

think process!



Werner & Pfleiderer  
Bakery Technologies

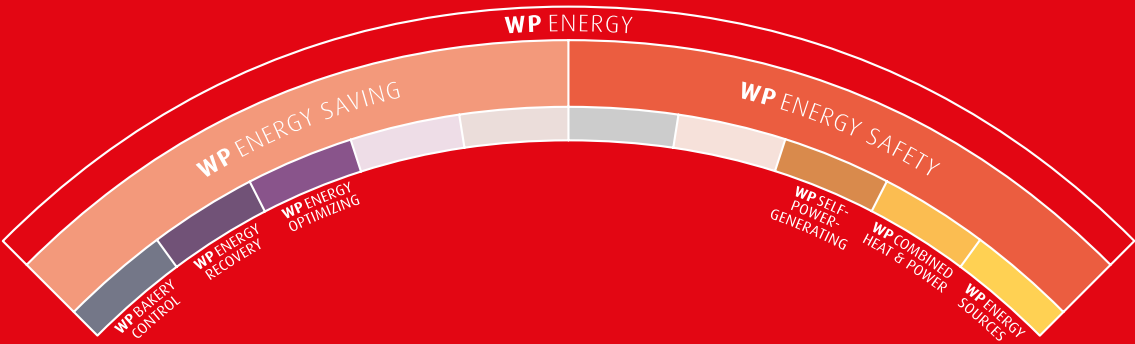
# WP ENERGY

**WP ENERGY SAVING**

**WP ENERGY RECOVERY**  
**WP ENERGY OPTIMIZING**  
**WP BAKERY CONTROL**

**WP ENERGY SAFETY**

**WP ENERGY GENERATING**  
**WP HEAT & POWER**  
**WP ENERGY SOURCES**



# We are WP.

We are **WP** Bakery Technologies. For more than 140 years we are developing technical solutions for bakers. We build, install and maintain baking ovens, machines and production lines for all kinds of bakeries from artisan enterprises to full-scale industrial production lines. Worldwide. MATADOR®, our multi-deck oven, is a legend in bakery technology. Within the **WP BAKERYGROUP** we are the experts for every type of oven and their loading systems that best work with them, for dough processing lines and for vacuum cooling systems.



We are a company of the **WP BAKERYGROUP**, which means we cover the entire process chain of bakery technology for all purposes ranging from finest artisan to large industrialized production, for fresh and durable baked goods. We are the only supplier in the market with that all-round capability, making us market leader in the field, worldwide. We produce everything the market needs. Our machine equipment covers everything from dough processing, dough dividing and moulding, baking in multi-deck, rack and tunnel ovens, their automated loading, proofing and vacuum cooling.

## WP Bakery Technologies

We have been working for bakers for a long time, and we're good at it. Our customers use our products all over the world to get best bakery results.

We are always looking for the better solution, better technology, ever better products. We observe the market very closely and know what customers are looking for. Which is why we are constantly looking for new ways, always in close collaboration with our customers. We are highly innovative and always have our eyes on tomorrow's developments – **FutureWork** is our passion.

For more than 140 years we have been developing new and innovative baking technologies – for multi-deck ovens, rack ovens, wood ovens, tunnel ovens, in-store ovens. Our patented brand ovens MATADOR®, ROTOTHERM®, UNITHERM®, PELLADOR® and MEGADOR® are used day-in, day-out for best results in bakeries all over the world.

We take care that our customers production lines run without interruption, which is what our **ProductionCare** is all about.

Against the background of dependencies in energy procurement, increasingly scarce resources, rising prices and environmentally friendly, sustainable production, we are working intensively with **WP ENERGY** on the possibilities of energy saving and energy security.

>>> like to know more? [www.wp-l.de](http://www.wp-l.de)

**WP ENERGY** – under this theme we bundle  
**WP ENERGY SAVING** . possibilities and measures for energy saving  
**WP ENERGY SAFETY** . possibilities and measures to secure the energy supply

**WP ENERGY SAVING**

**WP BAKERY CONTROL**

The digital production management system for planning ovens and machines and to optimise energy consumption.

