular fuel for lime production and will replace natural gas in four lime kilns at the Harz plant.

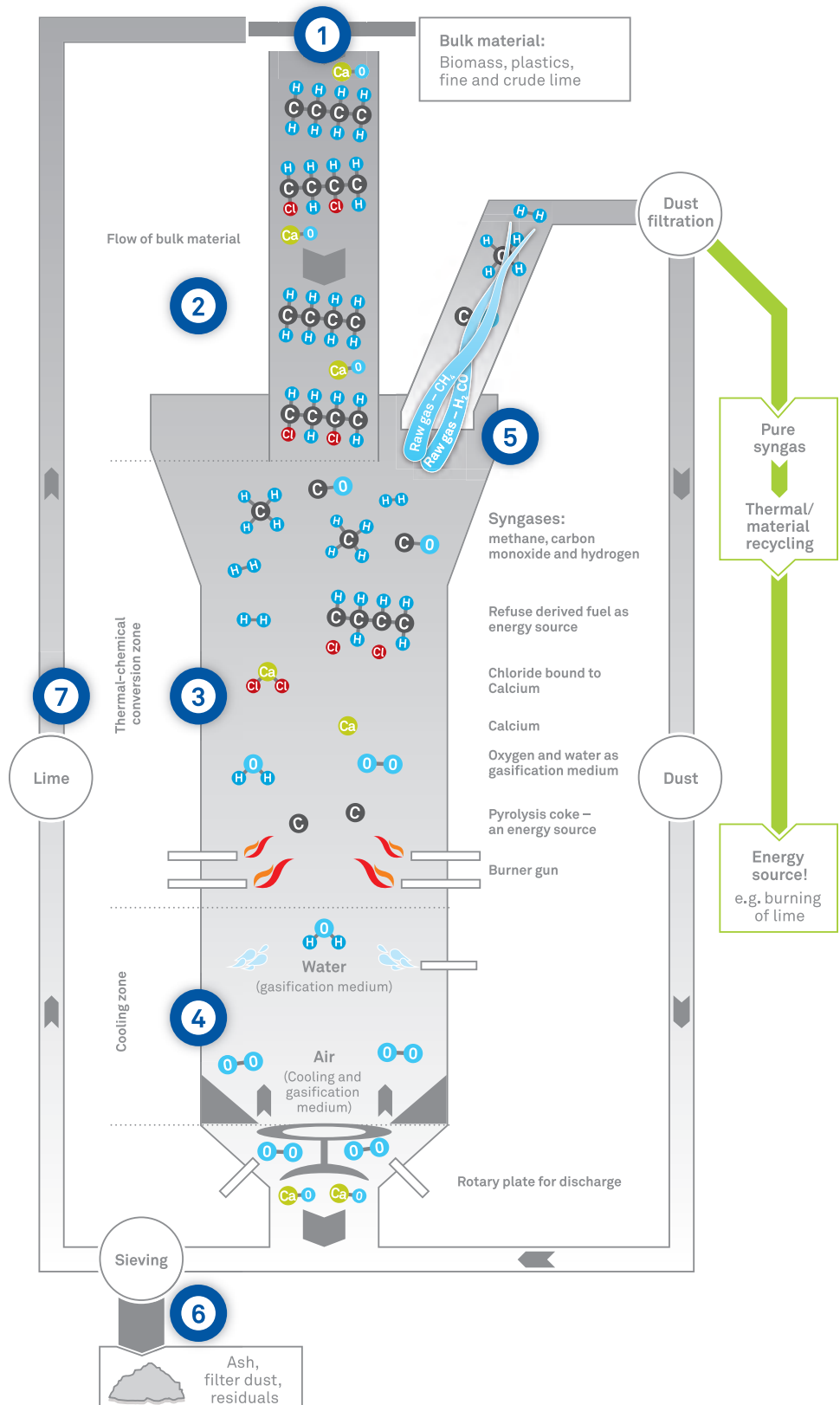


Ecoloop pilot plant at the Kaltes Tal lime works

Ecoloop technology, currently in the trial stage, can also be transferred to other industrial applications worldwide. Ecoloop makes a location-independent energy supply possible and allows us to contribute to conserving natural resources.

The EcoLoop Process

- 1 The input material is mixed in with the lime before getting into the hot reactor zones.
- 2 The material is moved by its own gravity and controlled by a rotary table discharge.
- 3 After the gasification in the upper pyrolysis zone, the remaining pyrolysis coke moves into the firing zone generating energy for the process.
- 4 In the cooling zone, the lime is cooled down by the gasification agents air and water while the heated gasification agents contribute to the energy efficiency of the process.
- 5 Syngas is extracted at the upper reactor head whereby the harmful substances are bound to the fine lime.
- 6 Harmful substances are sieved out with the fine lime and ash.
- 7 Crude lime is returned to the process.



Fields of Action

Staff



Expertise for All

Qualified and motivated managerial staff and employees are the most important basis that will ensure sustained success for the Xella Group. This is why we motivate and support our workers by offering them opportunities and benefits aimed particularly at their professional development. Recognizing and developing our employees' capabilities is just as important to us as retaining our staff over the long term.

The Human Resources Management (HRM) department at Xella is tasked with creating organizational and human resource structures that will allow our employees to fulfil their professional and personal potential to the full and ensure that their skills and aptitudes are correspondingly utilized. But we can't only rely on the existing workforce to secure the company's sustained success. It is also important to achieve the right individual balance between employees that have gained many years of experience with the company and bringing in new talent. This means on the one hand that we must permanently recruit suitable workers from the job market, while on the other we must ensure that our existing employees develop their skills to the best of their abilities. A further key issue lies in maintaining the attractiveness of our company, with the primary aim of retaining employees that have Xella-specific knowledge over the long term.

14.6

The average length of service of Xella employees is 14.6 years.



