



Freiburg and Glenrothes Locations

**“Preserving what we value”**

Micronas  
**Environmental**News 2011

to EMAS/ISO 14001

## „Conserving the environment while reducing costs“

### Editorial



Micronas can look back on a successful 2011. Despite the Japan crisis, the weakness of the euro and our company's extensive investment in research and development, Micronas achieved a positive double-digit EBIT margin of 13 percent. To ensure constant growth and continue to achieve a positive result in the future, it is vital to drive innovation in product development.

In August 2011, Micronas entered an important partnership with X-FAB Silicon Foundries Group – the largest foundry group for the manufacture of silicon wafers for mixed analog/digital integrated circuits (ICs). This has enabled Micronas to secure access to the next-generation production technology.

Apart from that, at the beginning of 2012, an Innovation Center was set up with the aim of identifying promising market opportunities for new product lines that reflect the changing market conditions and make optimum use of Micronas' present and future capacities. Our investments in marketing, sales and R&D remained at the same level as in the previous year.

Stricter legislation and greater safety awareness are raising the demand for highly reliable sensors. The Micronas products are based on leading-edge technologies and also comply with the mega-trends of environmental protection and safety.

In the automotive segment, Micronas Hall sensors are used, for example, in hybrid and electric vehicles, while in combustion engines they contribute to a reduction in CO<sub>2</sub> emissions. In safety-related applications, the demand for intelligent and redundant systems is increasing.

Our embedded microcontrollers for smart actuators play a key role in making full use of the benefits of brushless DC motors (BLDC) with regard to environmental protection and safety. BLDC motors significantly enhance efficiency compared with brush motors. Furthermore, the increased chip intelligence allows greater integration of safety functions in a single „on-the-chip“ system.

Our gas sensors are in demand both in the automotive segment and in the industrial environment. In HVAC systems (Heating, Ventilation, Air Conditioning), for example, our sensors measure the air quality and are therefore vital for high energy efficiency and low CO<sub>2</sub> emissions. An important milestone in the industrial segment is the cooperation agreement between Siemens and Micronas in the field of gas sensor technology.

The whole matter of environmental protection is of major importance not only for our products, but also for their production. All the required operating permits have been obtained. The acquisition of a previously rented piece of land, including the buildings, has made it possible to carry out a major project for increasing energy efficiency at the Freiburg site.

This opened the way to the installation of a 2,000 m<sup>2</sup> photovoltaic unit with modules from the Freiburg-based company Solar-Fabrik on the roofs of our warehouses and logistic buildings,

a project completed in December 2011. With a peak output of over 300 kWp, around 175 t of CO<sub>2</sub> is saved every year. Another of our energy-saving projects is the cooling network linking Building 4 and Building 10, which ensures more efficient cooling generation and saves around 500,000 kWh of electricity a year. You will find further information on our environmental projects and the photovoltaics facility elsewhere in this edition of EnvironmentalNews.

We are delighted that ACE Risk Management Services has re-confirmed the outstanding standard of risk management at Micronas, and has again awarded us the AAA certificate in 2011.

In future, we want to integrate health protection into the ESF management system and report on it in our EnvironmentalNews. You can find some examples of activities in the field of health protection on page 7.

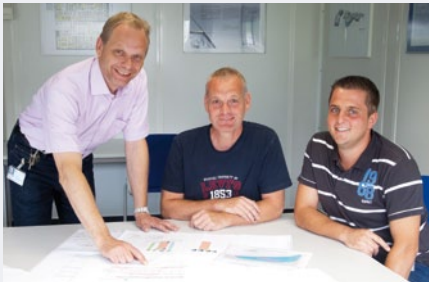
Our ESF management system is well positioned and we will continue to improve our environmental performance in the future.

Matthias Bopp  
Chief Executive Officer



# „Effective energy-saving measures“

## Environmental Projects



*The practical examples illustrate how project manager Michael Schöllhorn (left), Energy Manager according to ISO 50001, successfully implemented the two described energy-saving projects at Micronas. He was supported by Harald Durm (center) and Manuel Stein (right).*

### Energy-efficient technologies and energy-enhancing measures

The energy management system at Micronas GmbH involves an ongoing improvement process – the so-called “PDCA cycle” (plan, do, check, act). One of the aims is to improve energy efficiency and reduce energy consumption, costs and environmental impact while adhering to the legal regulations at all times.

Its success is based on the motivation and creativity of the employees in forming energy teams and working closely with the different departments. Good and effective communications between all the parties involved are essential.

### Free cooling

The process heat generated in the Waferfab must be dissipated throughout the year via a process cooling water circuit. The hot cooling water is cooled down to 15 °C with the aid of chillers.