**WP ENERGY RECOVERY**

Concepts for recovering used energy – especially from exhaust gases and vapours.

**WP ENERGY OPTIMIZING**

Concepts to reduce energy consumption.

**WP ENERGY SAFETY**

**WP SELF-POWER-GENERATING**

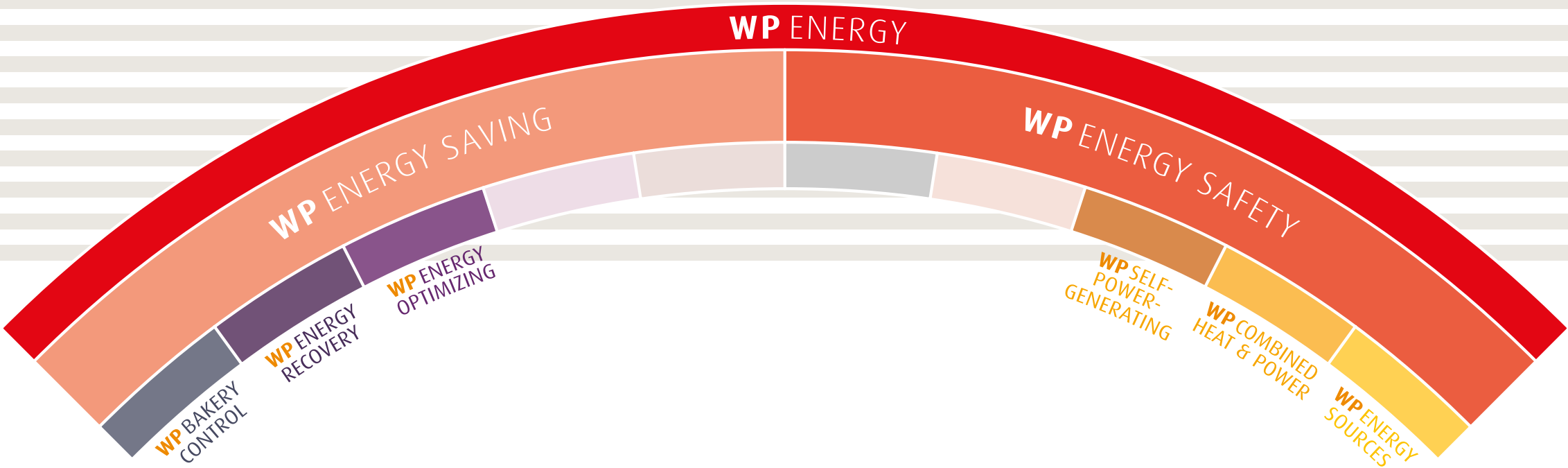
Having your own energy production makes you independent.

**WP COMBINED HEAT & POWER**

More efficient electricity generating through combined heat and power.

**WP ENERGY SOURCES**

Energy alternatives for heating baking ovens.

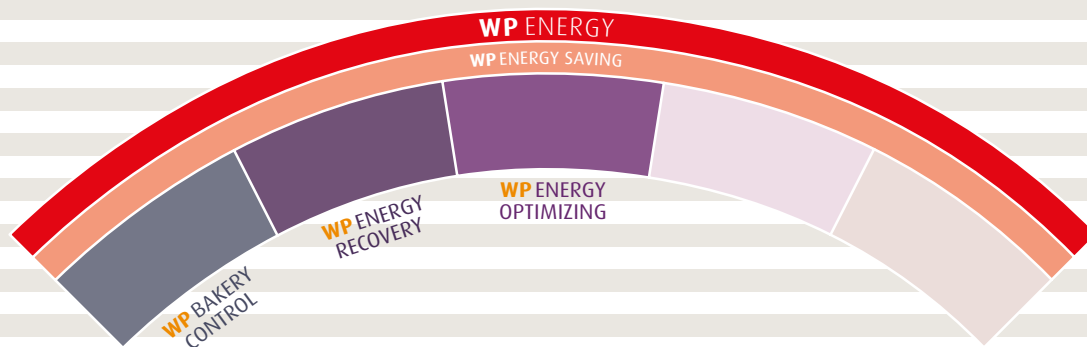


# WP ENERGY SAVING

**CONSISTENTLY USING ENERGY SPARINGLY IS ONE OF THE MOST IMPORTANT STARTING POINTS FOR RUNNING A PRODUCTION PLANT PROFITABLY.**