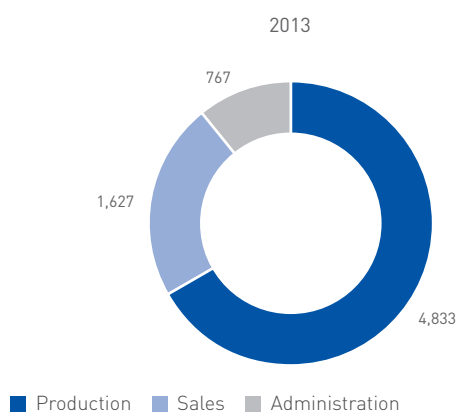
Human Resources

During the course of financial year 2013 the number of employees* decreased from 7,306 people to a total of 7,227 worldwide, which represents a reduction of 1.1 percent compared with the previous year. The number of employees working for the Xella Group has therefore remained constant over the past five years. The structure of the workforce has not changed significantly compared with last year. At the end of 2013, 66.9 percent of our workforce was employed in production (2012: 67.3 percent), 22.5 percent in sales and marketing (2012: 21.0 percent) and 10.6 percent in administration (2012: 11.7 percent). The majority of the workforce was employed in Europe with 42.2 percent located in Germany alone. 47.9 percent of our total workforce was employed in 24 other European countries while some 7.6 percent

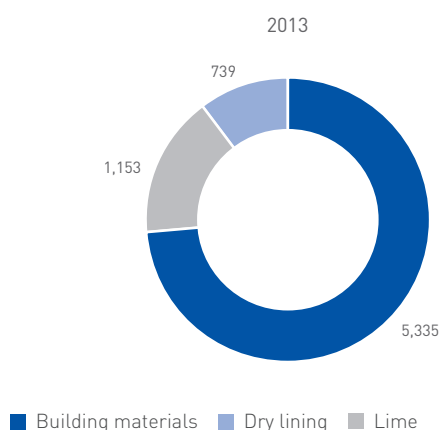
was employed in Asia and 2.4 percent in North and Central America.

At the end of the year 73.8 percent of the workforce was employed in the building materials business unit, 10.2 percent in dry lining and 16.0 percent in lime. The distribution of the workforce was similar in 2012. The ratio of full-time to part-time employees throughout the Xella Group has remained almost unchanged over the past two years. At the end of 2013 we employed 6,725 (93.1 percent) full-time and 335 (4.6 percent) part-time employees together with 19 trainees and interns (0.3 percent). We trained 148 young people (2.0 percent). In addition to these employees, 332 temporary workers were employed within the Xella Group (previous year: 376).

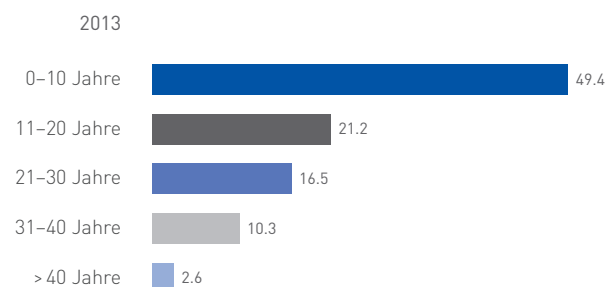
Workforce structure by department



Workforce structure by business unit



Workforce – length of service (in %)



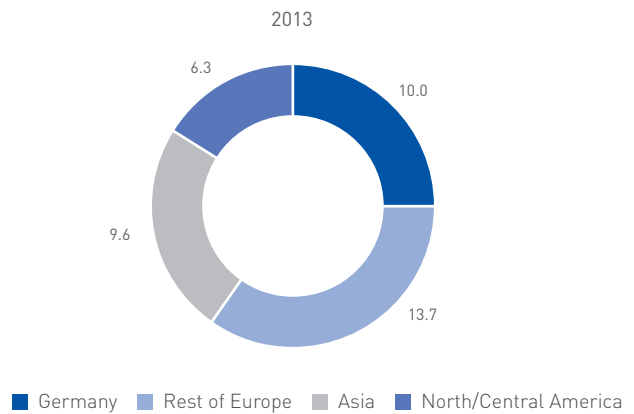
The group-wide employee turnover rate during 2013 was 6.6 percent (2012: 6.7 percent). The turnover rate is the ratio of employees leaving the company (excluding retirements) to the average number of permanent employees for that year. At the end of 2013 the number of permanent employees equated to 88.4 percent of the total Xella Group workforce (2012: 88.2 percent). The average length of employment with the Xella Group was 14.6 years – the same as last year.

* At Xella, all human resources key indicators are differentiated by business unit, department and region.

Diversity

As a company with a global presence, we offer all of our employees – irrespective of their age, sex, ethnicity or beliefs – equal opportunities. The sole deciding factor for occupational development is an employee's professional and interpersonal skills set. Our goal is to achieve success together. We will achieve this goal primarily by treating each other in a trusting, fair and respectful manner that transcends all boundaries.

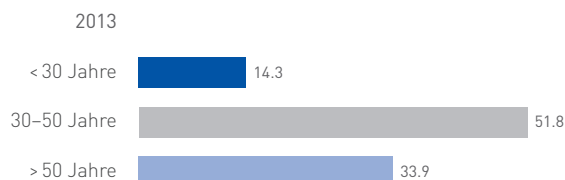
Continuing education (number of hours/employee)



Currently only around 19 percent of our workforce is female. This is because in production – both at Xella and in the building material industry in general – the workforce is predominantly male. The proportion of women in management positions at the end of 2013 was some 9 percent across the group, the same as for the previous year. We have decided not to set a fixed “quota of women”, but we do want to see a long-term increase in the number of female management staff and have already initiated corresponding measures.

These include preparing female staff to accept far-reaching management responsibility with the help of our management development program. The proportion of women participating in on-going development programs for next-generation managers (Potential Leaders Program) amounts to one quarter of all attendees and for middle management personnel (Advanced Leaders Program) one third of all attendees. The percentage of disabled employees among the workforce was 2.3 percent (2012: 2.2 percent).

Workforce age structure (in %)



Demography

Currently, only 14.3 percent of our workforce is aged 30 years or younger. During the reporting period the majority of the workforce (29.1 percent) was aged between 41 and 50 years. The proportion of employees above the age of 50 was 33.9 percent. We are well aware of the problematic demographic situation and our endeavors to be an attractive employer for young people are therefore on-going. We are equipping our younger employees with the requisite qualifications that will allow them to assume the corresponding key positions in future.

Co-determination

We respect and protect the rights of our employees to join employee representative bodies, trade unions and works councils. All employees, including those engaged at foreign sites, have the fundamental right to be members of a trade union. Constructive and trusting cooperation with worker's representative bodies and the early inclusion of these bodies in decision making processes is an important consideration for us.

Employee satisfaction

Satisfied employees that feel loyal to their employer are a key requirement for achieving corporate success. We therefore consider employee surveys to be an appropriate tool for determining where optimization is necessary in the employer-employee relationship. In this context, further employee surveys are planned for the coming years.





