# **MIWE** impulse


Editorial 2

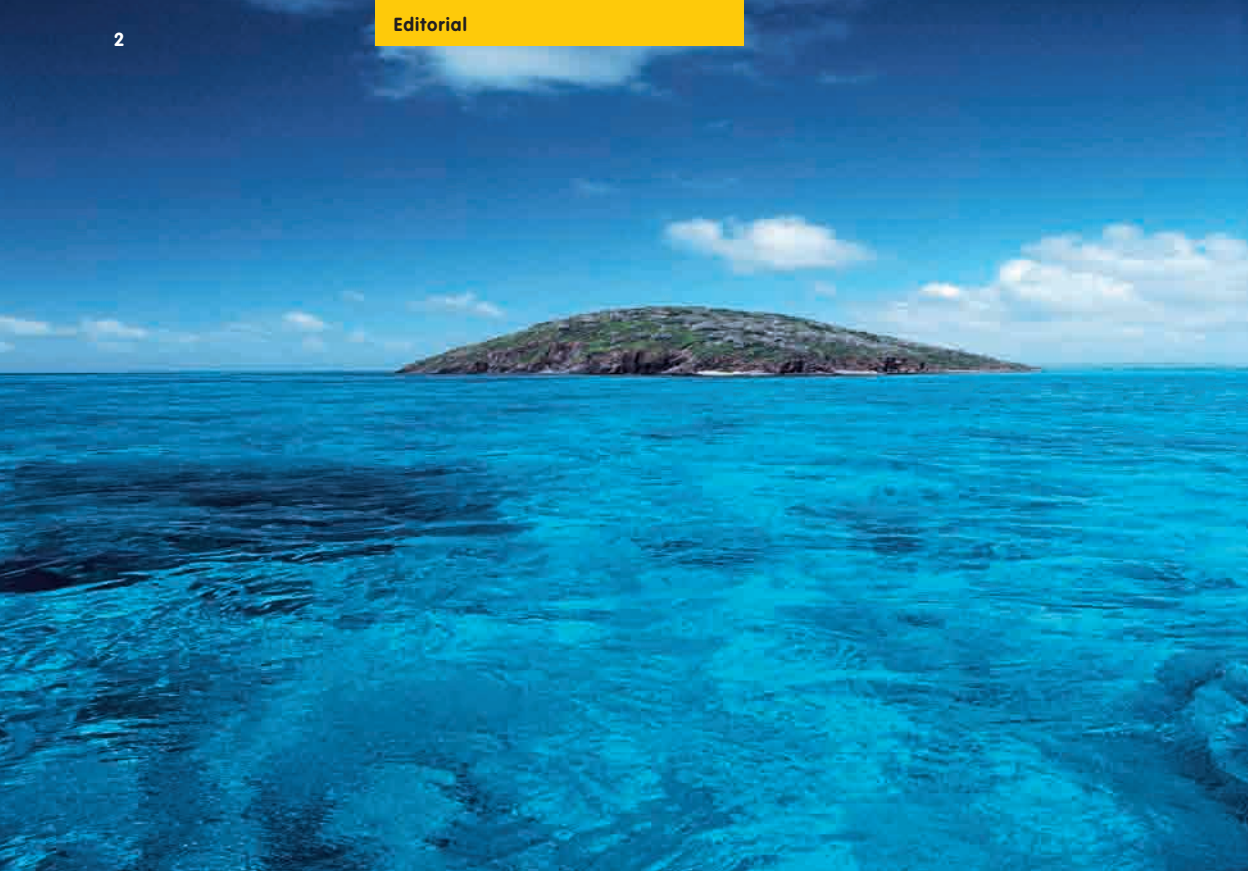
The cult baked product: the history of one of the oldest baked products of humankind 4

Automation: when the master no longer needs apprentices 12

Full steam ahead: the new MIWE thermo-static 28

Energy-savings offensive: how you can save energy cleverly with MIWE energy in your bakery 34

Fair dates / Imprint 51



**What do islands or rivers have to do with baking? Read our article on "Automation" to find out.**

Baked products can be both a basic foodstuff and a luxury good.
It is possible that shares and weighting are shifting and more people are purchasing in a price-conscious manner than before as a result of the economic crisis. This does not fundamentally change the basic meaning of baked products to a great extent: they are and remain a main part of our nutrition and thus of our shopping cart. Nevertheless, the world of the baker is changing quickly, independently of the crisis.
New processing technologies permit new forms of work organization and product presentation.

I would just like to remind you of the role of "sight and smell" baking, now called in-store baking, which brought a whole new group of suppliers onto the scene, from snack shops and convenience stores to gas stations.

The trade is formulating ambitious goals for baked product offerings and sale, thus promoting industrial production, which is already growing stronger. Chain-store owners counter with increasing sizes, differentiation of the product range, and quality or price offensives.
Classical trade bakers look for ways to differentiate themselves uniquely from other suppliers in regard to the individuality and quality of their products, an emphasis on how they work according to the traditions of the trade, or the regionality of their presentation. The market happenings are thus extremely versatile, and we as a manufacturer of modern bakery technology have to be prepared for this situation.

Despite all variety – one topic affects all market participants equally: the necessary reduction of production costs.

MIWE helps achieve this objective in many way, like automation solutions with intelligent control systems. Or with processing technologies like MIWE smartproof, which reconciles three important objectives of bakers: high quality due to added aroma, effective, spatiotemporal decoupling of production and baking, and economical use of energy when deep freezing is not used.

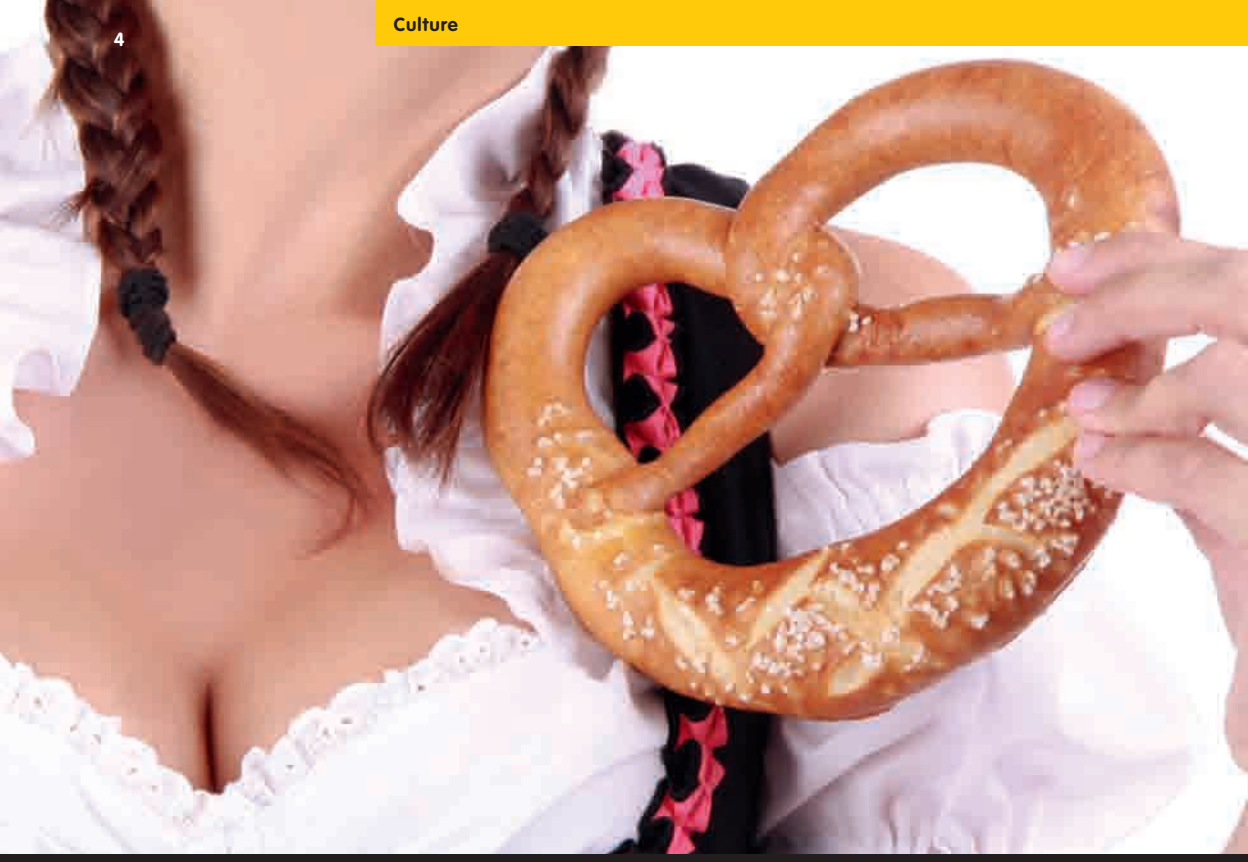
With MIWE energy, which we introduced for the first time in great detail in this issue, we are now implementing an initiative to help out with a topic that is particularly virulent at the moment: energy costs. We admittedly do not just leave it at offering you a heat recovery unit and placing a barrel of hot water in your bakehouse. Those familiar with us know that we think in context and usually develop solutions from the perspective of the baker.

For this reason, MIWE energy includes not just new products (MIWE eco:box waste heat exchanger and MIWE eco:nova, for example, or the absorption refrigerating plant MIWE eco:freeze developed for baker requirements), but also and especially comprehensive consultation that uncovers the secret energy depots in your bakehouse and makes them affordably usable in a combined energy system tailored perfectly to your individual needs.

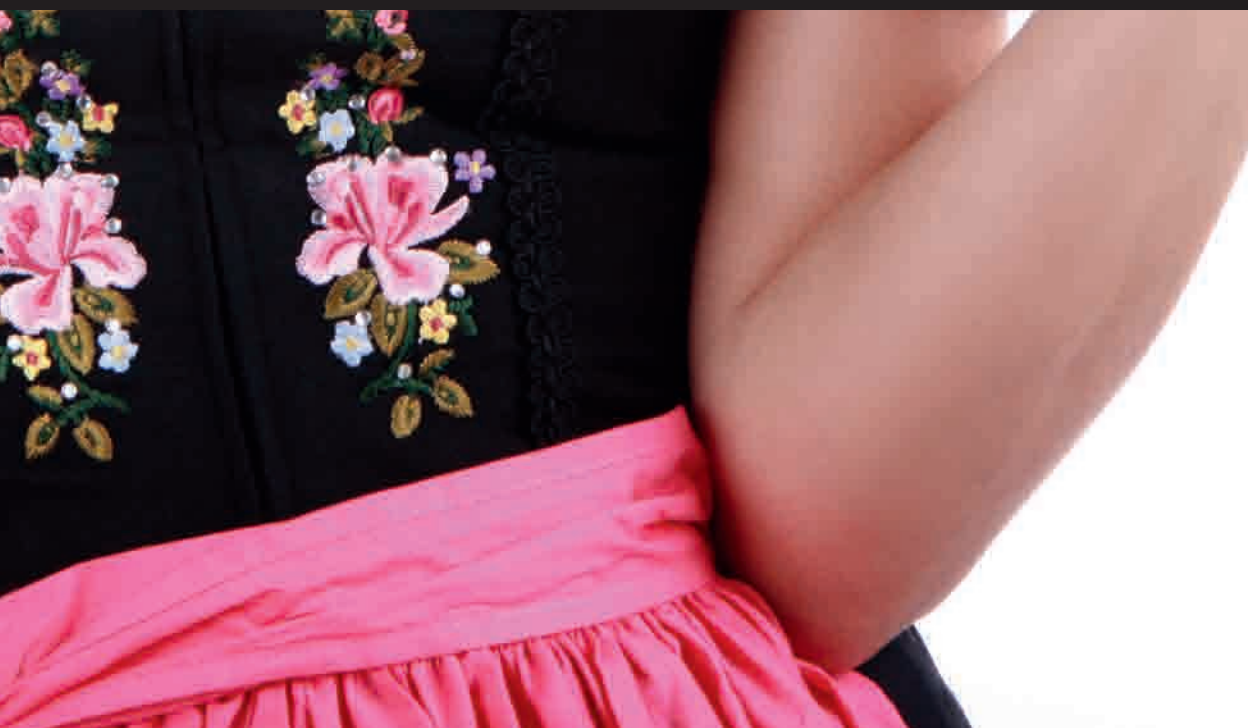
As you see: we are on our way with a lot of energy. I would like to invite you to profit from our activities.

Sabine Michaela Wenz

**Even if oil is not (yet) invaluable, we help bakers with MIWE energy. Extensive information on our energy-saving offensive can be found on p.34 ff.**



# Cult: Pretzel!



**The claim that a pretzel or "Brezn" is as much a part of Bavaria as a weiss beer is considered to be a truism, but it is actually only half true. We are going to look into the history of one of the oldest baked products of the human race in detail.**

You will find it on every proper May pole. And on many bags of bread or rolls. Even most baking guilds have it on their coat of arms, surrounded by lions, crowns, and swords: the pretzel, known as "Breze," "Brez(e)n," or "Brezel," "Bretzet," CBretzga," or Bretsche in various German dialects, the ultimate guild and sales symbol of the bakery trade. It has long made its victory march around the world, becoming the "pretzel" in the former "New World" in the process. The U.S. state of Pennsylvania, for example, in which many descendants of immigrants from the Palatinate and Württemberg live, has even received the nickname of "Pretzelvania."

This pretzel is a thing of many facets. It can be sweet or salty, made of yeast dough, puff pastry, short pastry, or even macaroon dough, soft and crumby or hard as a long-lasting baked product, miniature or large for hanging. It tickles your palette for breakfast or dinner, it can be eaten plain, buttered, or with toppings, and, in a few, elite kitchens, it can even be used as a base for delicious dumplings. Neither the trend for rustic Mediterranean baked products nor the whole grain wave have been able to seriously dent the popularity of pretzels. On the contrary, for some, pretzels are the secret star of the booming on-the-go eating trend. In short: the pretzel is a versatile, cult baked product with a special status. And that, as we will see below, in many regards.

When searching for the beginnings of the history of the pretzel's success, we have to go way back and consider for a moment what it exactly is that we are looking for: the pretzel shape as we know it today? Or the baked product that the word "Brezel" or "pretzel" designates? Just because it is called a "pretzel" does not mean it has to have a pretzel shape. And vice versa: what looks like a pretzel does not have to be called a "pretzel." And not every pretzel needs to be treated in alkaline solution.

Confused yet? Then come with us on a journey back in time to learn the history of the pretzel. Let's start with the easiest: the word.

The historical ancestors of the word "Brezel(l)" can be found in several variants very early, namely in Old High German glosses from the eighth to the tenth century: brezila, brezita, or brezitella  are the glosses for the Latin words for certain types of baked products (like artocopus, collyrida, simila frixa, crustula, or torta), about whose form and properties we mostly know very little. One thing we do know: they did not have the pretzel shape we know today.