In the production process of a bakery, there are three areas in particular whose energy efficiency must be critically considered and permanently developed and fine-tuned:

1. production planning
2. energy recovery
3. the use of energy



## WP BAKERY CONTROL

Digital production management

There are a number of adjusting screws that can be fine-tuned to plan oven and machine operations and optimise energy consumption: With **WP BAKERY CONTROL**, bakers have their production processes under control.

## WP ENERGY RECOVERY

Concepts for energy recovery

Where energy is used, energy can be recovered – it's as simple as that. The main question here is efficiency. With **WP ENERGY RECOVERY**, we combine the best concepts according to the current state of the art.

## WP ENERGY OPTIMIZING

Concepts for reducing energy consumption

Not all ovens are the same. And an old oven simply cannot be as energy-efficient as a new oven. Too much has happened in technical development in recent years for that.

With **WP ENERGY OPTIMIZING**, we pull out all the stops to reduce energy consumption. It is always worthwhile to make a comparative calculation.



# WP BAKERY CONTROL

- THE DIGITAL PRODUCTION MANAGEMENT**
- **PLANNING OF OVEN AND MACHINE USE**
  - **REDUCTION OF ENERGY CONSUMPTION**
  - **MINIMISING OF WAITING TIMES**

**What should be produced, how, when and in what order?**

**What is the optimal production planning?**

**How can energy consumption be optimised?**

**We make the production process transparent.**

There are a number of adjusting screws that can be fine-tuned in the course of production to save as much energy as possible: setting up the daily production schedule, planning the use and occupancy of machines, especially the planning of oven starts, oven occupancy and the avoidance of idle times, the choice of optimal recipes and the monitoring of ongoing production. All this should be reflected in the energy consumption statistics and batch reports at the end of the day.

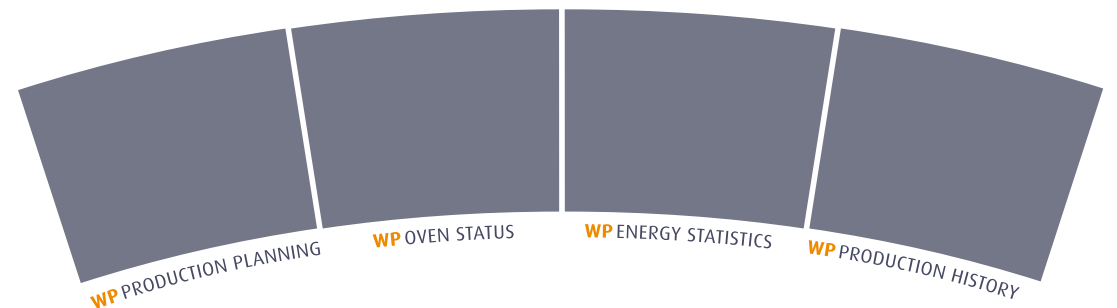
What more does **WP BAKERY CONTROL** offer? Data are stored and analysed, deviations are detected and reported – stationary and mobile, anywhere and anytime. Plan, do, improve – it can be as simple as that!

**think digital.**

## PRODUCTION MANAGEMENT

- ... Plan production (which products when)
- ... Plan machine use/occupancy
- ... Plan oven allocation
- ... Optimise energy consumption
- ... Monitor production
- ... Complete and evaluate batch reports
- ... Initiate improvement process

- **Network all machines and branches**
- **Production becomes more efficient**
- **Energy is saved**
- **The quality level of the products is constant**
- **The products are fresher**
- **A permanent improvement process takes place**