Communication

We promptly inform our employees and/or the co-determination committees of significant operational changes – at the latest within the statutory and/or agreed deadlines. Our normal channels for employee communication are the intranet, the employee magazine “Meilensteine” (“Milestones”) together with newsletters and circulars. Xella is in the process of launching an internal social media platform with the objective of optimizing communication and cooperation with employees.

Recruitment

The overall economy is currently exposed to fierce competition in terms of finding new talent and qualified workers. Demographic change and the associated need for employees are creating a situation in which the Xella Group must position itself more firmly as an attractive employer within the overall job market. This includes placing authentic images, videos and copy,

which realistically reflect our corporate culture, on Xella’s career web pages, in order to accurately target potential employees. Fels and Fermacell rely on moving images to attract new trainees and apprentices. Short video portraits that introduce our apprenticeship trades – such as electronic technician or industrial mechanic – can for instance be viewed on YouTube. A film about the varied meeting of the 60 or so apprentices at Fels and Fermacell also generated above average viewing interest.

The employment of workers in local positions below the management level takes place in accordance with local procedures, while management positions are filled centrally. On this management level over 90 percent of the positions are filled locally. This allows us to ensure cultural proximity and to benefit from the local knowledge of our executives.

Knowledge Management

Employees' professional and personal development is a matter of great importance to Xella. Alongside a wide range of training schemes that are available on a decentralized basis, we also offer our employees systematic, customized continuing education courses as part of our diverse personal development programs.

Training

In 2013 a total of 46 young people commenced a course of training at Xella Deutschland, Fels and Fermacell, the same number as in 2012. At its factories and various administration sites Xella Deutschland provides training in some ten different careers, while at Fels and Fermacell this number is six. From building material testers and IT administrators through to process technicians – we offer a wide spectrum of apprenticeships. To get to know one another better and in preparation for the months of training, Xella Deutschland organizes a "next-generation induction day" for its apprentices. During the annual trainers' day at Fels and Fermacell, trainers themselves have an opportunity to exchange ideas and experiences. The current shortage of apprentices is one subject

that is hotly debated here, because it is becoming increasingly difficult to find suitable applicants to fill the available apprenticeship places. At the end of 2013, 145 young people were engaged in vocational training in the German companies of the Xella Group (2012: 131).

Continuing education

In order to foster our employees' performance following their training, Xella also offers a wide range of qualification programs. These include seminars, tutorials and foreign language training. Programs are individually selected according to requirements and following consultation with the line manager. External trainers are available for in-house seminars that serve to transfer specialist knowledge, methodological, social and management skills. The range of subjects covered by the seminars has been developed to suit the needs of employees and the company and is updated at the beginning of each year. During tutorials, employees share the knowledge they have acquired with their colleagues, following training as a tutor. This transfer of knowledge from employee to employee not only makes good business sense, it also motivates and strengthens employees' identification with and commitment to the company. The foreign language training courses are organized as required and can either be accessed as an e-Learning program or provided at an external location. The focus here is primarily on English language learning.

Competency model

All Xella Group employees need to possess a certain set of competencies. To make sure that this is achievable, colleagues from all divisions of the business and from all market areas have developed a competency model. This is intended to provide the basis for greater standardization of group-wide human resource activities in the future – and clearly define the core competencies for employees and management. This encompasses three areas, each with three core competencies:

- Developing the business
- Cooperating on the basis of trust
- Shaping the future



The competency model provides orientation for all employees and defines the skills they require to perform their work successfully. It also serves as a basis for revising and more closely integrating the existing human resource development tools. The objective is to increase transparency for employees, thereby allowing them to further develop their skills and capabilities on an objective-driven basis. The implementation of internationally standardized guidelines is now planned for the selection process and for performance reviews within the Xella Group.



Management development

Managing staff is a skill that needs to be learned. Xella therefore offers the Potential Leaders Program (PLP) in association with the international learning partner Corporate Learning Solutions (CLS) and the Advanced Leaders Program (ALP) together with the Executive School of the University of St. Gallen (ESHSG). These are aimed at providing a comprehensive and objective-oriented management development program. During these programs we selectively teach Xella-specific management know-how, expand competencies and foster the management qualities of talented and committed employees.

The Potential Leaders Program (PLP) prepares participants for assuming their first leadership duties.



Within 18 months, core competencies in the area of management are taught, self-confidence boosted, self-reflection improved, a Xella-wide network established and effective communication skills developed. This program for next-generation managers comprises the four modules project management, cooperation, communication and presentation, together with leadership skills. The focus of all these modules is the practical and interactive teaching of course content. There are also specific projects relating to various topics concerning Xella which are presented to top management during a final presentation and subsequently discussed. These modules and the associated projects ensure that participants are better prepared to meet current and future challenges.

The objective of the Advanced Leaders Program (ALP) is to expand the management knowledge of middle managers.



This includes preparing them for the strategic challenges facing Xella and discussing methods for assuming wide-ranging leadership duties. Furthermore, participants are given a better understanding of financial key indicators and an international cross-group network is established. The program extends over a period of 18 months and comprises the three modules strategy, leadership, innovation & growth and includes a closing workshop. Practical and Xella-specific examples and applications ensure the job-relevant transfer of knowledge and improve participants' management skills.

The next step for Xella is also to offer top management the opportunity of preparing to deal with strategic issues and Xella's objectives through specific learning activities as part of the Strategic Leaders Program (SLP). In addition to teaching concepts and methods of strategy development and implementation, it also offers participants an opportunity of analyzing management issues and current economic challenges in an overall context. The objective is to strengthen participant's entrepreneurial attitude and approach.

HR reporting

During the reporting period a refined HR reporting process was developed and introduced throughout the Xella Group. This helps us build a significantly more accurate picture of our workforce structure than has been possible in previous years.

Salaries and company benefits

In addition to fixed salaries that are regulated by collective wage agreements or individual employment contracts, many of our employees also receive additional performance-related variable salary components. Large proportions of the overall salaries of Xella's management personnel are variable and are defined in terms of achieving performance-based personal and/or corporate targets (sales key indicators, EBITDA, free cash flow). There is no relationship between severance payments and the performance of the organization. We do not differentiate between genders when determining basic salaries. Neither does the Xella Group differentiate between full-time/part-time employment or fixed-term/permanent employment contracts in terms of entitlement to company benefits.