This pretzel shape did not appear until a few centuries later. In a study published by the Museum für Brotkultur (Museum for Bread Culture) in Ulm in regard to the history of the pretzel from which we took a great deal of our information, Irene Krauß

**Wooden shop sign (for hanging onto a bracket), Wertheim (ca. 1820).**

The brass seal (ca. 1300) of the "Brotbeckenzunft" (Bread Baking Guild) in Basel shows the oldest known bakers' coat of arms.

discovered a fixed series of development. According to this study, the pretzel gradually developed from the original Roman ring-shaped bread (bracchium) to an open ring whose shape increasingly approached the shape of a "6" (precita), followed by the doubling of the ring into a double "6," and then finally the entwined shape that we now consider to be typical of the pretzel. This transition admittedly took place extremely slowly, and the shapes (some of which exist until today) also existed side by side.

The opening of the ring to the "6" shape was apparently completed by the ninth century and owed itself to a simplification in manufacturing: an enclosed, even circle from a rope of dough was more complex to form than a more or less accurate vaguely ring-shaped form, Krauß argues, going on to note that such a purely ergonomic consideration actually should not have led to the invention of the complicatedly twisted pretzel. Every baker remembers that the forming of even pretzels is not one of the easiest exercises during their training.

From the second half of the eleventh century on, the complete pretzel shape can be found – which means that the good old pretzel shape has been successful on the market for almost a millennium. A preliminary form of the pretzel in an emblematic function was first used on a seal of the "Brotbeckenzunft" (Bread Baking Guild) in Basel in the thirteen century. The pretzel ornament on the Romanesque Gallus Church in Brenz an der Brenz also shows the pretzel in today's shape with the entwined arms, just as the so-called "Bäckerfenster" (Bakers' Window) of Münster (cathedral) in Freiburg, donated by the local bakers' guild in the early part of the fourteenth century. The pretzel was also soon used in Gothic tracery: in a southeastern window of the late Gothic hall church of St. Georg in Dinkelsbühl, the stonemasons of the stonemasons' lodge worked in five freely chiseled pretzels into the masonry in ca. 1465.

This development of the shape of the pretzel apparently extended along the old main connecting roads between the cloisters – which makes sense in view of the astonishingly large mobility of medieval monks. One line of distribution reached from the Salzburg to the Frankish regions and further to the Oder, another to Alsace and northern Switzerland to Graubünden and then on to South Tirol – primarily the southern German language area.

This also corresponds to the historical-linguistic findings. What the Upper German glossers and lexicographers translate as "Brezel" continues to be Germanized as "Kringel" or Ring / Rinke"

The developmental stages of the pretzel: from the Roman ring-shaped bread (bracchium) and the opening of the ring to a six-like shape (precita) to the doubling and opposing of two six-like shapes up to the entwined form of the pretzel as it is known today.

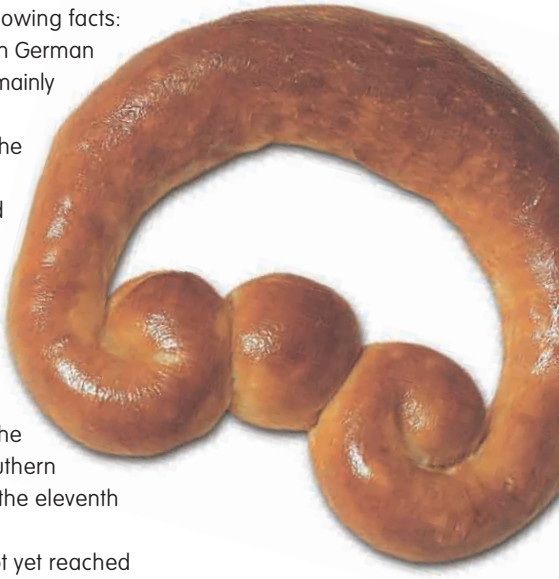
**"Bäckerfenster" (Bakers' Window) of the Freiburg Münster (cathedral) from the early fourteenth century (excerpt).**

in Lower German manuscripts – whereby we are once again on the trail of the the original circular shape. The Brothers Grim, who described the "Kringel" in their German dictionary as follows, demonstrated that a "Kringel" does not necessarily have to be a circular baked product: "In the form of two rings entwined in each other, thus the same as the bretzel, which is called 'Kringel' in Thuringia and Saxony."

Even in this case, many exceptions confirm the rule. In Basel, the pretzel was still called a "Kringel" into the eighteenth century, and the canton of Berne still has a customary baked product that is known as a "Kringel" even today. On the other hand, Switzerland in particular has many "Brezeli" that have nothing in common with pretzels except for the name.

A ring is not just the old shape; of both words, "Kringel" is the clearly older one. It is of Germanic origin, while the various linguistic forms of "pretzel" were borrowed from the Latin used in the monasteries in the late antique/early Middle Ages. In regard to etymology, they are based on medieval Latin forms such as "brachiatellum" or "brachitum" (cf. Italian bracciatello), both of which mean the "little arm," which probably refers to the narrow ends of the ropes of dough.

Let's record the following facts: the mainly southern German "Breze(l)" and the mainly northern German "Kringel" describe the same, originally ring-shaped baked product that gradually changed its shape in some regions until it started to appear in today's typical pretzel shape for the first time in the southern German region in the eleventh century.
Even if we have not yet reached the origins of the history of the pretzel by far, one thing is already clear: the nice legends woven around the invention of the pretzel shape are all precisely that: just legends. ▷



**Such pretzels were eaten by the Trojan hero Aeneas and Queen Dido (according to a dinner scene from the Codex Vaticanus in the fifth century).**

**"The Pretzel Baker of Urach"**

Once upon a time, there was
a pretzel baker, whom a count
had sentenced to death.
Since the pretzel baker had
a good reputation, however, the count
gave him a chance to save himself:
"Bake me a bread, dear friend,
through which the sun shines three times;
then you will not be hanged this time
and I will spare your life."
The clever baker thought and thought.
He needed no more and no less than
three days, and then he approached
the count with confidence.
He held up the pretzel so that the sun
shone through three times. The count
smiled and ate the entire pretzel.
For this reason, dear child,
you should buy yourself a pretzel
because they are so historical!

(Anonymous)

According to an anecdote in Swabia, for example, the court baker Frieder of Urach in the Swabian Mountains is said to have baked so badly that he was thrown in the dungeon and sentenced to death in 1477. Count Eberhard of Urach promised him he would be freed under the condition that he invents a bread through which the sun shines three times within three days.
By the sweat of his brow, the poor devil experimented in the bakery until he discovered the life-saving pretzel. Another tale is under no circumstances historically proven, but it is possibly closer to the truth. According to this story, an Italian monk in 610, inspired by the arms of his fellow monks folded in prayer, invented the pretzel shape and gave pretzels to particularly hard-working novices as a reward.

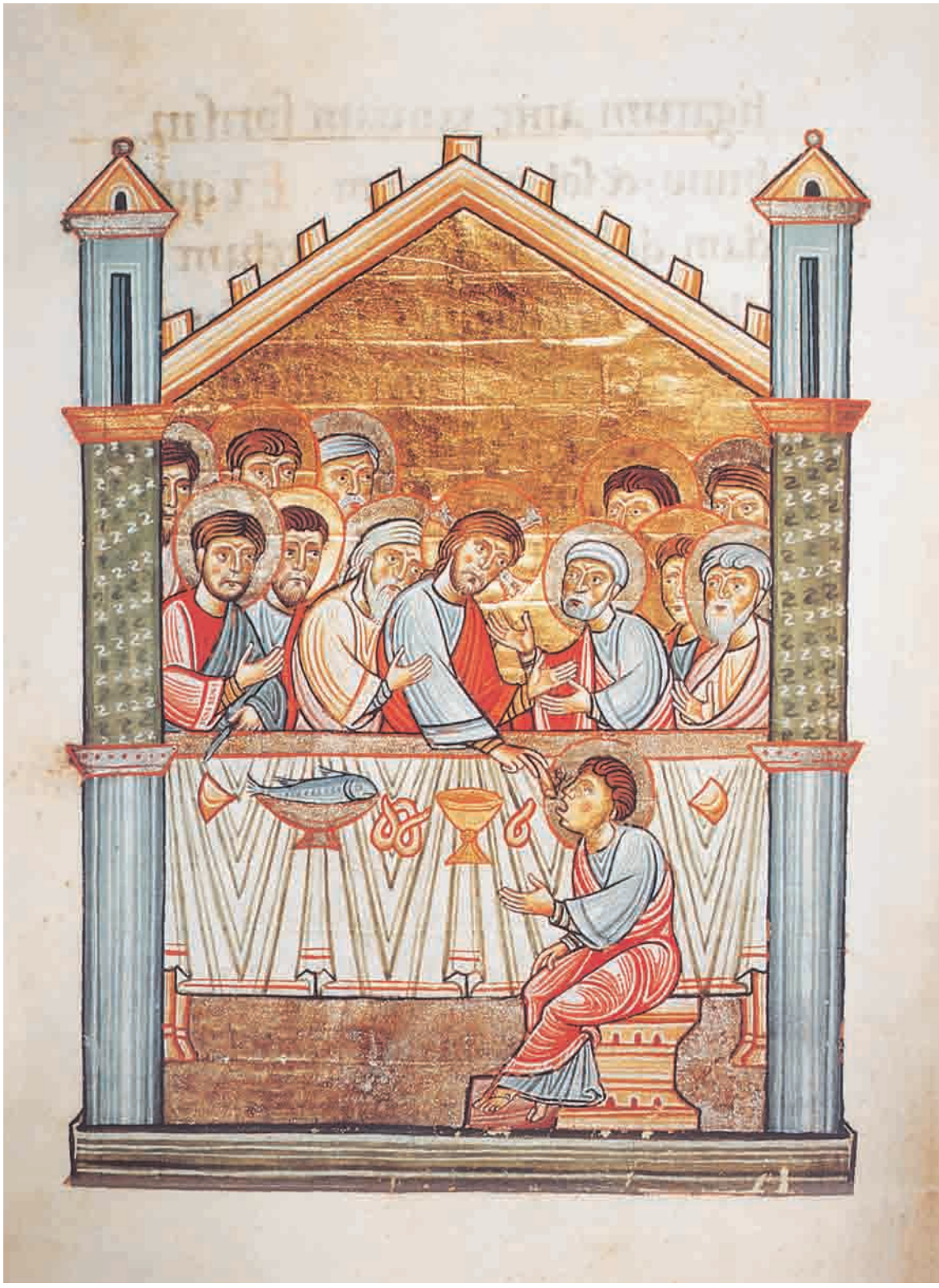
Other disciplines, which have long been interested in the origin of the pretzel and the customs surrounded this successful baked product, have also had their share in creating the legend.

The special shape and meaning of the pretzel in cultural history has inspired the fantasy of researchers again and again, who have brought forward a few more or less sound theories of its origins.
Some claim to recognize the magic straps of Old Germanic woman represented by the pretzel, while others recognize the Christian cross within a cross, others a wheel. People have also tried to identify the pretzel as a symbolic burial object within the scope of death cults. This theory is at least based on historical fact that such cultists gradually replaced the rings, bracelets, and necklaces originally buried with the dead with by symbolic breads (specially shaped breads with symbolic forms) in religious rituals.

The fact is, in any case, that the original shape of today's pretzel, the ring-shaped bread, was already used in antique Rome for religious rituals. The early Christians are said to have eaten it in a smaller form as Communion bread in the second century, and it was a permanent part of the Eucharist for centuries.
Even in the case of Pope Zephyrinus in the third century and Pope Gregory I the Great (590 – 604), ring-shaped breads were proven to have been used as the host in connection with mass. From this point on, we find pretzels in their various forms in many Communion representations until the late Middle Ages.

In addition, the pretzel has made a career for itself as a religiously founded Lenten and feast day baked product. ▷

**Cast-iron owner stamp of bakers for signing their baked products (ca. 1900).
Right: Oldest known picture of a pretzel from the eleventh century (now in possession of the Pierpont Morgan Library, N.Y.).**



Wooden model with pretzel image from northern Germany (ca. 1900).

Up till today, pretzels are baked on the high church feast days in many places and handed out to believers – in the original ring shape in many cases. Palm Sunday, Easter, and Lenten pretzels exist in many forms and recipes: "Boiled" or pretzels not treated with alkaline solution, Funkenbrezen ("spark" pretzels, named for the fires of Funkensonntag, (Spark Sunday) the first Sunday of Lent after Ash Wednesday) made of yeast dough with milk, butter, and raisins, Silesian Lenten pretzels made of marzipan, and, of course, Lenten soup with pretzels.

Some regions hold a "Sommerstagumzug" (Summer's Day parade) the third Sunday before Easter, using for example, "Sommertagsstecken" (Summer's Day staffs) decorated with pretzels in addition to colorful ribbons like the "Palmstecken" (palm staffs) popular in other areas.
On All Souls' Day in the fall, a second large customary pretzel season starts. In Allgäu and Hallein, people used to hang "Kreuz- and Seelenbrezgen" (cross and soul pretzel) onto tombstones and crosses on this holiday.

Even today, you can buy All Souls' Day pretzels, yeast baked products with coarse sugar, around All Saints' Day at the city market in Augsburg, while the surrounding pastry shops offer their own special variant:
All Souls' Day pretzels made of macaroon dough covered in chocolate and decorated with marzipan.
At Martinmas, pretzels are in demand once again. Earlier, the farmers' year ended on November 11. Workers who went on their way were often given a pretzel as a gift for their trip. Remainders of this time can be found in the St. Martin's Day pretzels that children get during the St. Martin's Day procession. Christmas pretzels, New Year's pretzels – the new pretzel year follows pretty much seamlessly. With the exception of the mostly local customs relicts, whose deeper symbolic meaning is usually lost on the participants, the original cult character of the pretzel has completely disappeared from public consciousness in the meantime. The pretzel has been secularized. The religious object has become a successful cult baked product of modern times.

Finally, one question still remains open: when and how did the alkaline solution that gives pretzels their bronze-colored outfit in most cases nowadays come to be used?
Even here, we have a nice legend for you. According to this legend, Wilhelm Eugen von Ursingen, the envoy of the King of Württemberg at the Bavarian court, was served the "other type" of pretzel at the "Königliches Kaffeehaus" (Royal Coffeehouse) of the Munich court supplier Johann Eilles because baker Anton Nepomuk Pfannenbrenner accidentally glazed the pretzels with the alkaline solution used to clean the cooking sheets instead of with sugar water on February 11, 1839. This sounds like this could be true, doesn't it? Unfortunately, there was never an envoy of this name and royal supplier Eilles did not found his company until 1863...

There is actually a direct predecessor of the pretzel dipped in alkaline solution: the boiled pretzel, which is dipped in hot (salt) water before baking, or pretzels completely cooked in this manner. It is assumed that the reason for this is that the boiling prevents fast development of a skin on the dough and thus provides an even crust.
From a salt water bath to an accidentally used alkaline solution is really no great leap.

Only the alkaline solution-dipped pretzel, the youngest and most successful descendent of the pretzel family, offers a barely conceivable variety of shapes and textures, from the design of the knot (single, double) to that of the dough rope (bulbous, conical, or just cylindrical), from the light yellow to dark brown crust, from the soft dry to the long moist crumbs of the typical "Bretzga" of Allgäu. With the brilliant success of the alkaline solution-dipped pretzel, "Breze" has now become the designation for this special type of manufacturing in some areas. In this case, "Breze" does not mean the entwined form itself, but rather any type of baked product that uses alkaline solution ("Brezn-Stangerl" (a long pretzel roll), "Brezn-Semmerl" (a short pretzel roll), etc.). After everything that has been said, this fact can hardly surprise you. That is how etymology works.