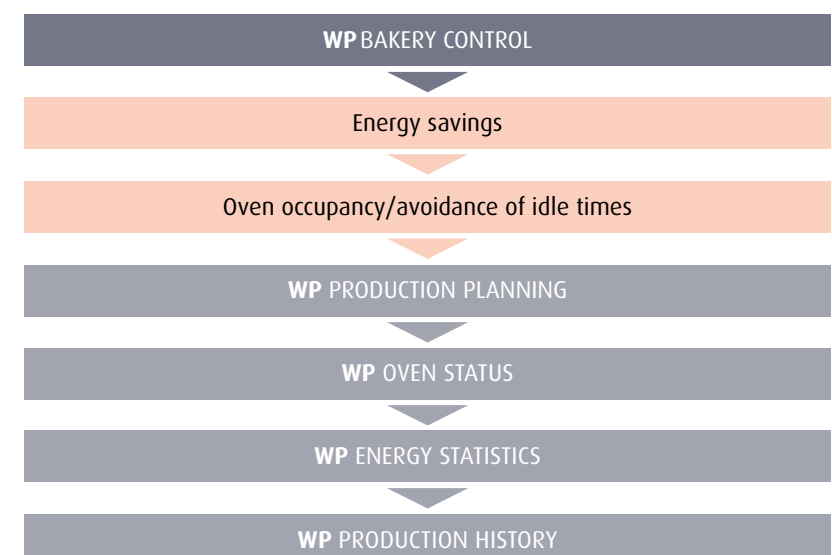


We enable our customers to plan their productions consistently, to have an efficient production process, to maintain a constant level of quality, to save energy and to the implementation of a permanent improvement process. Optimised planning results in a concentrated production schedule with less idle time and thus a later start of baking. Optimisation leads to more freshness – safe, better, digital!

## CUSTOMER BENEFITS

1. **WP PRODUCTION PLANNING** . Optimisation of energy consumption
2. **WP OVEN STATUS** . Oven utilisation and occupancy
3. **WP ENERGY STATISTICS** . Energy consumption statistics
4. **WP PRODUCTION HISTORY** . Identifying potential for improvement  
Avoidance of errors

**... less consumption!!! ... more freshness!!!**







# WP ENERGY RECOVERY

**THE ENERGY USED IN THE OVEN SHOULD BE RECOVERED AS FAR AS POSSIBLE – WHENEVER IT CAN BE PUT TO GOOD USE.**

**Saving energy is one side of the coin, recovering the energy used is the other.**

In ongoing baking operations, the regular use of energy – a great deal of energy – cannot be avoided. A not insignificant proportion of this energy – approx. 40% – from the operation of the ovens can be recovered through the use of exhaust gas and steam heat exchangers. It can be usefully employed, for example, for space heating and water heating.

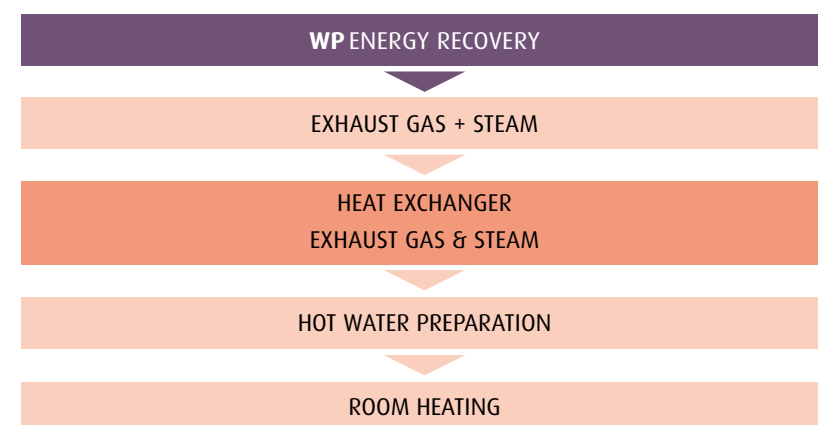
**think energy.**

## ENERGY RECOVERY OVEN

- Energy recovery from exhaust gas
- Energy recovery from steam
- Combined energy recovery from exhaust gas + steam