Company benefits at Xella are usually regulated by the applicable collective wage agreements. Additional attractive benefits are also available to employees. For employees of the German Xella Group the deferred compensation option deserves particular mention. With this plan, employees take voluntary reductions in their salaries in order to accrue capital for later payment of a retirement pension. Xella pays these employees an additional 20 percent contribution on the deferred amount.

In order to provide employees with assistance in the care of children and family dependents or in times of personal difficulty, we are supported by our professional partner, pme Familienservice (pme Family Service). This allows our employees to receive assistance with a range of personal situations – in line with an overall concept agreed with Xella – without the employer becoming aware.

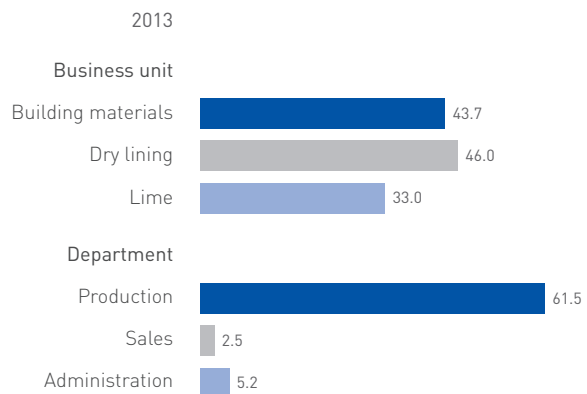
Occupational Health and Safety Management

At Xella we regard taking responsibility for the health of our employees not only as our statutory duty; we consider health and safety to be in our own fundamental interests. The health and wellbeing of our employees is the key requirement for ensuring their commitment, performance, creativity and flexibility.

For a manufacturer of building materials that utilizes a large amount of plant and machinery, occupational health and safety is of fundamental importance. Accidents at work are generally the result of human error. In other words the improper handling of machines or tools, not wearing – or the incorrect donning – of protective clothing, rushing and even tripping. It is therefore all the more important that employees are continually reminded of the correct behavior. Furthermore, we contribute to reducing the incidence of accidents by meticulously analyzing their causes. Safety experts regularly check our sites and all Xella production facilities undergo comprehensive environmental and safety audits on a recurring basis. Preventive actions at Xella also encompass specific measures such as fire protection, fire-extinguishing and evacuation drills together with training in the areas of load control, environmental protection, first aid, safety in the workplace, correct lifting and carrying and much more.

The incidence of absence due to sickness is far greater than absence caused by accidents at work. A permanent objective of the Xella Group is to improve the wellbeing and working capacity of its employees. To this end we have developed a concept for occupational health management in association with the health insurance providers, and this has been introduced at all of Xella's German sites. The program available to our employees ranges from exercise and relaxation classes through to preventive medical checkups. Fels and Fermacell both have a works council agreement on workplace health promotion measures. In order to be able to monitor the effect of measures taken, the company's management has decided to record the number of work days lost due to illness as a key indicator.

Accidents per 1,000 employees (number)



Fields of Action

Compliance





Fairness is our Duty

Over recent years the requirements for sustainable and ethically correct corporate management have become significantly tighter. Correspondingly, compliant conduct is increasingly demanded by stakeholders, in particular business partners. Large corporations have recently undertaken major efforts to prevent non-compliant conduct, especially in the area of corruption. However, compliance is about more than simply preventing corruption. It's also about compliance with the law in general, fairness, non-discrimination and the strict separation of business and private interests.

In order to ensure both proper conduct and the fulfilment of stakeholder expectations, it is necessary for the company to have an organizational structure. In 2011 Xella commenced a comprehensive review of its existing Code of Conduct. Even if much of the content is not new – and also applies without the need for a Code of Conduct – a detailed presentation of the rules of conduct gives employees greater confidence in their actions and helps both them and the company to avoid incurring potential penalties.

Clear compliance structures

For the development, planning and implementation of our compliance organization we also established the Corporate Compliance Board in 2011. This comprises the Head of the Internal Audit department and the Head of the Legal department, who also coordinate the activities of the highest compliance body, the Central Corporate Compliance Committee, which was established at the beginning of 2013. All executive staff of the Xella Holding departments that are involved in compliance-relevant issues during their daily activities belong to this committee. There are also local Compliance Officers in the market areas or at foreign subsidiaries that support this work. They are the local contacts for employees and formally report on a quarterly basis to the Corporate Compliance Committee on compliance-relevant issues, e.g. regional changes to the law. All of the responsibilities and authorities of the committee, board and officers are regulated in a Compliance Directive.

No one should fear consequences

In 2013 the Corporate Compliance Committee submitted a policy that is aligned with the special requirements of Xella. The new Code of Conduct is almost fully standardized. Only in exceptional circumstances were minor amendments necessary as a result of national legislation. So far, an external ombudsman has commenced work solely in Germany. The om-

budsman treats all cases reported to him by employees in confidence and forwards them anonymously to the Corporate Compliance Committee. All employees are required to report known violations of our Code of Conduct, provided this does not conflict with national legislation. Such violations include not only potential attempted corruption, but also situations where many are put at risk due to the actions of a few (by ignoring the safety regulations, for example). The Compliance Officers are under obligation to do everything necessary to establish the facts of the case and take the necessary consequential action. No employee that reports potential violations, or reasons for suspecting violations, in good faith need fear consequences – even if the report eventually proves to be unfounded.

Rolling-out the Code of Conduct across the group commenced in 2013. It is addressed not only to the executive staff – but to each individual employee worldwide. In addition to a pamphlet that sets out the binding rules of conduct and which each employee will receive in a language he can understand, training has already commenced and is ongoing. The pamphlet makes the relationship to everyday working life easily understandable with the help of specific examples and illustrations. The training programs held for instance in Germany, were well received by

The compliance structure at Xella



the majority of employees who found the content useful. Every participant realized very quickly that each individual carries final responsibility for proper conduct. Where necessary for individual aspects, supplementary directives will be issued and special training provided for employees on selected content.

New Code of Conduct for suppliers

Xella has a standard Purchasing Directive for use by all employees that are either directly or indirectly involved in purchasing processes. The Purchasing Directive defines principles for the classic areas of procurement such as requesting quotations and awarding contracts, ordering, requirements planning and master data management. It also defines value limits and assigns responsibilities.