We would thus like to end our brief tour through the history of ring-shaped rolls and pretzels for now. We are certain much more can be said at certain points. Do you have a legend or addition to the story from your region or bakery? Let us know! ■

**Religious custom: Usually godparents give their godchildren a large pretzel after the palm procession.**
**Alfons Walde: "Palm Pretzel" from 1912.**



We would like to thank the Museum für Brotkultur (Museum for Bread Culture) in Ulm for their friendly support.

# When the Master No Longer Needs Apprentices

*What Aristotle would have said about bakery automation*

**The idea of automating processes is really not new. Industrial automation technology from MIWE is, though. This is reason enough for an overview with a historical excursion.**

"If every tool, by listening to or anticipating an instruction, were to finish its task itself, for example, if the loom were to weave on its own, the master craftsman would need no apprentices and the master would need no slaves." The original Greek text speaks of autómatos, something that takes place independently on its own power, which is retained today in words like "automatic" and "automation." The author: Aristotle himself (in the first book of Politics). Date: 350 B.C.E.

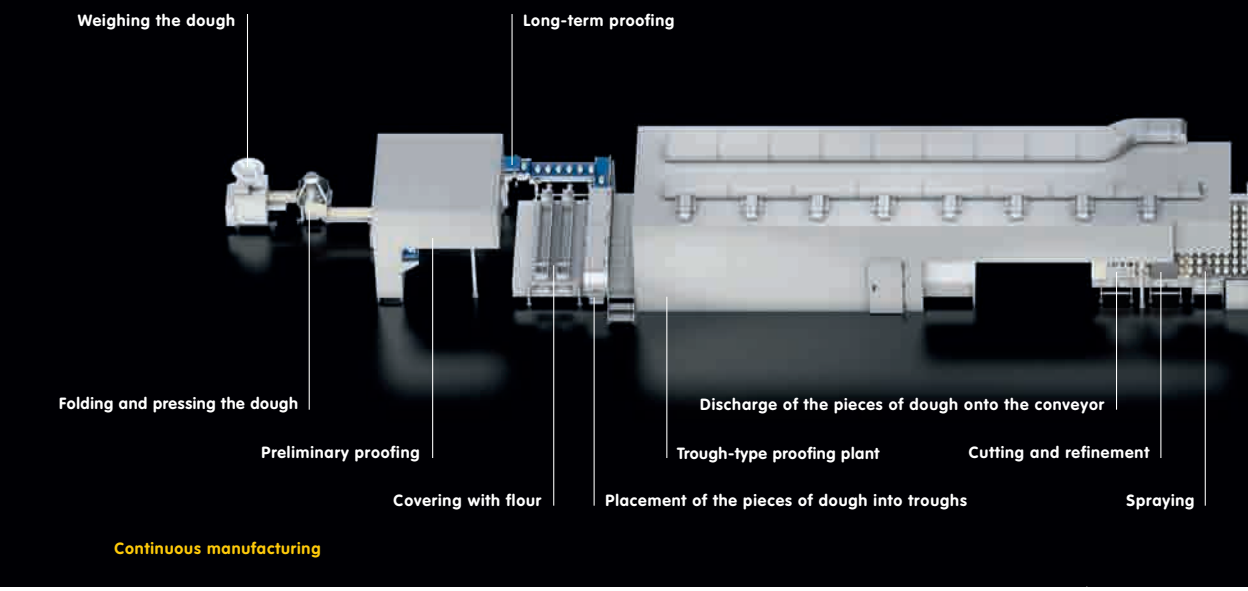
Together with the myths that Aristotle to which was referring, the daring thought of independent objects was initially forgotten for centuries. It lasted more than 2000 years until the first, modest approaches to "independent operation" actually became reality. Leonardo da Vinci, the brilliant painter and engineer, was the first in many areas. He had to leave the fame of having been the first to automate a process, however, to others: an English blacksmith, who constructed a mechanism by means of which windmills could independently turn in the wind in 1745.

Aristotle was mainly interested in the relationship between the master and slave within the state. That automation could help save personnel and costs was just a marginal aspect at most for him, the free Greek.
For bakers who install automated solutions in their bakeries today, however, precisely this rationalization effect is in the foreground.
Further objectives that can be achieved not only with automated production plants, for example, include consistently high production quality under reproducible boundary conditions and high production output that would no longer be able to be realized by hand, even if an army of apprentices were used. From a certain magnitude, increasing amounts of dough can simply no longer be managed with a mere multiplication of traditional methods.

Today, bakeries are automated on several levels and with a wide range, from the local automation of an individual manufacturing process (for example, proofing or baking) to the complete automation of the entire manufacturing process in industrial production lines. The growing importance of industrial manufacturing and the increase in size from operations that were formerly organized as workshops into branch outlets of a larger organization have considerably furthered the progress of automation technology.
MIWE has been accompanying this process on the side of bakers from the beginning and has thus reported on automation solutions for bakeries in MIWE impulse again and again.

With the takeover of the automation specialist erka, now MIWE Bräunlingen, we have considerably expanded our range once more, having thus been able to integrate a competence center that has been

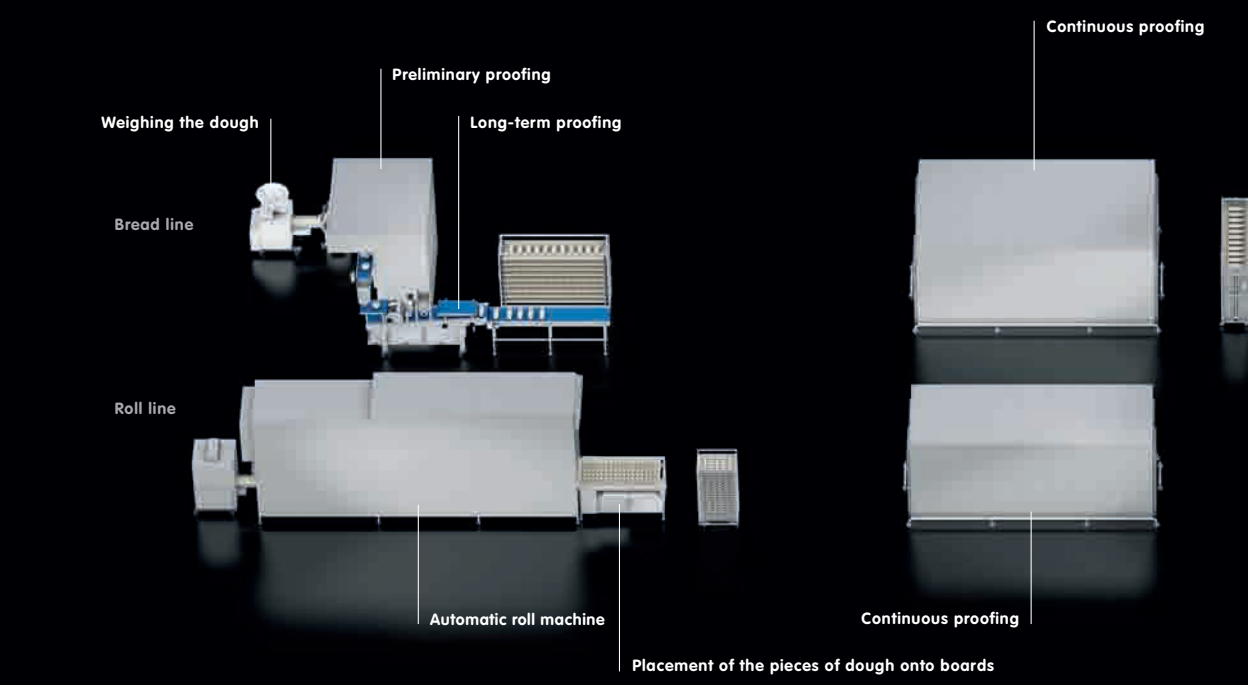
**Did you know? It was Aristotle who conceived of automation. And that already in 350 B.C.E.**

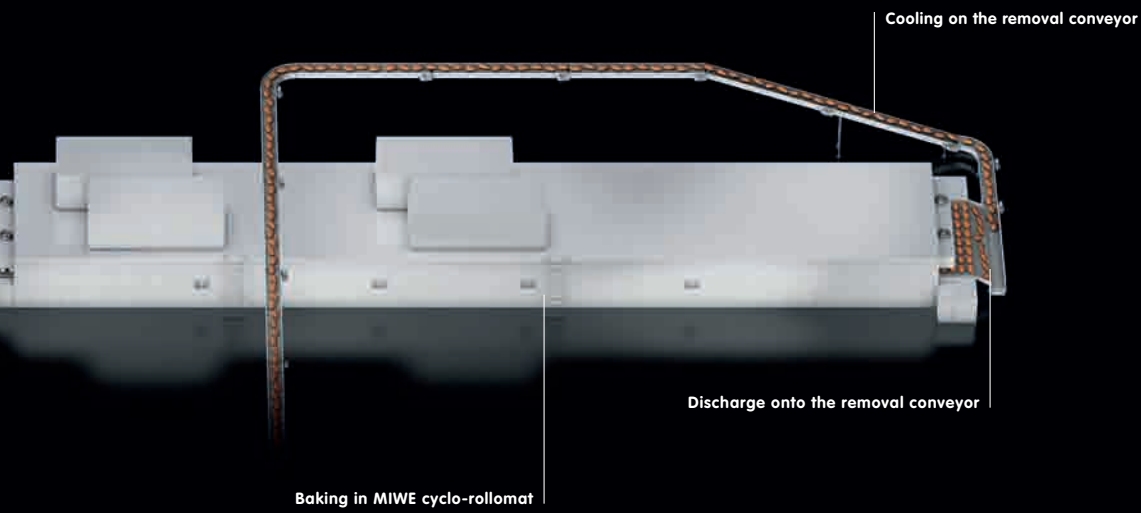



Continuous manufacturing

designing and building industrial plants for more than two decades, gaining an excellent reputation with bakers in the process.
This is reason enough to examine the automation approaches and solution possibilities of our company from a clearly expanded perspective with a focus on industrial solutions.

Discontinuous manufacturing

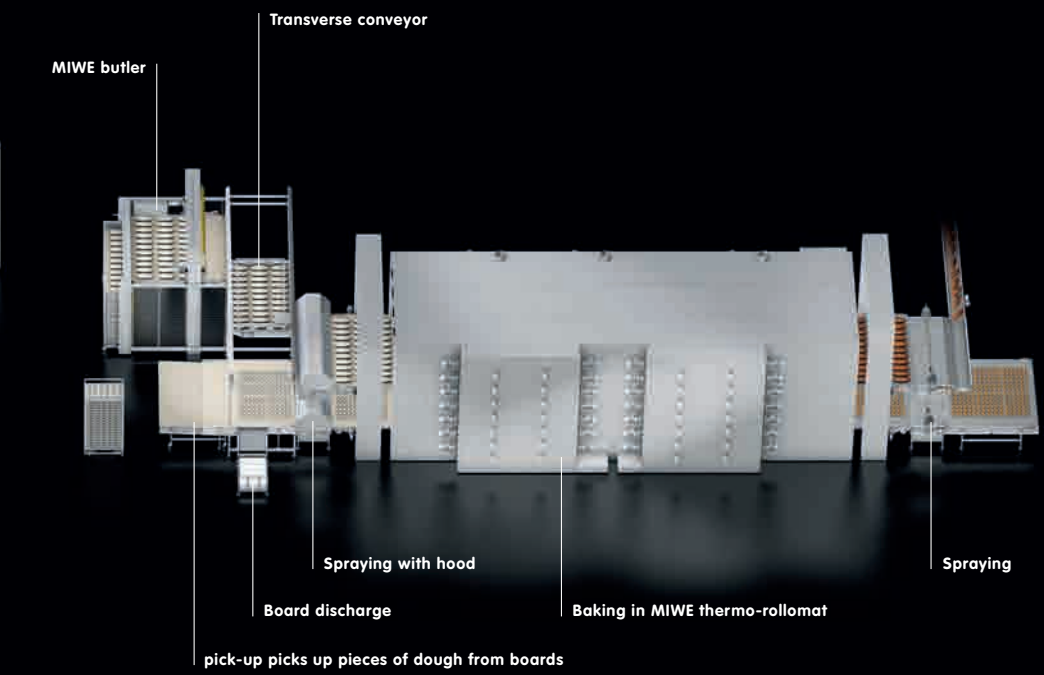




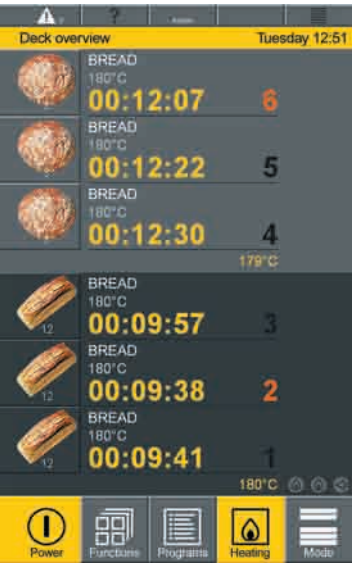

## *Continuum – yes or no?*

Basically, one achieves an output-increasing automation of the manufacturing of baked products in two different ways: through continuous or discontinuous manufacturing.

The right way primarily depends on the variety of products and size of the batches to be manufactured in the plant. ▷



Product variety and smaller batches usually demand discontinuous manufacturing: In the process, independent process islands are linked to each other; baking ovens can be loaded with different products in oven groups or as individual ovens.




Top: oven overview of a deck oven on MIWE TC. During discontinuous manufacturing, responsibility and monitoring is in the hands of the baker.

## *Discontinuous manufacturing*

The higher the product variety, the smaller the batch; if this is the case, discontinuous manufacturing is taken into consideration. In the case of this manufacturing variant, the individual process-islands (e.g. for proofing or baking) are connected to each other by transport or conveyor sections and specialized loading technology and usually also automated as islands, but they contain a high degree of autonomy and independence within the entire system.

They thus easily permit individual branches and individualized processes. A baking oven with several decks, for example, can be actuated in oven groups or in individual ovens, which means that completely different products can be baked, even simultaneously. Since the baked products do not continuously run through the oven, but rather remain inside it for a freely selectable period of time, the duration of baking and all other process parameters can be set individually for each product. Something similar can be said for discontinuous proofing technology. The individual process steps are cycled in sequences of steps and not organized as a continuous manufacturing flow. In this way, which is closely related to the classic way of craftsman thinking of bakers and can thus be found at many large branch outlets, wide ranges of cake shop goods up to and including bread can be manufactured efficiently and, for the most part, in an automated manner. The conversion to new or changed products is possible without great intervention into the hardware and the flexibility of the system is thus accordingly high. For so much flexibility in detail, however, a small price must be paid for the whole: feedback of the individual parameters, especially of the respective process times, to an overall parent system and their inclusion within the scope of a bakery-wide production planning and automation system generally does not take place at the moment. The comprehensive planning of a smooth production flow thus mostly remains the task of the baker or his or her operations manager. A networking of the individual islands with the objective of a total automation of the production flow is fundamentally conceivable, but extremely complex due to the many autonomous process islands involved and often not desired at all. Some tasks, such as the insertion of proofing boards into baking wagons and of the baking wagons into a proofing room, must still be performed manually to some extent using this solution. Especially due to such non-automated intermediate stages (example: the boiler is in the production chamber while the dough is resting, the baked products are manually brought from the proofing chamber to the baking oven loader), individual phases of the manufacturing process are not subject to control by a parent system. The responsibility for the climatic control lies in the hands of the baker.