The amount of electricity required for this has been considerably reduced through what is known as “free cooling”. At low outdoor temperatures, the cold water circuit is no longer cooled

by chillers but directly by the outside air using a heat exchanger. The heat exchanger has been integrated into the cooling water system and utilizes the available pump capacities.

In practice, a temperature difference of around 10 K is necessary for free cooling. This means that an effective outdoor temperature of under 5 °C is needed to obtain a water temperature of 15 °C. With 24/7 production at our Freiburg site, the ambient air can help with the cooling process for up to 800 hours a year. This is equal to an annual power saving of 250,000 kWh, which, in turn, is equivalent to 40 t of CO<sub>2</sub>.

### Integrated cooling

Small and older chillers operate at lower efficiency and thus require a large amount of energy to produce the required cooling capacity. An older decentralized chilling unit for the Micronas administration and laboratory buildings was therefore taken out of service.

The generation of cooling for the buildings was switched to new, more efficient turbo chillers in Building 4. For this, a cold water connection from Building 4 to the former cooling center in the laboratory building had to be

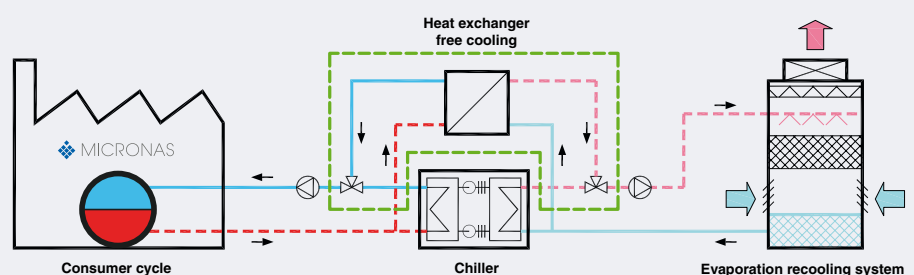
installed. The two cold water systems were hydraulically separated for safety reasons by the installation of a heat exchanger.

The capacity utilization of the chillers in Building 4 was optimized. Furthermore, the controlling and monitoring duties in this area were reduced very considerably by the department Plant Engineering and Facilities. Through this measure, we expect to save around 500,000 kWh of electricity a year, which in turn reduces CO<sub>2</sub> emissions by around 80 t/year.

### Photovoltaic unit

Freiburg's fourth-largest solar facility has been in place at Micronas since Christmas 2011 on the roof of Building 7 to feed clean electricity into the public grid. The facility, with 1,296 modules, has a peak output of 305 kWp. Through the optimum arrangement and alignment of the modules, we expect to generate over 320,000 kWh a year.

Over the next 20 years, the photovoltaic system will thus make a considerable contribution to environmental protection through its CO<sub>2</sub> reduction of around 3,500 t.



*The green dotted frame depicts the free cooling unit. Via the three-way valves, the cooling water is conveyed via the heat exchanger; the chiller is not in operation and the heat exchanger is cooled directly by the outside air via the evaporation recooling system.*

# Overview of current and planned projects

## Freiburg and Glenrothes Locations

### Environmental Projects

Subject	Goal	Measure	Dept. responsible	2011	2012
<b>Energy management<sup>1)</sup></b>	Electricity savings of 56,000 kWh / year (9 t CO <sub>2</sub> / year)	Introduction of parallel tests with Hall through use of multiple test heads	Backend	●	
	Electricity savings of 250,000 kWh / year (40 t CO <sub>2</sub> / year)	Introduction of heat exchangers for free cooling in winter in parallel with the chillers	Plant Engineering and Facilities	●	●
	Electricity savings of 15,000 kWh / year (2 t CO <sub>2</sub> / year)	Raise flow temperature of the process cooling water	Plant Engineering and Facilities	●	
	Electricity savings of 800,000 kWh / year (128 t CO <sub>2</sub> / year)	Feeding in of compressed air generated in the production of nitrogen gas into the compressed air system	Plant Engineering and Facilities	●	
	Electricity savings of 84,000 kWh / year (14 t CO <sub>2</sub> / year)	Optimized plant utilization with wet-chemical etching	Frontend	●	
	Electricity savings of 100,000 kWh / year (16 t CO <sub>2</sub> / year)	Automatic power management on PCs and laptops	IT Operations	●	○
	Electricity savings of 15,000 kWh / year (3 t CO <sub>2</sub> / year)	Electricity saving in probing/final testing of linear Hall sensors through the use of dual-core controllers	Backend	●	●
	Electricity savings of 500,000 kWh / year (80 t CO <sub>2</sub> / year)	Cooling network between buildings 4 and 10, resulting in more efficient cooling generation	Plant Engineering and Facilities	●	
	Electricity savings of 10,000 kWh / year (2 t CO <sub>2</sub> / year)	Electricity saving by relocation of hazardous substances in the warehouse and optimization of the electric power consumption of the fan.	Plant Engineering and Facilities		●
	Electricity savings of 320,000 kWh / year (175 t CO <sub>2</sub> / year)	Installation of a photovoltaic unit with an output of 305 kWp on Building 7	Plant Engineering and Facilities	●	
	Electricity savings of 168,000 kWh / year (86 t CO <sub>2</sub> / year)	Replacement of three old compressors by installing a new compressor with higher efficiency	Facilities Glenrothes	●	
<b>Immission control</b>	Use of refrigerants with low to zero ozone-depletion potential	Refrigerant plants to be switched from R22 to alternative refrigerants	Plant Engineering and Facilities	○	○
<b>Resource management</b>	Saving of chemicals by process optimization	Introduction of throughput of controlled bath changes in electroplating	Backend	●	●