Since the beginning of 2014 a standard company-wide Supplier Code of Conduct has been effective which also makes the content of our Code of Conduct incumbent upon our suppliers. This Supplier Code of Conduct is aimed at ensuring responsible business dealings throughout the whole supply chain and achieving cooperation with our business partners in an atmosphere of mutual trust. It covers fundamental principles in the areas of anti-discrimination, the rejection of child and forced labor, working conditions and freedom of association, the avoidance of conflicts of interest, anti-corruption, confidentiality, discretion and data protection together with safety, environmental protection and occupational health issues. The Supplier Code of Conduct sets forth the key rules of conduct that are fundamental to both domestic and international business activities. Even if these business activities, particularly on the international level, also involve cooperating with people from different cultural backgrounds who are subject to other types of norms and values, these standards of conduct still remain universally binding.

By issuing this Supplier Code of Conduct, Xella is basing its actions on internationally accepted standards and norms, in particular the Global Compact and the ILO (International Labor Organization) conventions. Xella

Rules of Conduct of Xella Group

Xella Supplier Code of Conduct



expects its suppliers, their upstream suppliers – and of course its own employees – to comply with the principles set forth in the Code of Conduct.

Risk management safeguards values

The purpose of the risk management system is to assess all risks with regard to the superordinate corporate objectives – guiding values and growth – with a forward-looking approach. The management of the Xella Group is responsible for ensuring that the risks are identified, communicated and dealt with at an early stage throughout the group. The Chief Financial Officer is responsible for the risk management system. Furthermore, the Head of Controlling of the Xella Group has been appointed Risk Management Officer.

The Risk Management Board – comprising the general management, the Head of Internal Audit, the Head of the Legal department and the Risk Management Officer – deals with top-priority risks established during a group-wide risk identification process. The derived measures serve to maintain our success and the corporate values of the Xella Group.

Fields of Action

Corporate Citizenship





Better Problem-solving Skills

Xella supports many national and international social, educational and cultural projects. For over two decades we have organized architecture and civil engineering competitions for students at home and abroad, with the objective of bridging the gap between theory and practice. We are a founding member of the “Stiftung 2°” Foundation through which we are directly involved in the climate protection debate and offer our problem-solving skills. Last but not least, we are also committed to a variety of non-profit initiatives, e.g. for underprivileged children and teenagers that are victims of violence or natural disasters.

The Xella student competitions in Germany, the Czech Republic and Slovakia have become firmly established events among students of architecture and civil engineering. With these competitions we offer up-and-coming academics an opportunity to prepare for the challenges they will face later in their careers and to demonstrate their abilities under realistic conditions by undertaking demanding and practically-oriented tasks

20

Xella has organized student competitions for over 20 years. The illustration shows the winning design by Sofia Ceylan and Leonie Otten from 2012/2013.

Visionary and creative concepts

The Xella student competitions, sponsored for the first time over 20 years ago by Xella's current brand Hebel, cover a wide-ranging qualitative gamut. On the one hand, future architects and civil engineers are motivated and supported, while on the other contacts between the younger generation, universities and the construction industry – in particular with Xella – are intensified. With this approach we are making a significant contribution to the comprehensive education of young people. The competitions also serve as a springboard into a successful career. This is repeatedly confirmed to us by former prize-winners that now hold management positions at international architecture firms or run their own architectural practices.



Competition judges: Manfred Streng – Xella, Andreas Hilt – Munich, Prof. Donnatella Vioretti – Berlin, Prof. Felix Claus – Amsterdam, Hans Dieter Hegner – Berlin (from left to right)

The competitions reveal innovative approaches and problem-solving skills that are directly related to contemporary architectural challenges. They can help students develop their individual capabilities, gain practical experience and set themselves apart from the majority through creativity and commitment.

Unusual ideas are welcome here, but economic, design and functional aspects should of course not be forgotten.

The theme of the German competition is developed on behalf of Xella by a different university each year. It then applies across Germany. A board of specialists appointed by Xella safeguards continuity and the substantive quality of the competition procedures and ensures that current issues are taken into consideration when the tasks are set. It furthermore strengthens networking and communication between the different architecture faculties throughout Germany. In addition to promoting the young generation, another primary aim of the competition is to create a bridge – using current building tasks – between professional practice and education in order to promote a stronger brand perception among (future) architects.

In the heart of the city

The participants in the 2011/12 competition examined the transformation of monofunctional metropolitan areas under the title "In the Heart of the City". More specifically, it involved redeveloping the area between Stachus Square in Munich and the city's main railway station under the aegis of the Technical University of Munich. The result proved convincing: Over 100 submissions from some 170 students, 13 awards and a Facebook page with over 600 fans from the target group. In addition to the three prize-winners, four other designs were highly commended and six purchases made.

The 2012/2013 event was no less successful. It bore the title "On the Edge of the Center – Leibniz Salon Hanover". The competition was held in cooperation with the Faculty of Architecture and Landscape of the Leibniz University, Hanover. It addressed the transformation from medieval town to baroque city that is barely discernible today. Overall, 122 entries from students at 41 German universities were submitted; prizes were awarded to two winning teams. The 28th competition is currently underway with the theme of "The City's Memory. Documenta Archive Kassel".

Student competitions in the Czech Republic and Slovakia have been organized by the local Xella subsidiaries there for more than ten years. Over the past eight years the competitions have been jointly organized under an annually rotating leadership. For entrants to the 17th International Ytong Student Competition 2011/2012 in Bratislava, the challenge was to draft a new usage concept for a vacant barracks in Nitra, Slovakia.



Xella Student Competition 2011/2012 – “In the Heart of the City” – Stachus Square, Munich. 1st place Franziskus Martin, Technical University of Munich

The brief was to transform the area into a multifunctional space. This challenging task encompassed the urban replanning of the site and demanded creative ideas for dealing with the buildings – some of which have listed status. The competition jury awarded prizes to six entries. The following year’s competition involved drafting a design for a forestry school in Zichovec, some 50 km from Prague. The special challenge here was not only that the building should fulfil the passive

house standard, but that students should – in the truest sense of the word – also be able to learn in an open air environment.



Xella Student Competition 2011/2012 – “In the Heart of the City” – Stachus Square, Munich. 2nd place Manuel Nagel, Tobias Herr, Luis Guitierrez, Bauhaus University, Weimar

To-date, many prominent Czech and Slovak architects have participated as students in the competition, which not only rates highly among school children and students, but also within the professional community. Furthermore, two other competitions are underway for high school students and students of building trades at vocational schools. You can find further information on Xella’s student competitions at www.studentenwettbewerb.xella.com.