## *Continuous manufacturing*

The opposite also applies: the lower the variety, the larger the batch, and the higher the expected output,

the more speaks in favor of continuous manufacturing. In the process, the baked products are produced on a manufacturing line in a continuous process that runs fully automatically from the receipt of goods or making of the dough to packing in an uninterrupted, even flow.
In this form of organization, the individual process times are converted into distance. Since the conveyor often runs through the system evenly, a longer process time also needs a longer process distance – and vice versa. The processing sequence also ultimately determines the basic design of the system. Certain limitations result from the flexibility of the concept because these distances cannot be shortened, extended, or recombined to any length. For a product change, the system must usually empty first – these are all reasons why a product change in this case can usually only take place at longer intervals.

The strictest representative of the continuous manufacturing line is the monoline, which produces only a single product day after day – and usually around the clock. Such system concepts, which were widely spread earlier, were considered to be rigid with good reason because they strictly limited the baker not only in regard to product range, but also in regard to the baking tray size used.

Modern continuous systems – at least those of MIWE – however, leave the baker enough flexibility for a relatively wide product range. It is thus possible, of course, to manufacture different types within a product group or products with different "finishes" on MIWE systems. This includes, for example, those mainstays of sales, the various types of special rolls (wheat rolls, rye rolls, spelt rolls, organic rolls, etc.). The variety of optically attractive sprinkles that characterize the craftwork character of the products or refinements are unlimited (sprinkled and unsprinkled, covered in flour, nuts and seeds like pumpkin seeds, poppy seeds, sesame seeds, sunflower seeds, seed assortments, etc.). Ultimately, MIWE systems are extremely flexible in regard to unit weight; you can manufacture small wheat rolls and rustic rolls with unit weights between 40 and 500 g. We will speak of the special flexibility of the MIWE proofing plants later in another context.

In the case of continuous manufacturing, no process step is left to chance or manual intervention. From the kneading machine to the final transition point (e.g. to the packing area), the dough and product are under absolute, gapfree control at all times. And above all: in the case of the achievable highest output, continuous manufacturing is clearly at the top – for industrial manufacturers who are urgently dependent on quantity effects for their pricing, this is a priceless advantage.

## *The good news right away*

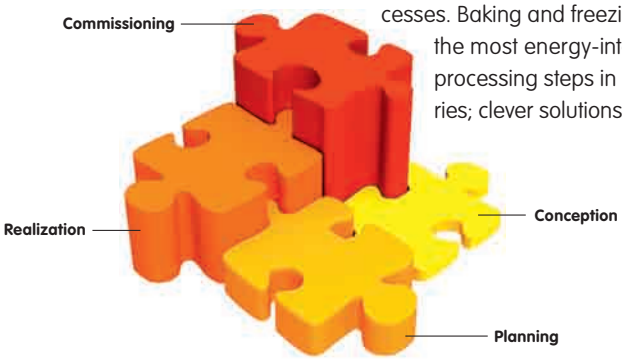
The good news for MIWE customers: no matter what type of product your company or product range demand – we are ready in every area. Today, we have a comprehensive portfolio of efficient aggregates, components, and systems by means of which individual automation solutions can be realized for every product and need. Our comprehensive engineering and consulting know-how makes it possible for us to realize automated manufacturing plants for all

**Continuous production means: everything flows. Every process step is controlled, monitored, and recorded in a gap-free manner.**

**Individual, product-specifically addable plant components (shown: spraying plant) also provide a perfect baking product even in case of gap-free automation.**

Paths used only for transport just generate costs. The implementation of a process step into a necessary path, such as a tunnel froster, is better.

operation sizes and product ranges, from local automation solutions to complete industrial manufacturing lines. For our own developments and manufacturing, we concentrate very consciously on those process steps where our core competence has always lain, that is, in the climate-control processes of the bakery (proofing plants and baking oven and bakery refrigeration technology) and the problem-free interconnection of these systems. Here, in the interplay of finely adapted proofing and baking processes, like cooling and freezing, the product quality is decisive. A further focus for us lies in the power optimization of the processes. Baking and freezing are the most energy-intensive processing steps in bakeries; clever solutions in this area thus release considerable savings potentials. In all other areas, we work together closely with proven, efficient partners so that we can design, plan, build, and commission complete manufacturing lines according to your requirements. Since we have already reported on our discontinuous plant solutions several times in the past, we are mainly addressing the industrial sector here.




## *Basic principles*

Independently of the individual implementation, we are guided by basic considerations when designing each system that aim to make the baking life easier for our customers from the beginning. In the process, we simply orient ourselves on the primary expectations of our customers.

## *High availability*

Especially for industrial bakeries, the reliability of a system is at the top of the requirement list. The higher the throughput and the more significant the quantity effects, the more

important the operating safety of a system is. For this reason, we already do everything in regard to design to give your system the highest possible degree of availability, which we also guarantee by contract if desired. For the support structures and all inside walls, we use serially produced stainless chromium-nickel steel which is particularly well suited for food processing due to its resistance against environmental influences and acids and which also guarantees the superior stability and robustness of our systems. The antitorsion structural framework is designed in such a way that it withstands extremely dynamic operation.

In regard to "Made in Germany," all of our industrial systems are developed, constructed, and manufactured only in Germany according to our high quality standards, of course. Even in case of modern, efficient control systems and I&C systems, we do not compromise; from the beginning, we rely on current industrial standards, while constantly guaranteeing a secure supply and easy implementation and use without proprietary frills.

Easy cleaning of all our systems is entirely within the scope of their high availability.

**The larger the plant and the higher the throughput, the more important the avoidance of unnecessary downtimes is. We do everything to prevent downtimes from happening...**

Cleaning is necessary in an environment containing food, but it does not have to turn into a time-consuming athletic activity. Due to special platforms, MIWE industrial plants are always easily accessible to the cleaning personnel; we avoid dead angles and classic dirty corners in their designs from the beginning by joining our body panels practically gapfree using a groove and spring.
The smooth stainless steel surfaces do one last thing: If desired, we also especially provide the cleaning-critical proofing systems in a washdown-capable design, i.e. suitable for cleaning with high-pressure systems.
To save cleaning work, we offer special brush-off systems and UV radiators for disinfection. ▷


**...from the conceptual design, planning, and production to successful commissioning, everything at MIWE is thus: 100 % made in Germany.**

## *Life Cycle Management*

Whoever invests in an industrial plant enters into a long-term relationship and must thus be interested in the high availability of his or her plant for the long run. For this reason, life cycle management is not just an empty phrase for MIWE, but rather a clear responsibility: we accompany your plant for a lifetime. We are a solid company that can offer you the guarantee that we will still be taking care of your plant at the usual high quality level in 10 to 20 years.

We support you in commissioning, final inspection, and handover to production, of course, and, beyond that, we are happy to help you with the optimization of the plant and processes. If agreed upon and installed, we have remote access to the plant from Arnstein; we can then access your process data and, in case of a malfunction, quickly identify the problem and usually remedy it immediately without having to visit you.

The storage of spare parts is a main point in the remedy of malfunctions. We recommend that our customers keep individually defined spare parts packages available on site.

**It doesn't work without: the MIWE plant service and its own spare part logistics guarantee spare parts that are available quickly.**

Independently of this, MIWE has implemented its own spare parts logistics for the fast provision of required spare parts for products that are often necessary or production-strategically important. Otherwise, the customer service for MIWE plants is available to you around the clock and is happy to support you. Depending on the geographical location of your operations, an individual reaction time can be agreed upon for customer service actions.
Since every operation and plant has different requirements, we offer maintenance contracts especially tailored to the delivered plant that focus on availability-critical components.
The plant documentation is also archived at MIWE beyond the legally prescribed, mandatory period without limitation. We can thus still advise, support, and help you in case of questions even after decades.

**Via remote access, plant and process data are queried and problems are quickly diagnosed and usually remedied immediately.**

## *Multifunctionality*

More and more frequently, a further challenge for industrial plants is their highest possible flexibility, that is, the most versatile possible usability for several products and different procedures with the lowest possible equipping expenses.

Even when the highest performance is in demand – for example, a monoline that can produce only a single product – an investor simply decidedly restricts his or her reaction possibilities to new consumption habits and market-trends. For this reason, today's industrial manufacturers thus look more for an ideal combination of both virtues, that is, for plants that have both high performance and flexibility. This applies not just, but especially in markets whose future developments cannot yet be foreseen, in which any long-term product decisions thus have a certain entrepreneurial risk, as is still the case in many Eastern European countries at the moment.

The required flexibility mainly affects two plant areas: dough processing, that is, the shaping and modeling of the products, for which mainly multifunctional plants that have to master more than just a single product type in a single variant are in demand today, and the climate-controlled process sequences that have to be set to various dough manipulation and baking parameters, as well as different conveyance and loading techniques for various product types.

We would like to demonstrate the versatility of the possibilities of MIWE plants using the example of an area that is particularly sensitive for the flexibility of a plant: the proofing plants. In connection with the recipe on one hand and the baking process on the other, the proofing process has a decisive influence on the later appearance and smell of the baked products. For this reason, it is very important to the planning of an industrial manufacturing plant that it corresponds precisely to the requirements of the customer and product(s), especially in case of the proofing plant, and that it supports the flexibility in proofing required for the planned product program.

This already starts during the selection of the optimum conveyance system, which in turn decides not only on the path and aids (baskets, boards, or baking trays) the products use to travel through the proofing cell, but also whether or not the proofing time can be variably adjusted. MIWE can offer bakers a number of systems in this area that meet all kinds of requirements. In the process, we know that the design of an industrial manufacturing plant is always additionally determined by the existing (or planned) spatial conditions. We work out clever solutions that guarantee that the desired plant also fits your room layout.

First is the classic suspended proofing plant, for which baskets, troughs, baking trays, boxes, or boards meander through the proofing chamber using a chain. This system is typically used primarily for bread, long rolls, toasting bread, short rolls, doughnuts, or jelly doughnuts.
It can be relatively easily mechanically realized; the products run through all temperature zones easily and can be turned easily if required. Since the proofing time is unilinearly coupled to a fixed route in the case of this concept, however, it cannot be changed and bakers should know that baskets or troughs must be cleaned at certain intervals. ▷

**Rigid monolines are rarely acceptable nowadays. Modern plants from MIWE also permit a product variety that was previously unthinkable with continuous manufacturing.**


**Diagram of the possible transport systems in the areas of proofing and baking**

For all that, this system scores with its relatively low spatial requirements since the plant has different dimensions due to its meandering guidance, is able to make do with a comparably low basic surface area, and is able to be set up directly through the baking oven.

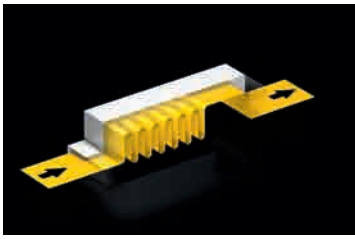
An alternative are the MIWE covered or conveyor-type proofing plants. In the process, the products are transported either directly on a conveyor belt or on baking trays or boards directly through the proofing cell. A decisive advantage: in both cases, solutions with several decks can also be realized. And that means: individual proofing times are possible for different products. Similar to the spiral proofing systems described below, the products can also be transported without baking trays and boards in the case of conveyor-type proofing plants; in contrast to spiral proofing systems, no product deformation results for shape-sensitive products like pizza or pretzels in the case of the conveyor-type proofing plants. The systems can be cleaned easily, but the spatial requirement of a conveyor-type proofing plant is relatively high, and the customer must provide its own loading technology for loading and unloading. With the exception of the previously mentioned pretzels and pizzas, such plants are used mainly for fine baked products and deck-placed specially rolls.

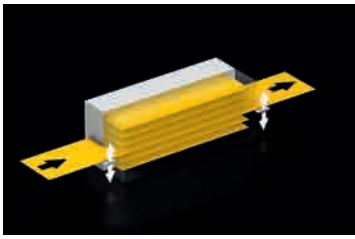
For fine baked products and crescent rolls, but also for baguettes and all products on baking trays or boards in general, MIWE paternoster or step proofing systems are the first choice. In this case, the baking trays or boards are pushed into a tower and transported upward step-by-step as in a paternoster elevator.

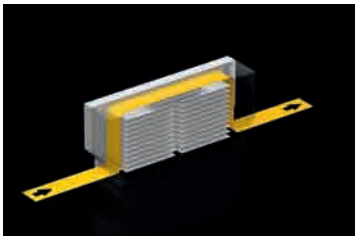
When they arrive at the top, the baking trays are pushed into a second tower and then transported downward again step-by-step. Since the step speeds can be individually set, different proofing times can be realized using a MIWE step proofing plant. People who take advantage of this freedom should not overlook the fact that the mechanical and control systems of such a flexible plant are inevitably more complex than those of the previously described systems. As long as the outer dimensions are the same, completely different baking trays or boards can be used. Due to its tower-like structure, the system can make do with a lot less basic surface area, but needs a lot of height space.

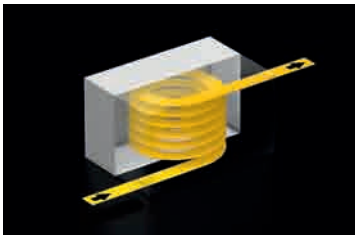
Finally, as a fourth variant, we offer spiral proofing plants for which the products first move upward on an ascending spiral and then back down again on a second descending spiral running in the opposite direction. In the case of this system, the products can be transported either on baking trays or directly on the conveyor.

You must observe, however, that deformation-sensitive products (like pretzels) are often warped somewhat during transport directly on the conveyor due to the circular geometry of the conveyor section and during transport in the spiral due the angular speed that differs according to the radius and thus their length is often extended. Spiral proofing plants should thus not be used when the products must have a precisely defined, consistently even position at the discharge. Spiral proofing plants are usually used for crescent rolls and refined baked products. Mechanically, these systems are relatively simply constructed and even cleaning is









**Variety and individual design are what matters. During proofing, you have – depending on the available space – a choice between various plant principles from the top to the bottom):**
- **Suspended proofing plant**
- **Deck or conveyor-type proofing plant**
- **Paternoster or step proofing system**
- **Spiral proofing plant**

easy to design due to automatable conveyor washing systems. Due to the system, however, only a maximum conveyor width of 1200 mm is possible. In the case of this system, flexible proofing times can be achieved using individual speeds.

With these four basic systems, however, the complete variety of variants of the industrial proofing plants of MIWE cannot be described by far. Even in the case of proofing product carrier systems, we could select from an entire fund of specialized solutions and develop suitable transport logics for every customer and product range, from dough-resistant plastic module conveyor belts and exchangeable suspension gear and baskets, boxes, and groups of boxes to plastic proofing boards with stainless steel frames.

Special bypass systems also expand the possibilities for use by permitting an individual delivery of the products away from the normal proofing sections.