## ENERGY RECOVERY

1. **WP** Exhaust gas heat exchanger
2. **WP** Steam heat exchanger
3. **WP** Energy block . combined exhaust gas/steam heat exchanger





# WP ENERGY OPTIMIZING

**OPTIMISING ENERGY CONSUMPTION IS THE ORDER OF THE DAY: USE AS LITTLE ENERGY AS POSSIBLE; USE AS MUCH ENERGY AS NECESSARY!**

**How much energy do your machines and ovens consume right now?**

**How much of it could be saved?**

**We offer modules that are each energy-efficient in their own right.**

We offer our customers high-performance oven modules whose use/installation achieves significant energy savings – for rack ovens and also for deck ovens. Whenever an old oven is in use, it is worthwhile to invest in new technology with

- efficient counterflow heat exchanger and
- optimised flow technology.

The ROTOTHERM® Green, for example, offers a certified energy saving of 28.7 % compared to the previous model.

**think energy.**

## ENERGY OPTIMIZING OVEN

- Reduction of exhaust gas temperatures
- Increase of flow velocities
- Optimisation of temperature profiles for partial occupancy
- Optimisation of the charging process
- Optimisation of the induced draught
- Intelligent energy control through night start calculation and when empty

## OVEN MODULES FOR ENERGY SAVINGG

**... for rack ovens . ROTOTHERM® Green**

### 1. WP HEAT EXCHANGER

- Use of the „counterflow principle“ for low flue gas temperatures and maximum energy efficiency
- Use of high-temperature stainless steels for high heat loads
- Creation of large surfaces for maximum reduction of flue gas temperatures

### 2. WP FLOW CONDITIONS

- Fan wheel geometry with high efficiency
- High flow velocity for better heat transfer
- ... in comparison with older rack ovens*
- Reduction of baking times by up to 10%.
- Increase in productivity by up to 10%

### 3. WP ISOTHERMAL BAKING

- Automatic baking for partial loads – one baking programme per product, independent of occupancy
- Reproducible product quality

### 4. WP THERMOGATE

- ... when opening the baking chamber door*
- Avoidance of burner shutdown up to max. 2 min
- Build-up of an energy store
- ... when closing the baking chamber door*
- Release of an energy boost

### 5. WP IEC . Intelligent Energy Control

- Efficient night start + burner switch-off when empty
- Automatic reduction of the setpoint temperature when the oven is empty

**... for deck ovens . e.g. MATADOR®**

### 3. WP ISOTHERMAL BAKING

- Automatic baking for partial loads – one baking programme per product, independent of occupancy
- Reproducible product quality

### 5. WP IEC . Intelligent Energy Control

- Efficient night start + burner switch-off when empty
- Automatic reduction of the set temperature when empty

### 6. WP ASR . Automatic induced draught control

- Constant induced draught for deck ovens with ZYKLOTHERM® principle
- Avoidance of unnecessary flue gas losses

## WP ENERGY OPTIMIZING

**for racket ovens . ROTOTHERM® Green**

**WP HEAT EXCHANGER**  
**WP FLOW CONDITIONS**  
**WP ISOTHERMAL BAKING**  
**WP THERMOGATE**  
**WP IEC . Intelligent Energy Control**

**... for deck ovens . z. B. MATADOR®**

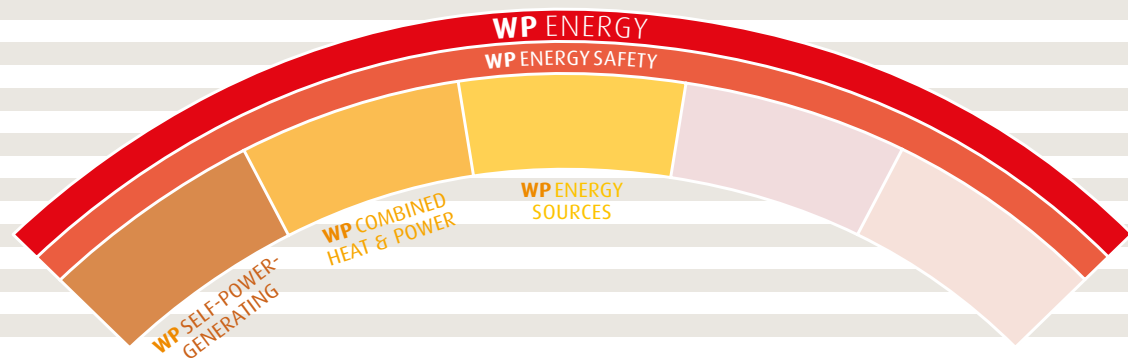
**WP ISOTHERMAL BAKING**  
**WP IEC . Intelligent Energy Control**  
**WP ASR . Automatic induced draught control**