Ambitious climate protection solutions

The “Stiftung 2°” Foundation is synonymous with a long-term corporate commitment to climate protection. In partnership with science, society and politics the foundation’s supporters – to which Xella belongs as a founding member – are working on specific climate protection solutions that are both ambitious and effective. The “Stiftung 2°” Foundation is an initiative of chief executives, managers and family businesses. Its objective is to support politicians in their efforts to establish market economy-based framework conditions for climate protection and capitalize on the problem-solving skills of German entrepreneurs. As an entrepreneurs’ foundation for climate protection, the “Stiftung 2°” Foundation is structured as a cross-sectoral organization. This allows the comprehensive knowledge pool and climate protection commitment of the participating companies to be bundled and incorporated into public debate and collaborative projects.

For Xella, as a manufacturer of energy-saving building materials, it is beyond question that every industrial sector and company must make its own contribution to climate protection – within the bounds of its own capabilities. For Xella, the necessary climate protection measures and sustainable orientation of our corporate strategy offer an overall opportunity. For further information please visit www.stiftung-2grad.de.

Demand for energy efficiency

In order to advance the issue of energy efficiency in Germany, Xella has been committed to the Deutsche Unternehmensinitiative Energieeffizienz (German Industry Initiative for Energy Efficiency, or DENEFF) since 2011. The objective of this first independent, cross-sector network of companies is to project the joint interests of its members in the area of energy efficiency into political opinion-making and accelerate the development of products and services in the energy efficiency sector. Xella is involved in the

“Fundamental issues & communication” and “Energy efficiency in buildings” working groups. Companies from the building material industry, the heating and sanitary installation industry, consulting engineers, energy advisors and scientists have banded together in this latter working group. Since the working group was established it has been primarily involved with the issues of quality assurance and qualification in the area of building renovation. For further information please visit www.deneff.org.

A plan for better living conditions

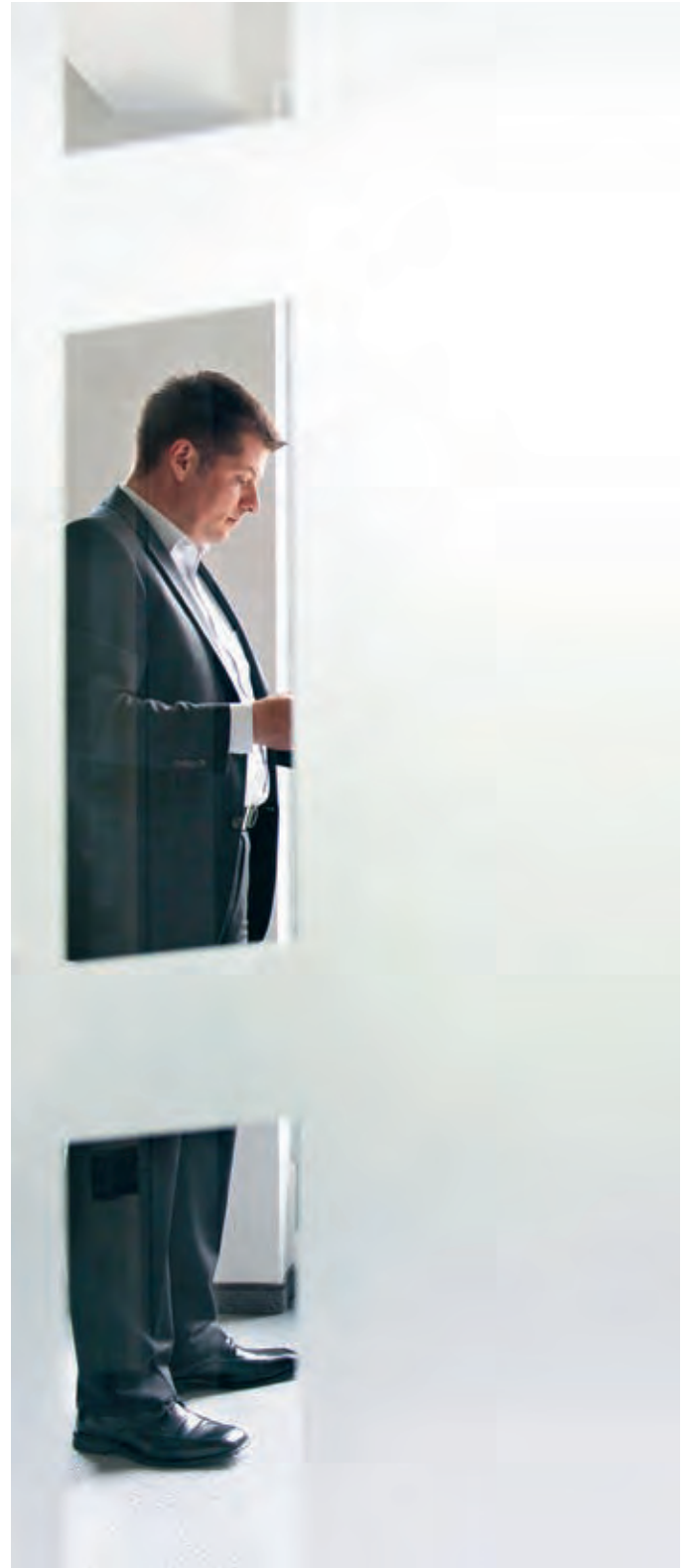
Each year Xella Deutschland’s works councils collect money from the workforce for the children’s aid projects run by Plan International. This independent aid organization is one of the oldest children’s charities and is involved in over 50 African, Asian and Latin American countries. Each donation is then doubled by Xella Deutschland’s management. We are also sponsoring two projects in Guatemala and Senegal. The donations are used to improve the living conditions in the project region. In addition to these sponsorships, Xella Holding also supports the Plan project “Protection for girls and women” in El Salvador. In this Central American country violence in the family is an everyday occurrence for women and children. Plan is helping 30 communities by opening up new perspectives for them. For further information please visit www.plan-deutschland.de.

Through its commitment to the District School of Music in Goslar, Fels provides the basis for musical education at elementary schools. As many as 80 children benefit each year from the support provided by the Fels-Werke. This also gives children from socially more vulnerable families an opportunity to learn a musical instrument. The Goslar District School of Music is one of the largest establishments belonging to the Association of German Music Schools, with 2,400 students in 15 locations and over 80 teaching sites.