It will not surprise you that a similarly differentiated image arises in the case of the baking ovens. With the exception of a few special applications, MIWE masters practically all conceivable types of baking. The customer can freely select what he or she needs, focusing on the requirements of the products in the process, both in the type of heating and the type of loading and in the degree of continuous manufacturing. A one end of the spectrum: the fully continuous, single-oven flue-gas tunnel oven MIWE cyclo-rollomat, which is available optionally in the

**Bake like a king: on stone slab, net, or hinged plate conveyor. For single or multiple ovens. With flue gas or thermal oil. At MIWE, you have the choice.**

highest quality level with weighted stone slabs in the upper output range with mesh belt/hinged belt and has its proper place in large branch outlets and industrially producing large-scale bakeries.
When the advantages of thermal oil heating, that is, soft heat and reduced drying that manufacturers of high-quality, prebaked deep-frozen baked products in particular value, are in demand, we recommend MIWE thermo-rollomat as a single-oven tunnel oven in the upper output range; this oven is also available in a king-sized version, with a stone slab belt. The multioven thermo-rollomat, which branch outlets like to use for high output requirements, promises more flexibility.

If the baker wishes to bake by batch, on the other hand, the MIWE ideal (flue gas) and MIWE thermo-express (thermal oil) deck ovens, two proven, flexible systems, are available; if rolling production is required, the MIWE roll-in (heating gas) or MIWE thermo-static (thermal oil, now with three wagons in the latest version) wagon ovens are in their element.

A special delicacy for the modern high-output bakery is MIWE thermo-rollomat, enlarged to the double loader depth, in combination with an external double loader that combines the highest throughput with great flexibility and thus meets the expectations of many bakers. The system comprises up to 12 ovens and thus achieves an overall baking area of about 288 m². ▷

**Your baked product: it moves by with an appetizing glow – here on the stone slabs of MIWE cyclo-rollomat.**

Transfer from stone slabs to the conveyor belt.

In regard to thermal oil, by the way, we naturally provide future-looking, $CO_2$-neutral, and resource-saving heating with regenerative energy carriers (wood chips, pellets, shavings, biological masses) and efficient heat recovery systems for our thermal oil baking ovens.

One thing must still be mentioned: the variety of special functions. Here is a list (incomplete) of these functions: removal from the baking tray or board, sprinkling, moistening, egg coating, baking tray cleaning (in several variants), or plants for baking tray storage, as well as several tilting and turning systems – whatever you need, we realize the appropriate solution.

## *Evenly high quality*

The fourth main requirement of the baker regards the quality of the products themselves. Even if "quality" is individually defined by our customers (to which we will find the perfect answer with accordingly optimized plants), all bakers agree on one point: the product quality must be even and reliably reproducible.

It is vital to pay precise attention to this quality especially in the climate-controlled process states of manufacturing, that is, in proofing and baking, because this is when the quality of the individual baked products develops.

As the name says: MIWE ideal is ideal for highly flexible, batch-for-batch baking.

No matter what you are baking – no matter how you define quality – the baking result must always be just what you want and reliably even.

As a baking oven builder with almost one hundred years of experience, we are extremely familiar with the special tasks of even climate control (i.e., control of temperature and moisture). Based on our practical experience, we have developed practical solutions that guarantee a high product evenness – even in case of fluctuations in the ambient temperature and humidity.

Let's look at both proofing systems again. Climate columns on both sides with adjust air outlet provide an even, horizontal flow through the decks. In the process, we consciously use alternating blow-in directions to increase the evenness, that is the principle of air flow inversion. A low air velocity of less than 0.2 m/sec provides an even, secure circulation of the proofing chamber air and, at the same time, prevents the products in the proofing cell from drying out and developing a skin. A sophisticated measurement and control system guarantee that the temperature and moisture correspond to the setpoint values as precisely as possible.

## *Individuality*

The world of the baker is versatile and his or her products even more so. Even if two products of different bakers have the same name, this does not mean that they are manufactured in identical manners.

For this reason, MIWE does not have any finished solutions off the peg or even complete, mostly or completely automated manufacturing plants, but rather system solutions that are individually tailored to the needs, productions, and spatial situations of our customers. The fact that we can fall back on a rich fund of specialized modules and subassemblies helps us work out individual configurations and, at the same time, lowers your customization costs.

We are also certain: Aristotle would have loved our automation systems. When may we persuade you of the same? ■

Tomorrow colorful doughnuts are the "hit"? Once again, we prove that flexible is equivalent with future-proof.

# Full Steam Ahead

*The new MIWE thermo-static*

**Thermal oil baking ovens are popular with bakers with good reason. With their typically soft heat, they maintain more moisture in the baked product and thus keep it fresh longer.**

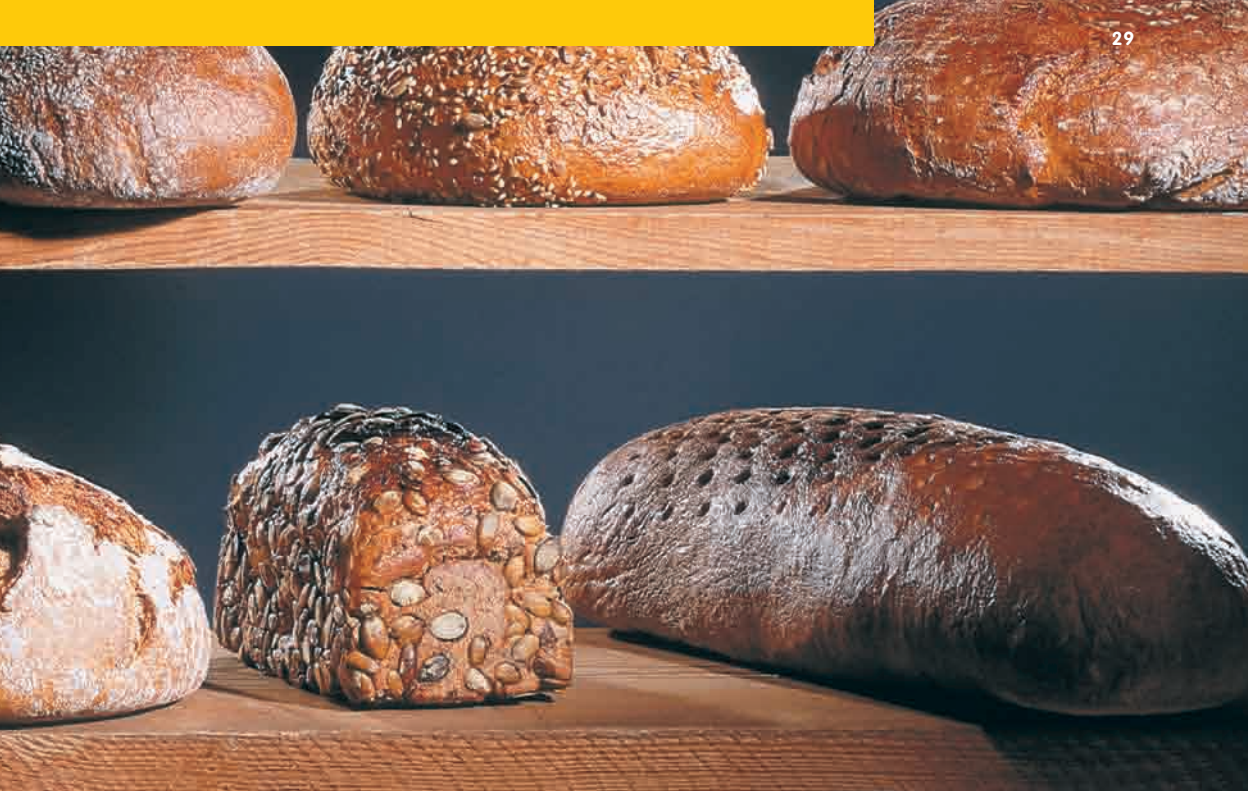
For this reason, they are the ideal "air conditioner" for all rustic bread and roll types with a classically high dough yield or for half-baked products that must finish baking or be crisped up a second time before being sold in a way that eliminates moisture. In general, baked goods rise intensively in soft heat. Many bakers also value the golden glow of the baked products, typical of baking with thermal oil, which comes from cararmelization in the crust due to the soft heat.

With the MIWE thermo-static, we have had a baking oven in our product range for many years that combines the advantages of thermal oil heating with the convenience of a wagon oven.

In the meantime, hundreds of them are being used by bakers all over the world – a wonderful success for our engineers and dough processing technologies, but also a constant incentive to be even better than we already are. The result is in: a new MIWE thermo-static that exceeds its worthy predecessor in many details, but also as a whole.

You will already notice the initial differences from a distance. All hinges are gone. The front panels are hygienically flat and otherwise correspond to those of MIWE roll-in, forming a uniform, enclosed, flat front panel appearance of the plant from a battery of many different baking ovens.

The control column that accommodates the control systems for two baking ovens can be attached either to the right or left of the baking chamber – or even somewhere else in the bakery, separated from the baking oven like a satellite.



Complete control systems for entire baking oven batteries can thus be placed away from the baking oven as central control units and the baking ovens can be moved closer together. The door of the baking oven can open on both sides completely independently of the position of the control systems in case you want to reorganize the layout of your bakery.

As for the door, an elevating mechanism that lifts the door automatically upon opening not only provides more operating comfort, but also a long service life of the lower door seal, which has been designed to be readjustable near the floor as a precaution.

Let's stick to the facts for a while: the floor tub of MIWE thermo-static is made of high-quality V4A stainless steel, which, in addition to chrome and nickel, is also alloyed with molybdenum, making it resistant to corrosion.

The anticorrosive property of the baking oven, with its somewhat aggressive mixture of materials, goes without saying. As is fitting for a quality baking oven, the floor is not just welded to the walls along the sides, but rather cleanly raised on edge so that a highly anti-corrosive, enclosed, easy-to-clean floor tub is formed. ▷


**Saves space in your bakery: two MIWE thermo-static ovens – for 2 or 3 wagons each – can be operated with a single control column.**

An additional innovation saves valuable energy: under the floor tub, a 10 mm-thick multithermal insulating mat provides the proper heat insulation of the new MIWE thermo-static. As a result, MIWE thermo-static does not need its own floor heating system to evaporate condensed water, thus economizing on yet another consumer.

Inside the baking oven, the entire flow technology has been reoptimized, which benefits the evenness of the baking results. The new two-stage turbo system also contributes to more flexibility and evenness. This system always brings a little action to the usually quiet baking atmosphere of the thermal oil baking oven when the baker wants to "step on the gas."
Monitored by the MIWE TC control system, this turbo system evenly circulates the air in the baking chamber and thus leads to a more intensive energy transfer to the baked products. The first stage enables a light, soft browning; the second, the so-called booster stage, which can also be used to advantage in order to desteam the baking chamber quickly, by the way, permits an intensive browning of the baked product.

This benefits not just the browning process, but also tin bread, which can become somewhat greasy along the edges since the moisture there cannot escape. With the turbo system, the side stabilization succeeds quite easily. In the process, the constant conveyance of the circulating air from the front to the back is a further advantage, since groups of tins are generally inserted longitudinally, which means that the hot air flow blows along the sides between the tins.

Since the new MIWE thermo-static is now also available in a variant for a three-wagon group (with 50 % more baking area than the version with two), our engineers have also developed a new, extremely easy loading method. When loaded, a three-wagon group can weigh one and a half tons or more, thus requiring a clever means of support.
The resulting system should not be electrical, however – the propensity of such systems to malfunction under the hot ambient conditions in a baking oven are decisively too high. ▷

**Always a clear view: the orange bar defines the use of the two-stage turbo system – the blue bar indicates the steam input.**

Cleaned-up: the interior of MIWE thermo-static wins people over with its cleaning-friendliness.

Our engineers have thus come up with a mechanical solution that ingeniously combines high-performance technology with simplicity: MIWE slide. The wagon group slides over a flat incline, supported on the guide rails by ball bearings. In the process, only special high-technical bearings (so-called oven or VA bearings) from high-quality German production are used.

The system is maintenance-free and does not need a drive, thus persuading users with its high operational safety – and, especially: it is very easy to use. The slide-on rails of the wagons can be mounted later at any time so that existing wagons can usually be reused. In the case of MIWE thermo-static with three wagons, MIWE slide is always present. For the standard two-wagon oven, it is available as an option.

Thanks to the maintenance-free, solid MIWE slide, the wagon glides effortlessly into the baking chamber.

The new thermal oil wagon oven also has other options. In the case of the pump technology, the customer will be able to choose whether to use high-quality magnetic clutch pumps that do not dissipate heat or show seal abrasion or the cheaper, but just as safe-to-operate slide ring packing pumps. If desired, we can also equip the MIWE thermo-static with a cool-down system. For technical reasons, thermal oil baking ovens act a bit sluggish when temperatures fall due to the high energy content of the thermal oil. If it takes too long for the thermal oil to drop to a desired temperature, some bakers help the process along by opening the baking oven doors and letting the heat escape into the bakery. This is a pure waste of energy, of course, and also takes too long. We have thus developed a cool-down system for MIWE thermo-static. This system lets you rapidly lower the temperature in the baking oven (a cool-down of 100 °C from 280 °C to 180 °C only takes about 12 minutes) and the collected energy in the bakery can be reused, for example, to heat hot water for the dishwasher or to recover energy using a heat exchanger module, such as the new MIWE eco:nova. For this purpose, the thermal oil is conveyed through a cooling coil and cooled (while water is heated at the same time) and then fed back to the baking oven. The cool-down system is actuated – as in the case of all other functions of the MIWE thermo-static – using the new MIWE TC touch screen control system.

The new, patented steam system of MIWE thermo-static ultimately also brings more power to your bakery. We do not simply construct this system using structural steel, as is generally common, but rather we use

a special chain made of oval chain links that considerably increase the hot surface and thus guarantee an evenly steamed atmosphere throughout the entire process. This chain alone weighs 75 kilograms. For bakers, the best result of the new steam system is its extremely short recovery time, which lasts about 12 minutes. Even in case of baked products with very short baking times, batch-for-batch baking is thus guaranteed. The fact that the steam pipe is integrated into the baking oven cover and thus uses the excess heat of the baking oven as "supplementary heating" to some degree also contributes to this fast recovery time.

The cartridges of the steam system can be removed and replaced as a unit, which reduces the downtimes for maintenance to a minimum.

A large, easily accessible revision opening also provides a quick view of the interior if required.
The steam device can be chemically delimed and should be thoroughly rinsed afterward.