# WP ENERGY SAFETY

THE USE OF ALL POSSIBILITIES FOR INDEPENDENT ENERGY GENERATING AND A CRITICAL CHOICE OF THE PREFERRED ENERGY SOURCE CO-DECIDE FOR THE SUCCESS OF A BAKERY.

In the production process of a bakery, there are three main approaches to achieving a secure energy supply:

- 1. Own energy production
- 2. Own electricity generation
- 3. The choice of energy sources



## WP SELF-POWER-GENERATING

Producing your own energy

The greatest possible independence from energy suppliers is no longer a dream of the future. Under **WP SELF-POWER-GENERATING** we subsume a bundle of the most diverse possibilities, which are above all also sustainable, environmentally friendly and efficient: photovoltaics, wind power, wood pyrolysis, utilisation of biomass.

## WP COMBINED HEAT & POWER

Generating your own electricity

**WP COMBINED HEAT & POWER** is engaged in electricity generation through combined heat and power (CHP). Compared to photovoltaics and wind power, it has the decisive advantage of being able to supply a constant, weather-independent electrical output.

## WP ENERGY SOURCES

The choice of energy sources needs to be carefully considered

A wide range of energy sources is available to supply a bakery and especially to heat the ovens. With **WP ENERGY SOURCES**, we monitor the multitude of possible alternatives and carry out permanently updated assessments for heating oil, natural gas, liquid natural gas LNG, liquid petroleum gas LPG, biogas, wood gas, hydrogen, electricity.





# WP ENERGY GENERATING

**TODAY MORE THAN EVER, ENERGY PROCUREMENT MUST BE EVALUATED AGAINST THE BACKGROUND OF DEPENDENCE ON THE SUPPLIER.**

**Wouldn't it be best to be as independent as possible from energy suppliers?  
To generate the energy needed for production ourselves?  
And then sustainably?**

The use of photovoltaic systems on one's own or third-party property or participation in wind farms can make a significant contribution to an independent energy supply today. If the company owns its own forest, it may be worthwhile to use a wood pyrolysis system. Or it might be a good idea to generate energy from biomass if there is enough of it available. And as far as one of these ways or their combination is not sufficient for a complete energy supply, the reduction of purchased energy always makes sense.

**think energy.**

## ENERGY GENERATING

Power generating  
– **Photovoltaic systems**  
– **Wind turbines**

Gas generating  
– **Wood pyrolysis**  
– **Biomass**

## OWN ENERGY GENERATION

1. Photovoltaics
  - Own or rented roof areas
  - Own or rented agricultural land
2. Wind turbine
  - Own wind turbines . smaller versions
  - Participation in wind turbines/wind farms
3. Woodgas . Combined heat and power generating
  - Wood pyrolysis from own forest management
  - Cheap wood supply options
4. Biogas . Combined heat and power generating
  - Own biomass production
  - Favourable biomass supply options



WP ENERGY GENERATING

PHOTOVOLTAIC SYSTEMS  
WIND RACKS

ELECTRICITY

WOOD PYROLYSIS  
BIOMASS

GAS



# WP HEAT & POWER

**IN ORDER TO COUNTERACT THE INCREASING DEPENDENCE ON PUBLIC ELECTRICITY SUPPLIERS, THE USE OF A COMBINED HEAT AND POWER PLANT IS RECOMMENDED.**

**How can bakeries become more independent of the public electricity supply?  
How can they best generate electricity on their own?**

In bakeries, more and more equipment is operated with electrical energy. The refrigeration technology used, which serves both to increase efficiency (large batch sizes, daily work) and to improve quality (long-term management), is almost exclusively electrically operated. The demand for electricity in bakeries is continuously increasing and alternatives are being sought more and more intensively. The use of alternative energies, which are obtained via photovoltaic or wind power plants, is an obvious option and should be pushed in any case. The disadvantage, however, is the limited reliability of this electricity generation.