Help for flood victims

Xella employees were on hand to offer active support and provide rapid assistance to their colleagues that fell victim to flooding in the eastern parts of Germany and Bavaria in June 2013. Over and above generous monetary donations, a whole range of highly practical assistance was organized which included pallets to help load sandbags onto trucks. Xella also released from their duties employees that volunteer as fire fighters or give their time to work for the “Technisches Hilfswerk/THW” (Federal Agency for Technical Relief). Alongside the management of Xella Deutschland, Fermacell and Fels, Xella employees in Germany and from further European locations were also involved. Xella Bulgaria donated 1,500 m³ of building blocks for the reconstruction of buildings in a Bulgarian village that were also damaged by flooding in 2012.

Xella furthermore supports charitable initiatives in the Duisburg region. We contribute among others to the cost of lighting the “Regattabahn”, a popular jogging and walking area in Duisburg, during the evenings. We also donate money to sports associations and religious institutions. Here for example, we support the St. Josef’s Children’s Home which looks after children, teenagers and young adults from troubled families. The homeless charity “Duisburger Tafel”, the “Telefonseelsorge Duisburg” (Duisburg crisis line) and the “Kinder und Jugendtisch” (children’s food bank) which provides regular meals together with educational, cultural and care services, have also depended on our help over many years.





Key Indicators

On the following pages we offer an overview of the company's activities over the period 2011 to 2013 using various key indicators for the group. These are subdivided into the areas of ecology, safety and human resources. Further key indicators and notes on the information given here can be found on our website at nachhaltigkeit.xella.com.



Environmental Key Indicators

Materials used by weight or by volume

			2011	2012	2013
Xella Group	Sand	m tons	5.7	5.6	5.5
	Binders, gypsum, CEM, etc.	m tons	2.0	1.9	1.8
	Light concrete aggregates, expanded clay, expanded gas, perlite	m ³	22,725	25,073	28,652
	Fibers	tons	86,471	86,386	82,077
	Lime	m tons	8.4	8.6	8.8

Direct energy consumption

			2011	2012	2013
Xella Group	Natural gas	PJ*	5.25	5.19	5.87
	Solid fuels	PJ*	7.85	7.37	7.54
	Liquid fuels	PJ*	1.23	1.35	0.67

Indirect energy consumption

			2011	2012	2013
Xella Group	Electricity	PJ*	1.90	1.50	1.50
	Steam	PJ*	0.52	0.58	0.55

Total water withdrawal

			2011	2012	2013
Xella Group		m ³	n/s	5,970,270	6,058,832

Greenhouse gas emissions

			2011	2012	2013
Xella Group		tons CO ₂	3,166,701	3,014,332	3,094,245

Waste

			2011	2012	2013
Xella Group	Hazardous	tons	n/s	1,022.3	707.7
	Non-hazardous	tons	n/s	110,783.4	170,701.0



Human Resources Key Indicators**

Total workforce

			2011	2012	2013
Total			7,297	7,306	7,227
Business unit	Building materials	Head count	5,568	5,463	5,335
	Dry lining	Head count	635	720	739
	Lime	Head count	1,094	1,123	1,153
Region	Germany	Head count	2,923	2,981	3,049
	Rest of Europe	Head count	3,662	3,650	3,459
	Asia	Head count	560	515	547
	North and Central America	Head count	152	160	172
Type of employment	Full-time	Head count	6,970	6,780	6,725
	Part-time	Head count	327	377	335
	Apprentice	Head count	n/s	138	148
	Trainee, intern, working student	Head count	n/s	11	19
Employment contract	Fixed-term	Head count	398	863	837
	Permanent	Head count	6,899	6,443	6,390
Sex	Male	Head count	6,025	5,984	5,870
	Female	Head count	1,272	1,322	1,357
Department	Production	Head count	5,000	4,916	4,833
	Sales	Head count	1,473	1,533	1,627
	Administration	Head count	824	857	767
	Temporary workers	Head count	n/s	376	332

Employee turnover and average length of service

		2011		2012		2013	
		Turnover in %	Ø length of service in years	Turnover in %	Ø length of service in years	Turnover in %	Ø length of service in years
Business unit	Building materials	7.0	13.6	7.6	14.0	7.7	14.1
	Dry lining	3.4	11.6	4.9	11.9	5.5	11.7
	Lime	4.7	19.7	2.8	19.1	2.6	18.3
Xella Group		6.4	14.3	6.7	14.6	6.6	14.6

Number of employees***

		2012	2013
		HC	HC
Business unit	Building materials	5,463	2,639
	Dry lining	720	511
	Lime	1,123	943
Region	Germany	2,981	3,049
	Rest of Europe	3,650	3,459
	Asia	515	547
	North and Central America	160	172
Department	Production	4,916	4,833
	Sales	1,533	1,627
	Administration	857	767
Total bound by collective agreement		4,256	4,093
Total not bound by collective agreement		3,050	3,134
Xella Group		7,306	7,227

Training

		2013
		Number of students/ employees
Total		11,7
Subjects	Occupational safety training	3,2
	Compliance	0,5
	Other	8,0
Business unit	Building materials	11,7
	Dry lining	11,1
	Lime	11,9
Region	Germany	10,0
	Rest of Europe	13,7
	Asia	9,6
	North and Central America	6,3
Department	Production	9,3
	Sales	14,9
	Administration	19,6

Number of work days lost due to illness

		2013
		Employee-days
Absence due to illness		9,5
Business unit	Building materials	9,4
	Dry lining	9,7
	Lime	10,0
Department	Production	11,3
	Sales	5,5
	Administration	6,5

Safety Key Indicators

Safety

		2012	2013	2012	2013
		Accidents per 1,000 employees		Accidents per 1 m (production) hours	
Total		40,2	42,2	21,9	21,9
Business unit	Building materials	41,6	43,7	22,0	22,6
	Dry lining	38,9	46,0	21,1	24,0
	Lime	34,7	33,0	21,8	17,3
Department	Production	55,7	61,5	29,8	31,4
	Sales	11,1	2,5	6,2	1,3
	Administration	3,5	5,2	2,0	2,8

n/s = not specified

*PJ = 1 Petajoule = 10¹⁵ J

** The following overviews are based on the actual number of employees and have not been converted to full time equivalents.