Only one question still has to be answered: when are you getting up steam? ■

**Even a battery of different baking ovens can have a uniform, flat plant appearance.**

# On the Energy-Savings Offensive

*How you can save energy cleverly with MIWE energy in your bakery*

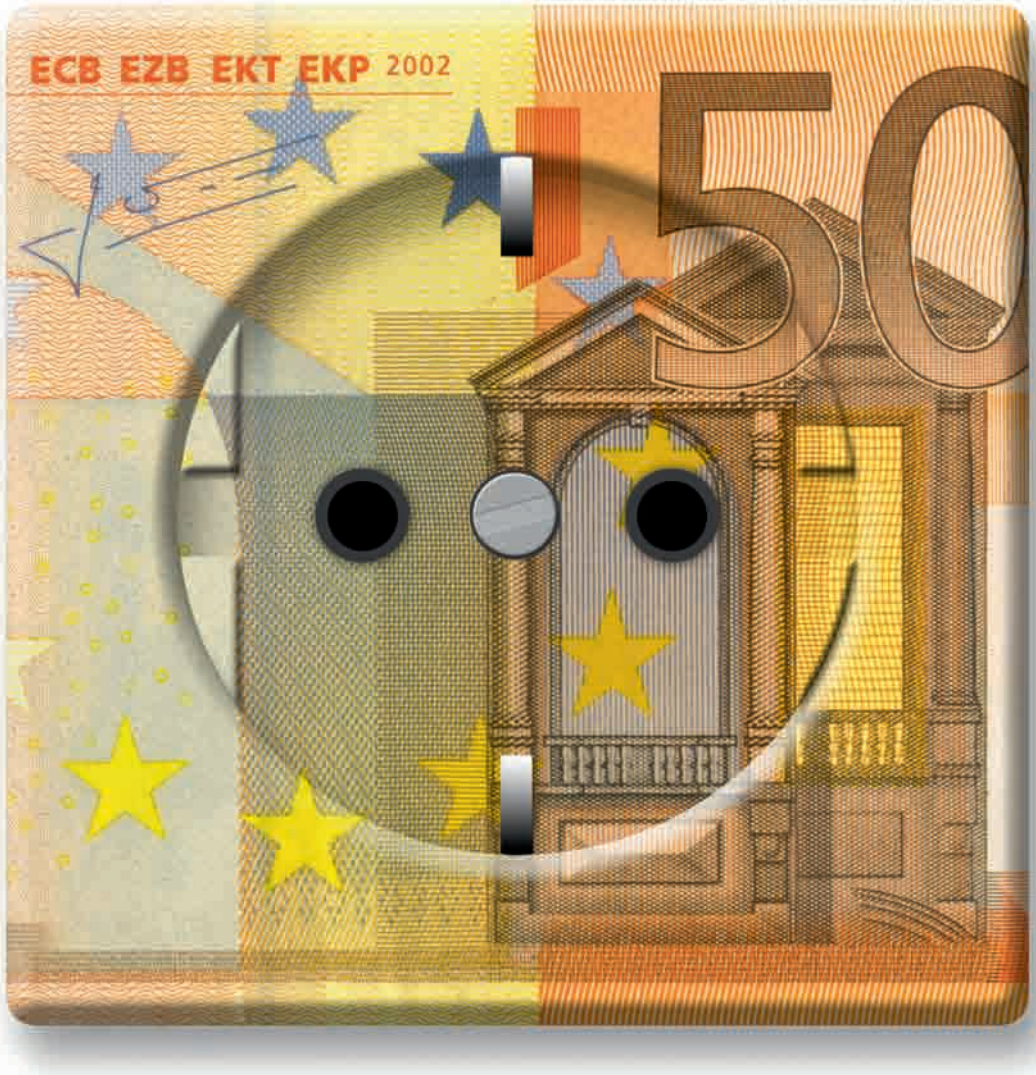
**Energy prices are stagnating. You do not have to be a prophet, however, to foresee that it will not stay that way. We will show you how you can stay out of the energy cost trap permanently with clever concepts and efficient technology.**

Everyone is talking about saving energy in the bakery. The advance announcements for IBA 2009 let us imagine what will astonish us in Düsseldorf: here a recovery plant, there a hot-water storage tank, a heat pump over there, and possibly a burner system for wood pellets in the next hall.

It is good for bakers that something is finally happening in this matter. They are thus now spoiled for choice and have the not-so-easy task of bringing light to a labyrinth of performance figures and thermodynamic case calculations.

Which system is the right one for my purposes? What is the best way to get started? Where can the most effective effects be achieved? Is it better if I invest in a new baking oven or in a heat recovery plant? Can various approaches be combined and higher energetic yields be achieved?
Can I proceed in steps – and what must be thought out and preplanned from the beginning? How does energetic optimization affect the quality of my products and operational safety of my plants? Is the energy consultant at all familiar with baking? Can he or she guarantee that his or her energy-saving concept will not mess up my processes or entrench them for years? Will the concept leave me the freedom I need as a baker in regard to assortment and organization?
People who deal in depth with the energetic optimization of bakeries quickly determine that the context is complex and solution approaches vary widely. In bakeries, the topic of energy comprises all areas of production and even goes considerably beyond them. Process water heating and heating and air conditioning technology almost automatically come into focus. Which energy-saving solution is the right one in individual cases and which energetic components should sensibly play a role in the process can be determined only by carefully balancing which energy consumers, energy flows, production processes, and energetic objectives apply in your individual case. Every bakery is different. Every baker sets his or her own personal focuses.

For this reason, MIWE energy is also not just limited to a portfolio of energetic systems that have been optimized especially for bakeries, such as a heat recovery plant, an absorption refrigeration machine, or a heat pump for bakery refrigeration. MIWE energy, rather, is a comprehensive consulting

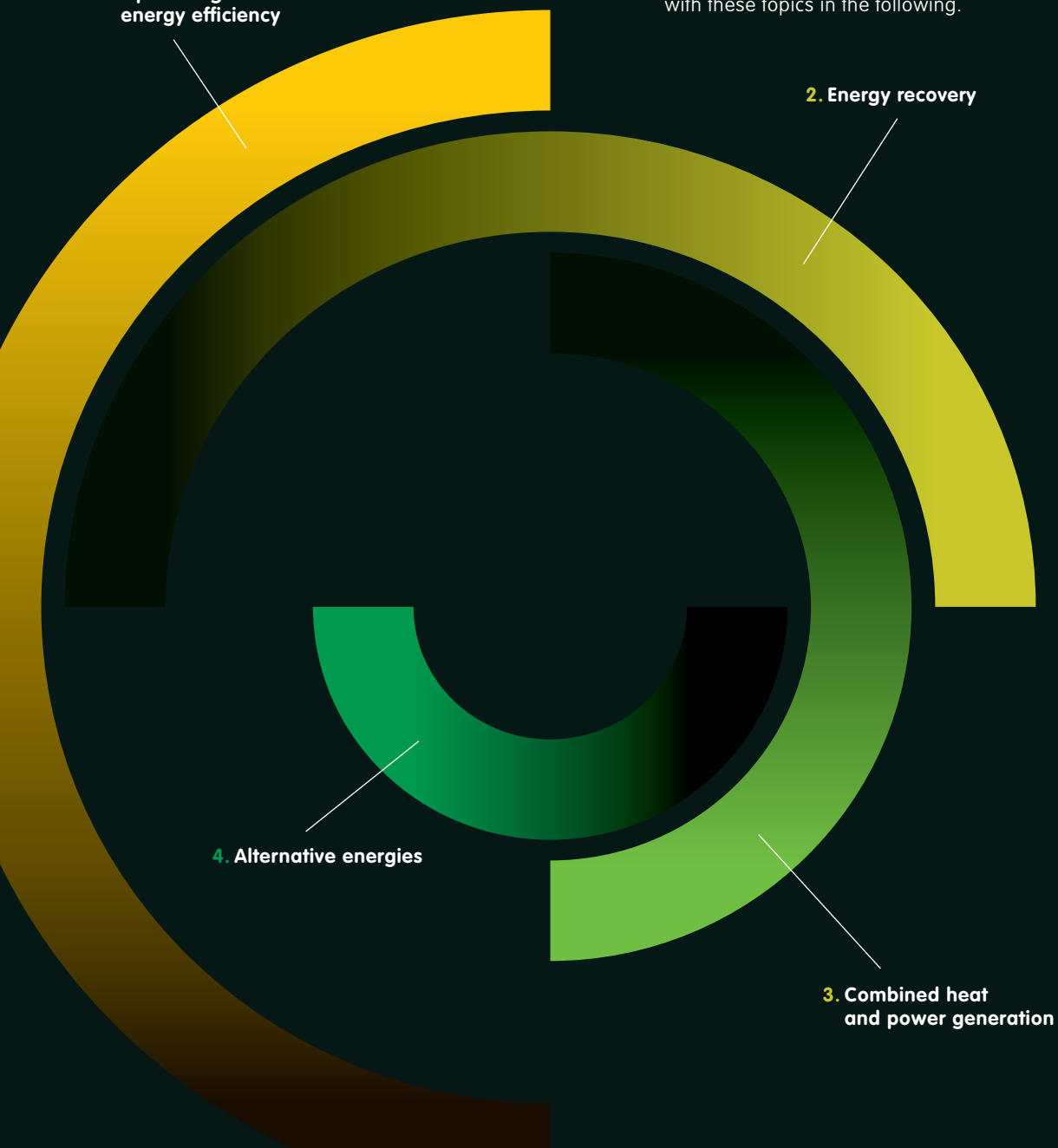



and engineering service for bakers, which competently surveys the complicated contexts of their bakery and which can draw from a whole reservoir of energy-technical possibilities while always keeping an eye on the technological requirements for proofing, baking, and freezing – we think these aspects are not unimportant in the case of a raw material that is as sensitive as dough. We guide the baker through the complete process of the energetic optimization of his or her bakery, from the determination of the current energy situation, development of the optimum savings concept, and planning of the new plant to the installation, commissioning, and maintenance of the entire system.

MIWE energy is based on four components that are not strictly, but rather principally based on each, which you will find written in the recommendations of the trade associations and VDI (Association of German Engineers) Guideline 3922 (Energieberatung für Industrie und Gewerbe (Energy Consulting for Industry and Trade), at least in spirit: the energy

efficiency of the plants used, the waste-heat utilization of the baking ovens and bakery refrigeration plants, combined heat and power coupling as an optional expansion, and the use of regenerative energies. From this wide fund of systems and approaches, the best-suited solution can be developed for every operation, need, and budget.

Precisely this is the objective of our energy consulting: helping you determine your path to energy savings. How these individual components influence each other, which place value you place on them within the scope of an energetic optimization of your bakery, and how you can be involved in a comprehensive, expert energy consultation with MIWE energy – we will briefly deal with these topics in the following.



## *Optimizing energy efficiency*

Heat recovery sounds like a win. This is absolutely right because, in the case of heat recovery, heat, which, as you know, would otherwise disappear unused, is supplied to a further use for which additional energy would otherwise have to be expended. This saves energy costs. The energetic optimization of a bakery, however, sensibly already starts with an earlier step: the energy efficiency of the plants and systems used. It makes no economical (not to mention ecological) sense to run up expenses recovering previously consumed energy for absolutely no reason.

A baking oven veteran in which the same, more badly than well maintained burner has been working for more than thirty years has no chance of developing cost-saving efficiency. Trying to lower the energy costs of this historical piece of equipment with a modern energy recovery plant would be a waste of money since nothing changes in the primary consumption of the baking oven and the gain made possible by the recovery had to be purchased expensively beforehand. In various cases, the modernization or utilization of existing plants using such state-of-the-art, energy-saving technology is thus the best start in a energy-saving future. In this way alone, up to 35 percent of the energy consumption or even more can be saved in individual cases.

Now, however, not every new baking oven is automatically an energy-saver – even if the manufacturer claims that it is. Master bakers Jakob-Ludwig Schantz and Lothar Skowronek, who were about to invest in a new rack oven, wanted to be absolutely sure. They subjected a MIWE roll-in and the corresponding rack oven- of a competitor to an extensive, simple, but thorough comparative practical test.

Both ovens were installed one after the other. First one, then the other had to demonstrate what it could do – and how much energy it consumed in the process – for a period of four weeks. In the regular production with the same products under the same conditions.
At the end of each utilization phase, the amounts of oil consumed were read. Then they were compared.
The result surprised even the bakers themselves. From the beginning, MIWE roll-in not only delivered a better, more consistent baked product quality, it consumed 20 % less energy than its competitor in the process. A fifth of the energy costs saved due to the selection of the right oven – this is the proper beginning for energetic optimization. ▷

**Proven in practice: MIWE roll-in already innately saves a great deal of expensive energy.**


**MIWE aircontrol is so easy to program, it's child play: you can thus precisely generate the air circulation that is optimum for your product.**

In addition to the generally high efficiency of the heat exchanger and the efficient utilization of heat, the MIWE aircontrol circulating air control system, which can be actuated and deactivated (in an automated manner) from the MIWE TC control system in fine stages depending on the baked product and the operating situation and thus individually optimize the heat transfer to each product, has a considerable share in this optimization. MIWE aircontrol switches off the circulating air fan automatically when the door is opened (this also applies to our baking stations). The heat is thus kept in the oven and not blown into the bakery. Even during steaming, the dosing grille of MIWE aircontrol automatically closes the baking chamber. The steam is thus not blown through the heating register and consequently also not cooled down. In addition, it has to fill only a smaller room volume – you need less steam, which means less water, less liming, and less energy. Others would have rested on their laurels at this point. Not the developers at MIWE. At IBA in October 2009, we are presenting a further-developed, energy-saving version of MIWE roll-in, namely MIWE roll-in e+ (you can find out more about this energy-saving baking oven on the next page).

**In shop operation with unpredictable baking times, the energy-saving mode of MIWE TC bridges the gap between fast baking readiness and highest possible energy savings.**

What we have shown here using MIWE roll-in e+ as an example – namely that energy saving at MIWE starts long before energy recovery – applies in a similar manner for the other baking oven systems from MIWE as well and even for apparently incidental details. Let's take the new MIWE thermo-static thermal oil wagon oven, for example: Where otherwise a fan under the floor tub would have to counteract the formation of condensate water (and thus consume a lot of energy), we have made sure that condensate does not occur using a special multithermal insulating plate, thus saving you electricity costs around the clock during the entire utilization phase. Solid insulation and special glass panes that steam from the inside and do not let the oven heat escape, while still permitting a good view of the products, serve the same purpose.

The control systems we use, especially the new MIWE TC, have a special place value for energy saving. At this point, we would like to remind you of the teachable baking oven that helps you gets optimum baking results according to the principle of gradient baking even when only partially occupied, thus allowing you to save energy. Or of the freely selectable time for baking readiness that makes sure that the oven reaches its operating temperature just in time. ▷

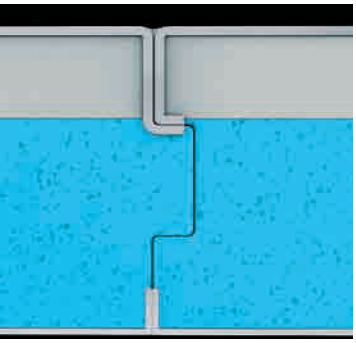

# Probably the most economical baking oven in the world: The MIWE roll-in e+

**Energy saving starts with the efficient utilization of energy. According to this principle, the MIWE developers have further optimized the MIWE roll-in rack oven, which already saved energy, to more extensive energetic optimization, thus creating the presumably most energy-saving baking oven in the world: MIWE roll-in e+.**

**The core of this oven is an additional flue gas channel (patent pending) on the back wall, in which the steam bars are now accommodated as well. The already impressive combustion efficiency of roll-in thus increases once more by about 5 %, while the connected load of the baking oven falls from 85 to 70 kW. The excellent degree to which MIWE roll-in e+ consumes energy can be seen by the temperature at which the flue gas leaves the baking oven. This temperature usually lies between 20 and 25 °C above the baking room temperature at the outlet; in the case of the new roll-in e+, it lies up to 50°C below it.**

**Even the air guidance was further optimized so that MIWE air-control controls the air circulation in a more efficient, more finely dosable manner. Experiments have shown that the baking room temperature can thus be set up to 15 °C lower – with the same baking result. In sum, energy savings of up to 15 % result in comparison with the preceding model.**
**Pleasant side effects are added to this: the service life of the heating register is improved and the evenness of the baking result increases – and remains stable even if the steam bars show initial signs of liming.**

Energy savings in refrigeration start with optimum insulation. The new MIWE TC (lower figure) helps save energy even in this case thanks to more precise regulation and improved sensors.