With combined heat and power (CHP), on the other hand, a constant, weather-independent electrical output can be called up.

**think energy.**

## COMBINED HEAT AND POWER

- Natural gas
- Liquefied petroleum gas
- Wood gas
- Biogas

## COMBINED HEAT AND POWER

CHP's are operated with gas

*based on renewable energy sources*

1. Wood gas . obtained from wood pyrolysis
2. Biogas . obtained from biomass

*based on traditional energy sources*

3. Natural gas
4. Liquefied petroleum gas

In a combined heat and power system, mechanical energy and usable heat are generated simultaneously. The mechanical energy is usually converted directly into electricity via a generator. The resulting heat is used for heating purposes, e.g. for heating the company building, for hot water production, for operating e.g. a dishwasher or also for heating neighbouring buildings.

The advantage of CHP is the reduced fuel requirement for the simultaneous provision of electricity and heat, which greatly reduces emissions of carbon dioxide and other pollutants. The efficiency of up to 90% is significantly higher than that of normal electricity generators with approx. 30-40%.

## WP COMBINED HEAT & POWER

WOOD GAS

BIO GAS

NATURAL GAS

LIQUID GAS





# WP ENERGY SOURCES

**A WIDE RANGE OF ENERGY SOURCES IS AVAILABLE FOR HEATING THE OVENS. BUT WHICH IS THE BEST? AND WHICH IS THE SAFEST?**

**Which energy source offers the greatest security of supply?**

**Which energy source is the cheapest?**

**What is the right compromise?**

Self-supply of energy is usually not sufficient, but should be expanded as far as possible. But what comes next? Until now, natural gas has been the cheapest, most convenient and also one of the most efficient energy sources. But things look different today. So let's look at alternative options, their advantages, their disadvantages. Each owner must decide individually about a possible general change in the energy supply of his company. Or possibly about splitting in order to avoid too much dependence.

**think energy.**

## ALTERNATIVE ENERGY SOURCES

- Heating oil
- Natural gas
- Natural gas . liquid . LNG
- Liquid gas . LPG
- Bio gas
- Wood gas
- Hydrogen
- Electricity

## ENERGY . ALTERNATIVE MEDIA

**For burner-heated baking ovens, the following primary energies can be used:**

### 1. HEATING OIL

*Advantages*

- Choice of any supplier
- Stocking via tanks
- Use of a combined Oil/gas burner possible

*Disadvantages*

- Pre-financing
- High pollutant content in the exhaust gas: sulphur dioxides, nitrogen oxides, etc.
- Space required for tanks

### 2. NATURAL GAS

*Advantages*

- Payment according to consumption
- Clean combustion
- No space required for tanks
- Use of a combined Oil/gas burner possible

*Disadvantages*

- Dependence on gas supplier
- Stockpiling not possible

### 3. NATURAL GAS . liquid . LNG

*Advantages*

- Choice of any supplier
- Clean combustion
- Storage via tanks

*Disadvantages*

- Pre-financing
- Space required for tanks

### 4. LIQUID GAS . LPG

*Advantages*

- Choice of any supplier
- Clean combustion
- Storage via tanks

*Disadvantages*

- Pre-financing
- Space required for tanks

### 5. BIO GAS

*Advantages*

- Renewable energy from biomass
- Self-generation possible
- Clean combustion
- Storage via tanks

*Disadvantages*

- Self-generation vs. procurement from suppliers
- Space requirement for tanks

### 6. WOOD GAS

*Advantages*

- Renewable energy from pellets/etc.
- Self-generation possible
- Clean combustion
- Storage via tanks