*** For reasons of simplification the term "employee" is used to mean both male and female employees.

Status

 Completely covered
  Partly covered
  Not covered
 C = Cover Internet = nachhaltigkeit.xella.com

GRI Index

This sustainability report was prepared in accordance with version G3.1 of the Global Reporting Initiative (GRI) international guidelines and complies with the requirements of GRI Application Level B. This has been verified by the GRI during the course of an audit. The reporting period includes the years 2012 and 2013. The following index provides an overview of all GRI indicators used together with their status, i.e. the extent to which Xella has taken these indicators into consideration in this report. We provide reports on other indicators on our website at nachhaltigkeit.xella.com. You can read the entire GRI guidelines at www.globalreporting.org.



GRI standard disclosure

Status Reference

GRI standard disclosure

Status Reference

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GRI standard disclosure

Status Reference

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GRI standard disclosure

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EN20	NOx, SOx and other significant air emissions by weight	□	
EN21	Water discharges	□	
EN22	Waste by type and disposal method	■	56, 90
EN23	Number and volume of significant spills	□	
EN26	Initiatives to mitigate the environmental impacts of products and services	□	

GRI standard disclosure

Status Reference

EN27	Percentage of products and their packaging materials that were reclaimed by category	<input checked="" type="checkbox"/>	Internet
EN28	Fines/sanctions for non-compliance with environmental laws and regulations	<input checked="" type="checkbox"/>	Internet
EN30	Environmental protection expenditures	<input checked="" type="checkbox"/>	Internet

Social

Labor practices and decent work

Management approach		<input checked="" type="checkbox"/>	50, 51, 67, 70, 72–75, 77–79
LA1	Workforce by employment type and region	<input checked="" type="checkbox"/>	68, 90
LA2	Employee turnover by age group, gender, and region	<input checked="" type="checkbox"/>	68, 91
LA4	Percentage of employees covered by collective bargaining agreements	<input checked="" type="checkbox"/>	91
LA5	Notice periods regarding significant operational changes	<input checked="" type="checkbox"/>	71
LA7	Injuries, absenteeism, and fatalities	<input checked="" type="checkbox"/>	75, 92
LA8	Risk-control and programs regarding serious diseases	<input checked="" type="checkbox"/>	74
LA10	Average hours of training by employee category	<input checked="" type="checkbox"/>	69, 92
LA12	Performance and career development reviews	<input checked="" type="checkbox"/>	Internet
LA13	Composition of senior management and employee structure (e.g. age/gender/culture)	<input checked="" type="checkbox"/>	69, 70
LA14	Ratio of basic salary of men to women by employee category	<input checked="" type="checkbox"/>	Internet
LA15	Parental leave	<input checked="" type="checkbox"/>	Internet

Human rights

Management approach		<input checked="" type="checkbox"/>	77–79
HR1	Investment agreements with review or human rights clauses	<input type="checkbox"/>	
HR2	Percentage of suppliers that have undergone screening on human rights and actions taken	<input checked="" type="checkbox"/>	79, Internet
HR3	Training on human right	<input checked="" type="checkbox"/>	77–79
HR4	Incidents of discrimination and actions taken	<input checked="" type="checkbox"/>	Internet

GRI standard disclosure

Status Reference

HR5	Operations in which the right to exercise freedom of association and collective bargaining may be at risk	<input type="checkbox"/>	
HR6	Operations at risk of incidents of child labor	<input checked="" type="checkbox"/>	Internet
HR7	Operations at risk of incidents of forced or compulsory labor	<input checked="" type="checkbox"/>	Internet
HR8	Security practices	<input type="checkbox"/>	
HR10	Human rights reviews and/or impact assessments	<input type="checkbox"/>	
HR11	Grievances related to human rights	<input checked="" type="checkbox"/>	Internet

Society

Management approach		<input checked="" type="checkbox"/>	10, 15, 84, 85
S01	Impacts of operations on communities and society	<input type="checkbox"/>	
S02	Business units screened for risk related to corruption	<input checked="" type="checkbox"/>	Internet
S03	Percentage of employee trained in anti-corruption policies	<input checked="" type="checkbox"/>	77–79
S04	Actions taken after incidents of corruption	<input checked="" type="checkbox"/>	Internet
S05	Policy positions and participation in public policy development and lobbying	<input checked="" type="checkbox"/>	15, 83, 84
S08	Fines/sanctions for non-compliance with laws and regulations	<input checked="" type="checkbox"/>	Internet
S09	Operations with negative impacts on local communities	<input type="checkbox"/>	
S010	Prevention and mitigation of negative impacts on local communities	<input type="checkbox"/>	

Product responsibility

Management approach		<input checked="" type="checkbox"/>	10, 16–33, 39–51, 77–79
PR1	Lifecycle stages of products in which safety and health effects were assessed	<input checked="" type="checkbox"/>	10, 16–33, 39–51
PR3	Principles/processes for product identification	<input checked="" type="checkbox"/>	10
PR6	Programs for adherence to laws and voluntary codes in advertising	<input checked="" type="checkbox"/>	Internet
PR9	Significant fines for non-compliance with laws and regulations concerning the use of products and services	<input checked="" type="checkbox"/>	Internet

Company Information

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Statement GRI Application Level Check

GRI hereby states that **Xella International GmbH** has presented its report "Sustainability Report 2014" to GRI's Report Services which have concluded that the report fulfills the requirement of Application Level B.

GRI Application Levels communicate the extent to which the content of the G3.1 Guidelines has been used in the submitted sustainability reporting. The Check confirms that the required set and number of disclosures for that Application Level have been addressed in the reporting and that the GRI Content Index demonstrates a valid representation of the required disclosures, as described in the GRI G3.1 Guidelines. For methodology, see www.globalreporting.org/SiteCollectionDocuments/ALC-Methodology.pdf

Application Levels do not provide an opinion on the sustainability performance of the reporter nor the quality of the information in the report.

Amsterdam, 12 May 2014

A handwritten signature in black ink, appearing to read "Ásthildur Hjaltadóttir".

Ásthildur Hjaltadóttir
Director Services
Global Reporting Initiative



The Global Reporting Initiative (GRI) is a network-based organization that has pioneered the development of the world's most widely used sustainability reporting framework and is committed to its continuous improvement and application worldwide. The GRI Guidelines set out the principles and indicators that organizations can use to measure and report their economic, environmental, and social performance.
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