Or of the Power Down mode, during which a baking oven automatically enters an energy-saving standby mode with a baking room temperature lowered to 100°C according to another freely selectable time period because extensive experiments have shown that this standby temperature is optimum between restorable baking readiness and energy to be saved.

The same applies to the MIWE bakery refrigeration technology because energy, expensive electrical energy, is also consumed in refrigeration, especially due to the increasing importance of freezing methods and deep-frozen products; in this case, as well, we pay attention to energy-saving use from the beginning. Gapfree insulating systems make sure that the cold remains where it belongs, namely in the cooling and freezing cell (physically more correct: the ambient heat may not penetrate into the cells).

For several years, we have been equipping our refrigerating machines with frequency converters if requested because the machines can always be operated in the optimum output range in this manner. Energy savings are achieved by avoiding start/stop operation and prevent a long-lasting startup process. Output peaks can thus be extensively compensated. This alone provides energy savings up to 30%. Even in bakery refrigeration, MIWE TC comes into use just in time for IBA 2009 and, with its expanded measuring and evaluation capacities and further improved sensor system, opens up not just a more precise regulation of the temperature curve, but also (e.g. through the regulation of the steam cylinder instead of an on/off circuit) a further saving of the electrical energy consumed.

Even MIWE smartproof, the dough guidance method that we developed especially for the manufacturing of large quantities of high-quality, small baked wheat products, is mainly used for energy savings in addition to increasing the quality of the products. It namely does without the particularly energetically expensive freezing stage (even during dispatch), but still offers a convenient time horizon between manufacturing and the in-shop baking process.

All this shows that MIWE customers are professionals in the efficient use of energy from the beginning. What you do with this power is decisive, of course. To a certain degree, it lies in your hands whether an energy-saving plant also runs in an energy-saving manner.
Due to clever production planning (e.g. continuous baking at a principally lower temperature instead of longer standing phases at operating temperature or baking with oscillating temperatures) and careful behavior in the bakery (e.g. avoiding unnecessary opening of doors), any amount of energy can be also saved. This also applies to the regular maintenance of the plants and especially to the regular cleaning of the steam condensers.
Dirty apparatuses reduce the efficiency and cost unnecessary energy.

## *Energy recovery*

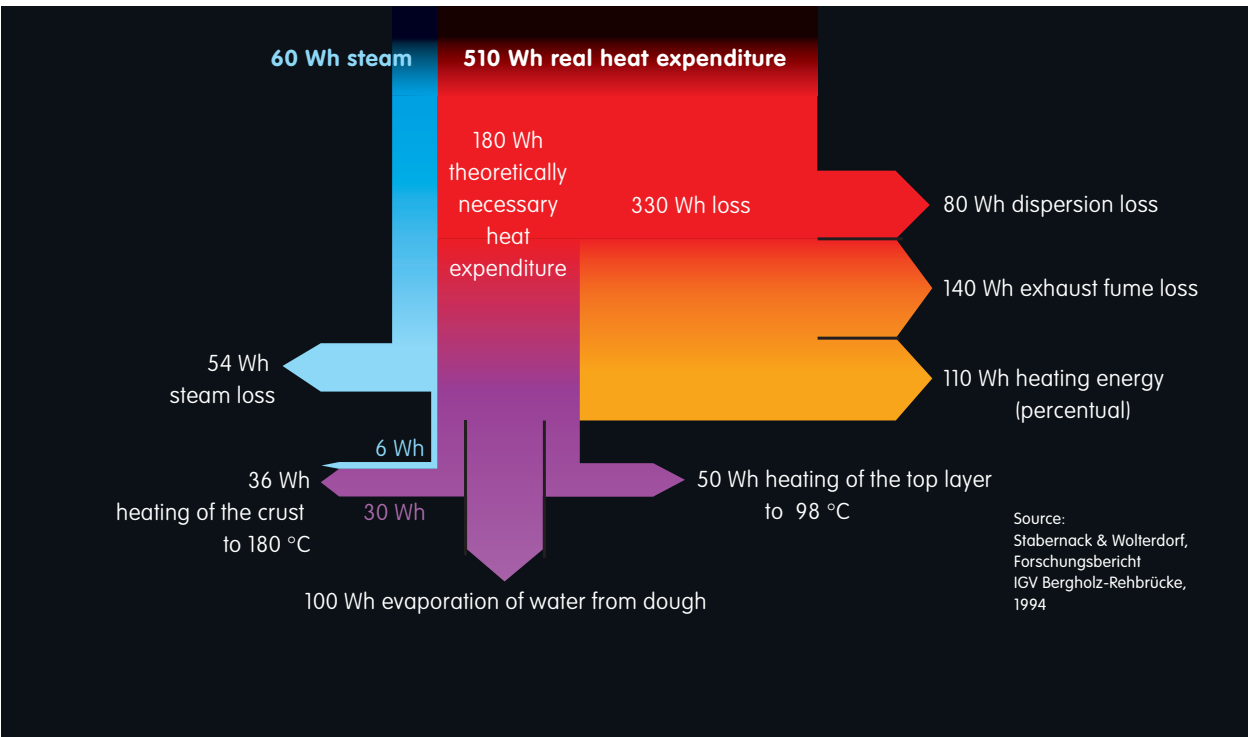
When the energy efficiency of the plants and equipment used is guaranteed, energy recovery comes

into play as the next stage of energetic optimization. This sounds like a contradiction: If the use of energy is efficiency-optimized, how can energy still be recovered? The answer is easy: because more energy than is actually required for baking (or freezing) the product has to be used during baking and refrigerating for a number of physical and technological reasons. After having performed its task in the baking chamber, for example, steam still has a very high energy-content.
Similar to the flue gas, which dissipates most of its energy (but not all) to the baking chambers, thus cooling down to a temperature that is still high, but no longer usable for baking, the steam is simply blown through the chimney into the atmosphere if no recovery measures have been taken. There it disappears without an effect – with the exception of its contribution to global warming in its own way. These dissipated materials still have a lot of energy, however. Energy that can no longer be used for baking, but absolutely for other purposes.

Something similar applies to freezing: other than cold, compression refrigerating plants always generate heat as well. You can see this using your own refrigerator. Without recovery measures, this heat is just dissipated to the circulating air.
A running refrigerator cools its contents, heating up the kitchen in the process.

The same applies to compression refrigerating plants in bakeries.
If you use this waste heat in a targeted manner instead of uselessly heating up the bakery with it, the energy expended can be reused. This is precisely the point of every heat recovery measure: an improved use of the energy expended.
Composite plants of MIWE have been doing this for many years: using the heat of the refrigerating plants for proofing chambers and thawing according to the motto: "From minus to plus." ▷

**Should the expensive energy really escape unused through the chimney? The diagram below clearly shows which amounts of expensive residual energy are available during baking alone.**



## *Recovery in the bakery is a skill*

With all the concentration on energy savings, bakers always have other objectives that are just as important to them in focus: the evenly high quality of their products and safety of their processes. A recovery solution that saves energy costs, but forces the baking process to its knees again and again is not in the best interest of the baker.

Specialists who, in addition to the complex possibilities of energetic optimization, know their way around the difficult material of dough and its climatic requirements are thus in demand for these tasks. Energy consultancies have been springing up like mushrooms in recent months and not all of them can keep the promises they rightfully make for other applications to bakeries as well. A certain care is thus necessary. Public funds can be obtained with energy consulting, which has attracted one or the other charlatan. The designation of "energy consultant" is also not legally protected.

Principally, anyone can call themselves an "energy consultant" without having to provide proof of their qualifications. And even where high-quality training is offered, for example at your local Chamber of Crafts, the aspects that are important to bakers are not focused upon: the sensitive processes during proofing, baking, refrigerating, or freezing in the bakery.

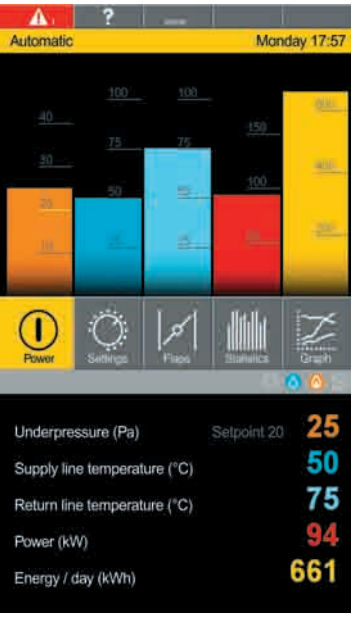
People who are not familiar with terms like steam, baking loss, or draft regulation should not be energetically optimizing bakeries. A certain degree of care should also be taken with consultants who have experience in bakery optimizations: anyone who cannot offer you more than simple flue gas recovery and perhaps waste-heat utilization for refrigeration obviously masters only half of the necessary tools. At any rate, optimum efficiency is not achieved in this manner.

An energy consultant for bakeries merely needs a good command of the following two aspects: he or she must know his or her way around techniques and technology of the process stages in a bakery and he or she must understand his or her profession as an energy optimizer. The energy consultants of MIWE have precisely these prerequisites. They have a comprehensive overview of the complex area of energetic optimization, not just of the baking oven environment, and not just limited to bakery refrigeration. Precisely there, however, that is, in the processes that are extremely quality-critical and highly production-relevant for bakers, they have a fundamentally solid understanding of the context and the necessary baker know-how.

## *The MIWE energy composite system*

Energy recovery is principally a lucrative business. But only if those involved have previously considered for which purpose the recovered energy should ultimately be used. A large tank of hot water that is not used heats your good conscience, but otherwise makes no economic or ecological sense. Such solutions, however, can be found on the market, sometimes with grotesque consequences. One anecdote tells how a baker runs his central thermal oil heating boiler unit around the clock so that he can heat his swimming pool with the recovered waste heat.

**The touch screen of MIWE eco:nova clearly shows you how much energy you can recover by the hour, day, and year.**



That might be fiscally advantageous, but it is a catastrophe in terms of energy technology.

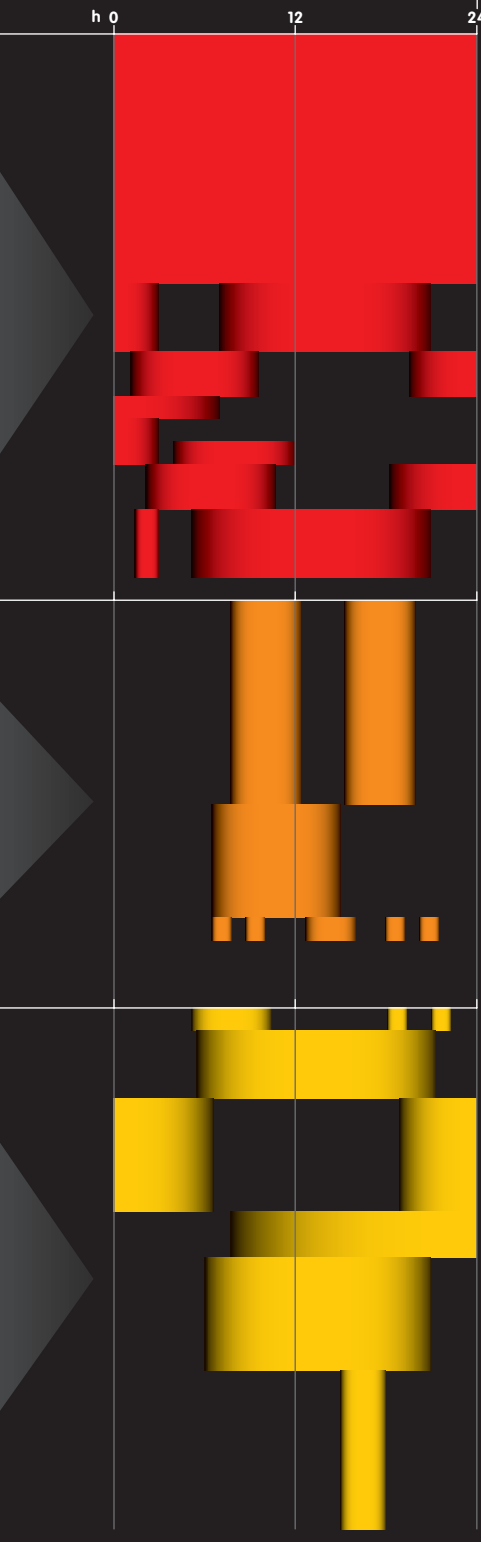
The opposite also applies, however: a waste-heat utilization concept that does not consider the availability of the required hot water for the assumed utilization purposes, for neither the current operation organization nor for possible assortment or production changes in the future, has obviously not been thought through to the end.

For us at MIWE, this means that we do not offer or plan energetic optimizations if the consumer side has not been satisfactorily clarified.
This is not as trivial as it sounds – and precisely for this reason so many recovery solutions remain far below their technically possible efficiencies.
On the "supplier" side, some systems provide heat at different temperature levels continuously, but others only temporarily. A baking oven provides recoverable energy only when it bakes, but at a very high (flue gas) or minimally high (steam) temperature level. The compression refrigerating plant of a deep freezing storage cell, however, constantly supplies usable waste heat, but only at a comparably low temperature level.
On the customer side, the conditions are similarly inhomogeneous.
For the floor-freezing protection of a refrigerating cell, for example, low temperature-controlled hot water suffices, but must be continuously available. Floor heating can be operated at similarly temperature-controlled water, but requires this water generally only in cold seasons.
A baking tray washing machine, on the other hand, occasionally uses a large water volume that needs to be as hot as possible for a washing sequence.