*Disadvantages*

- Self-generation vs. from suppliers
- Space requirement for tanks

### 7. HYDROGEN

*Advantages*

- Absolutely clean combustion
- No pollutants, exhaust gas is pure water vapour
- Storage via tanks

*Disadvantages*

- Burner capacities currently only up to 50 kW or from 300 kW
- Space required for tanks
- Complex safety technology

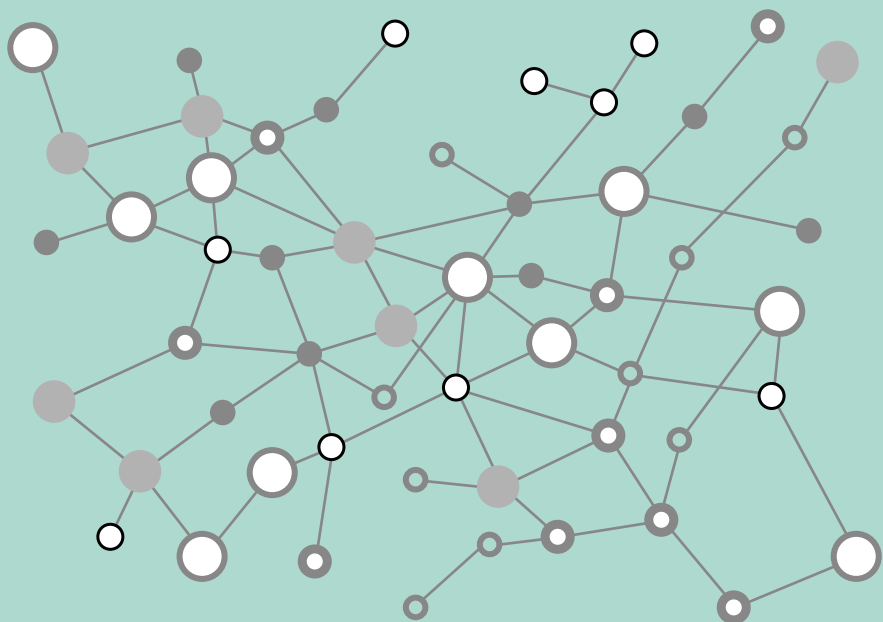
### 8. ELECTRICITY

*Advantages*

- Payment according to consumption
- Choice of any supplier
- Absolutely clean energy
- Own generation possible
- Each baking chamber is independent
- Easy replacement of gas/oil burners against electric cartridge heaters

*Disadvantages*

- Energy efficiency with purchased electricity from oil, gas or coal-fired power stations very low (approx. 30% of the energy sources used)
- Storage of own generation currently still difficult
- surplus electricity fed into the public grid



# FutureWork

**FutureWork**, as we understand it, is a forward-looking orientation of all our employees to what the future holds, and it is a central element of our corporate philosophy. For us, **FutureWork** is about motivation, about the drive to find new things, about passion, implementing structured ways of working, closely following market developments, sensing new customer requirements and following up on them, developing new ideas in creative processes, and never compromising on finding the best solution.

We invest extensively in research & development, we work intensively on ways to automate our ovens, to save energy, to recover heat and to provide a flexible energy supply in context with a projected energy security/independence - to increase efficiency in general.

The future can come ... we are steaming up.

>>> like to know more? [www.wpbakerygroup.org/futurework](http://www.wpbakerygroup.org/futurework)

The future always starts right now, and it starts over and over again. That's where we get our drive from and how we understand our mission. A mission we pursue with stringent structure and passion. At **WP Bakery Technologies**, we call it **FutureWork**, our active work on shaping the future – in the Group, together with partners, with universities and in collaboration with research institutions. For ourselves and our customers.



**WP BAKERYGROUP**

**WP** Werner & Pfleiderer  
Bakery Technologies

**WP** Werner & Pfleiderer  
Industrial Bakery Technologies

**WP** Kemper

**WP** Haton

**WP** Riehle

**WP** Digital

**OUR BRANDS**

**WP BAKER'S EQUIPMENT**

**WP PIZZA**

**WP DONUT**

**WP ROLL**

**WP TOAST**

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