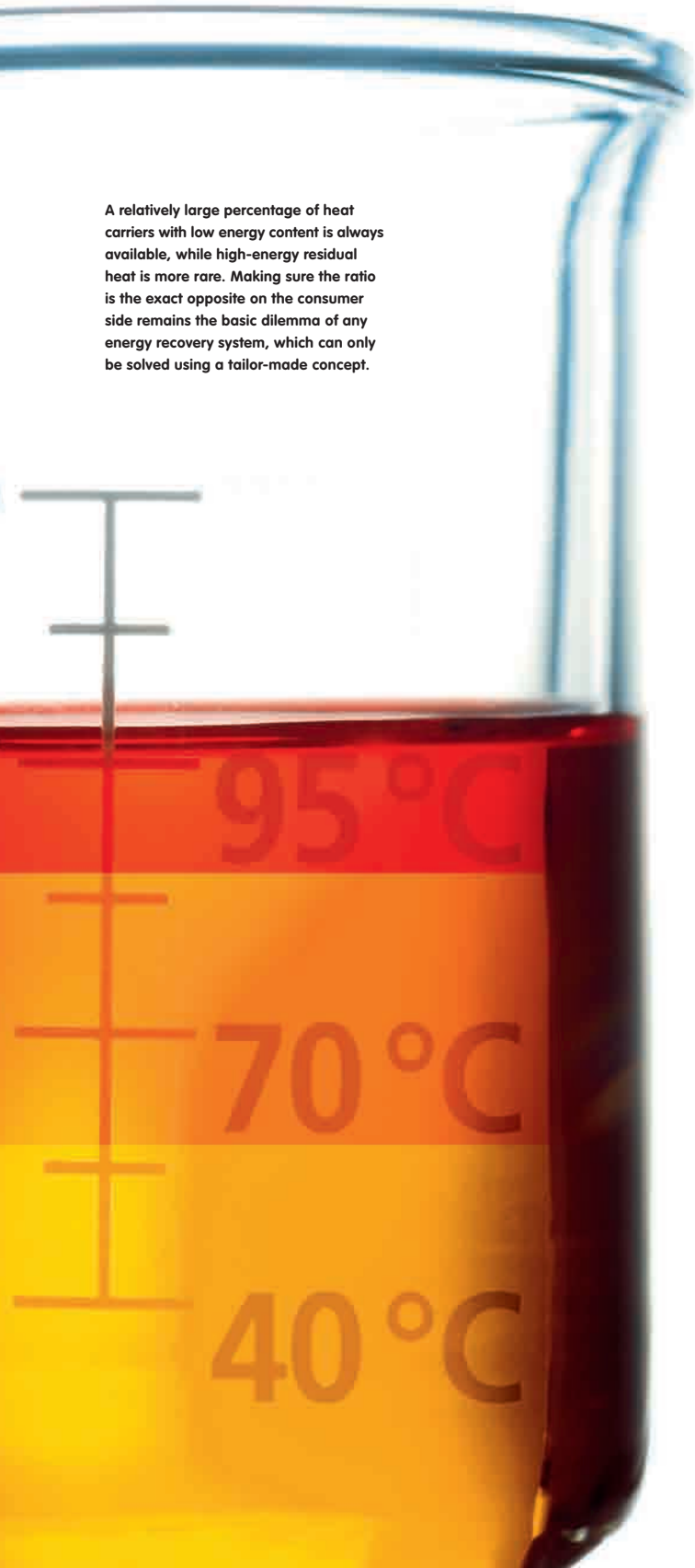
Energy production and consumption are thus asynchronous in the case of heat recovery and take place on several, completely different temperature levels. In this context, we speak of the hot water pyramid: a wide band with the typical process water temperature of about 60 °C and above that a comparably small peak with high-temperature water (> 90 °C) sits on a voluminous base with low-temperature water (about 40 °C). ▷


**Next to MIWE eco:box and MIWE eco:freeze, MIWE eco:nova is an extremely important component of the overall resource-saving concept (also see the graphic on the following page).**


To demonstrate the complexity of this topic, we have used only one example each of all conceivable energy suppliers and energy consumers. The colors indicate the temperature range (95/70/45 °C), the height of the bars defines the amount of energy, and the length of the bars represents the approximate period of availability or consumption. If the number of energy suppliers increases on the one side, for example, the consumer side reacts analogously, which means that the basic dilemma remains: too much high energy – and often at the wrong times. Here (thus in parentheses), for example, a combined heat and power plant could represent a bypass – in addition to the supply of new energy. MIWE energy:check gives you an initial (and especially affordable) impression of the opportunities for your company, while MIWE energy:analysis provides a well-founded, completely calculated, individual solution. Ultimately, the following also applies in regard to "energy": we make the baker's life easier.




| Energy converter | Energy carrier | Energy consumer |
|---|---|---|
| MIWE eco:freeze | Water | Freezer storage room |
| MIWE eco:freeze | Water | Freezer |
| MIWE eco:freeze | Water | Air conditioner |
| MIWE eco:freeze | Water | Ice water |
| Plate heat exchanger | Water | Gelatinizing plant |
| Plate heat exchanger | Water | Deep-frying plant |
| Plate heat exchanger | Water | Tempering unit |
| Plate heat exchanger | Water | External steam generator |
| Plate heat exchanger | Water | Pasteurization oven |
| Plate heat exchanger | Water | Case washing plant |
| Plate heat exchanger | Water | Baking tray washing plant |
| Plate heat exchanger | Water | Dishwasher |
| Plate heat exchanger | Water | Sanitary needs |
| Plate heat exchanger | Water | Heating plant |
| Plate heat exchanger | Water | Proofing chamber |
| Plate heat exchanger | Water | Yeast sponge preparation and/or fermenter |
| Plate heat exchanger | Water | Swimming pool |
| Plate heat exchanger | Water | Car washing facility |




**A relatively large percentage of heat carriers with low energy content is always available, while high-energy residual heat is more rare. Making sure the ratio is the exact opposite on the consumer side remains the basic dilemma of any energy recovery system, which can only be solved using a tailor-made concept.**

Each temperature is well suited for certain purposes, for others less so. The higher the temperature, the more versatilely the hot water can be used and the more valuable it is within the scope of an energy composite system. The key to the success of a heat recovery concept thus lies in the clever dimensioning and intelligent management of these various temperatures and volumes. For this reason, a component that stores excess energy like a buffer in the form of water at a different temperature and distributes the available potentials intelligently across the various consumers is thus the focus of the energy composite systems of MIWE. Among other things, such a centralized storage and distribution system is important because the concept of heat recovery may not limit bakers in their freedom of decision in regard to assortment and operating processes against their will. An energy recovery concept tailored too precisely to the actual situation of a bakery leaves no room in the weekly or assortment scheduling – precisely this may not be the purpose of an energy composite system.

## *The MIWE energy component*

The first important component of a recovery system has thus already been addressed: the storage unit that not only buffers the hot water supply, but also provides intelligent distribution management.
A whole series of active recovery components are added to this, especially heat exchanger systems that remove the waste heat from flue gas and steam and add it for further use in the form of hot water.

An example of this is MIWE eco:box, a simple, but highly effective flue gas

heat exchanger for individual baking ovens and smaller burner outputs. Added to this is MIWE eco:nova, long well-established on the market, which processes flue gas and steam separately and thus opens up twice as much energy as pure flue gas heat exchangers: up to 25 % of the burner energy used is recovered in this manner. MIWE eco:nova can be used modularly for nominal burner outputs of 160 kW to 960 kW and higher. At the same time, it supplies an efficient flue gas cleaning system and thus also reduces the emissions of your bakery. It also ultimately permits a precise control of the oven draft completely independently of the climatic ambient conditions.

In the area of refrigeration, we rely on a two-stage energy recovery system because, in this way, higher water temperatures can be achieved than in the case of just single-stage heat exchangers. The first stage, a heating stage, supplies process or heating water with temperatures up to 70 °C, while the second stage (full condensation) reaches temperatures of about 40 °C.

That is not enough, however. Since the electrical energy expended for refrigeration purposes is quite considerable and since electrical energy is the most valuable and accordingly most expensive energy form of all, we have developed a system, MIWE eco:freeze, that is able to generate refrigeration down to a temperature of –10 °C from hot water (> 90 °C) using the principle of the absorption refrigerating machine. The possibilities for use are accordingly versatile: walk-in coolers, air conditioning, ice water preparation, or the support of conventional compression refrigerating plants for freezer rooms come under consideration. In this way, a lot of money can be saved at a point that is very critical in terms of energetic considerations. ▷

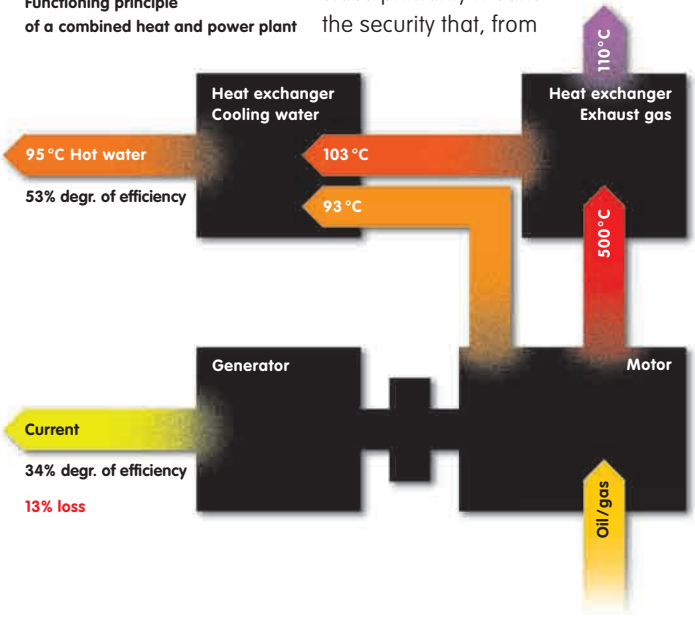
**MIWE baking ovens and heat recovery: energy-saver in a well-thought-out, efficient interplay.**

## *Combined heat and power coupling*

If energetically sensible and economically attractive for the baker, we integrate further components into our energy concepts, of course, even if we do not manufacture them ourselves. A combined heat and power plant that generates electrical power and heat according to the principle of combined heat and power coupling, for example, should be mentioned first; such plants can profitably round off the energetic optimization of the bakery in many cases. This technology is very well established on the market and a number of manufacturers have plants that can be used in industry or trade that have been excellently proven in practical use. Many of these manufacturers share our concepts of quality and service.

For bakers, this openness on all sides primarily means the security that, from MIWE, they can expect a comprehensively energy-optimized solution in the truest sense of the word and an expertise that goes beyond the company's own energy components.

**Functioning principle of a combined heat and power plant**




## *Alternative fuels*

Within the course of the energetic optimization of bakeries, the use of alternative fuels is often discussed, from wood cuttings and pellets to biogas. Two things can be said for these fuels, completely independently of their price: in contrast to fossil fuels, they are not infinitely, but almost unlimitedly available as a renewable raw material.
In regard to $CO_2$ emissions, they are environ-mentally neutral – a weighty argument for bakers who find themselves in the position where they have to provide figures on their emissions or even name a $CO_2$ footprint for their products.

For this reason, we at MIWE have already been dealing intensively with alternative fuels for our baking ovens for a long time. They primarily come into consideration in connection with central heating boiler units for thermal oil systems because, in that case, a few basic disadvantages of these fuels are of no consequence. Their energy content is namely not nearly as consistent as in the case of oil and gas. They also produce ash, for whose disposal a means must be provided near the burner. By the end of 2009, we will present a pellet-driven burner system – initially for our thermal oil industrial ovens.

## *How do I obtain a solution?*

The previous sections were intended to make it clear that the energetic optimization of your bakery is generally a very rewarding, but not entirely easy task. We offer several possible approaches and a large number of conceivable combinations. A concept off the peg promises no solution in these cases.

The point rather is to help you find a way that opens up the highest potential savings in your special case and generates short amortization periods with high capital returns. For this purpose, a balance and comprehensive consideration of all energy consumers and flows of energy in your bakery must be made.

Only before the background of this overall evaluation can a founded decision be made as to which components should be sensibly integrated and which can be confidently left out because they help the supplier, but not the degree of efficiency of the plant, on its way.

We have organized this phase of requirement determination and concept development into three successive stages. In this way, you can first obtain information on the possibilities and opportunities of your bakery at a downright affordable price and then decide step by step how far, how fast, and how comprehensively you want to advance and realize the optimization concept.
The first step, the MIWE energy check, clarifies the most important questions at the beginning: what energy reserves does your company have? How profitable is an investment in energetic optimization for you? Which possible approaches are open to you? For this purpose, we first collect the most important, energetically relevant data of your company with your active help, for example, data on your current energy consumption, the energy consumers, and your production organization. On the basis of this elementary data, we can roughly calculate where which possible savings open up with which measures. ▷

**Whether solar energy, pellets, wood chips, or biogas: alternative, regenerative energies are generally the "dot on the i" of an overall energetic concept and can never replace such a concept entirely. For this reason, they should be at the end and not at the beginning of your savings considerations.**


**Clearly defined steps help you keep an eye on the cost/benefit factors from the beginning, develop the right model for saving energy, and ultimately implement this model for your business optimally and profitably.**

More precise results and a guideline for your decision on the path to take is provided by the second consultation stage: MIWE energy analysis. The core of this analysis is a precise, actual determination of all energetically relevant components, processes, and material flows in your company.
For this purpose, a MIWE energy consultant records all required data and facts together with you within the scope of a bakery tour.
If required, special measurements are made.

In this context, the spatial situation is also considered in detail. In the accompanying consultation, we also ask about everything that could have an influence of the design of the energetic optimization: your personal objectives, for example, or planned changes in the assortment or operating sequences. On this basis, we develop at least two models for an energy composite system, which leads to noticeable energy savings in your bakery.

We name the energetic components that should be sensibly integrated, we explain and dimension the planned energy flows, and we evaluate the models under economic view points, especially in regard to a possible development of amortization. In short: we put you in the situation where you can assess the efficiency, effects, and range of the planned energy composite system in detail.

Once you have finally decided on a solution, the implementation of the planning begins: MIWE energy concept for your company. On this level, we work out the selected concept and all its details for you. The result is a precise plan and exact naming of the costs connected with its implementation. It is then up to you to give the green light for execution and start saving energy.
In the process, we always put great value on making sure that neither the quality of your products nor the operating safety of your plants are impaired by the energy optimization. We also guarantee that you have room to maneuver in regard to assortment and operational-organization even after the energetic optimization.

You would like to get started? Great! You can find out more about this multistage plan for energy savings in your bakery when you visit us at IBA in Düsseldorf. From October 3 – 9, 2009. At Booth D11 / 12 in Hall 15. Or you can request additional information material that we will have ready for you in October 2009. ■

## *Fair dates*

- **Food Week**
  Utrecht / Netherlands
  28.–30.09.2009
- **iba**
  Düsseldorf / Germany
  03.–09.10.2009
- **Anuga**
  Köln / Germany
  10.–14.10.2009
- **Gulfood**
  Dubai / UAE
  21.–24.02.2010
- **Bakkerij Dagen**
  Amsterdam / Netherlands
  28.02.–02.03.2010
- **Europain**
  Paris / France
  06.–10.03.2010
- **internorga**
  Hamburg / Germany
  12.–17.03.2010
- **Die Genuss, ÖBA**
  Wels / Austria
  24.–27.04.2010
- **Bakery Show Case**
  Toronto / Canada
  16.–18.05.2010
- **Südback**
  Stuttgart / Germany
  16.–19.10.2010
- **IBIE**
  Las Vegas / USA
  26.–29.10.2010

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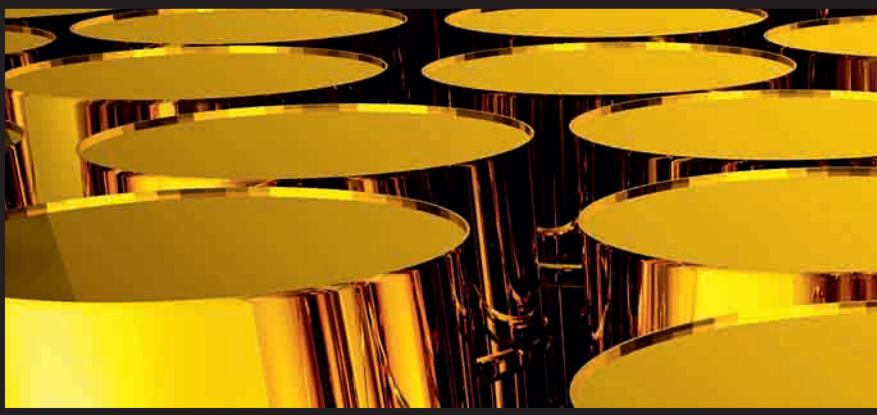

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