<sup>1)</sup> Calculation of the CO<sub>2</sub> savings is dependent on the local power supplier

<sup>2)</sup> Calculation of the CO<sub>2</sub> savings is based on the Federal German electricity mix



# Micronas at a Glance

## Micronas at a Glance

### FACTS AND FIGURES

#### Micronas in 2011

- ◆ Headquarters of holding company in Zurich, Switzerland (SIX Swiss Exchange: MASN)
- ◆ Operational management and production in Freiburg, Germany
- ◆ 879 employees worldwide, of which 780 work at the operational headquarters in Freiburg
- ◆ Test center in Glenrothes (Scotland)
- ◆ Sales of CHF 159 million / EUR 128 million
- ◆ Investment and current expenses of EUR 2.2 million in corporate environmental protection (waste management, water protection, soil decontamination, noise reduction, air pollution control, climate protection, nature protection, landscape conservation)

	EUR million
2008	1.5
2009	1.2
2010	1.2
2011	2.2

#### Test center in Glenrothes (Scotland)

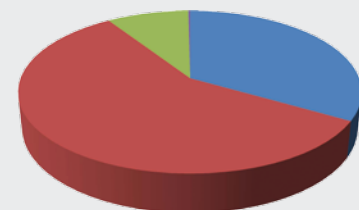
- ◆ 69 employees
- ◆ Energy consumption: 3.3 GWh, equivalent to 1,300 t CO<sub>2</sub>
- ◆ Main waste fractions: 15 t paper and board, 10 t plastics, 6 t metal into recycling
- ◆ No notifiable accidents

#### Sales distribution according to production lines



- Sensors 88 %
- Microcontrollers 8 %
- Consumer 4 %

#### Sales distribution by region



- Europe 33 %
- Asia 57 %
- America 9 %
- Others 1 %

#### Micronas Certificates



ISO 14001 Freiburg



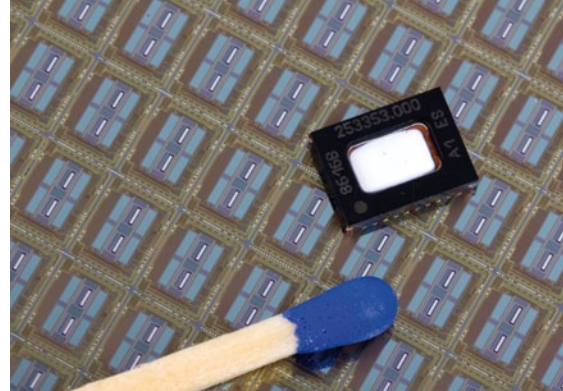
ISO 14001 Glenrothes



EMAS Freiburg



AAA Freiburg



## Environmental Data 2011

### Environmental Data 2011

The following charts show the 2011 environmental data for the Freiburg site, which is the Micronas headquarters and its largest production site. By publishing these figures, we comply with the requirements of regulation (EC) No 1221/2009, the so-called EMAS regulation.

The bar charts show the absolute consumption figures, while the linear diagrams show the consumption normalized to the total gross value added – the so-called “core indicators”. The core indicators themselves are then related to the year 2011. Normalization to the total gross value added over the last four years ensures

the required comparability of the consumption data.

#### Other environmental data for 2011:

- The natural gas consumption of approx. 21,500 MWh according to GEMIS<sup>1)</sup> corresponds to equivalent emissions of 37 kg of SO<sub>2</sub>, 2,000 kg of NO<sub>x</sub>, and 25 kg of dust.
- Annual CO<sub>2</sub> emissions attributable to commuter traffic and business trips were below 2,500 t<sup>2)</sup>, which is only minimal compared with other emission sources. Due to that fact this environmental aspect is considered as not significant.

- The sealed area (core indicator biological diversity) is 39,200 m<sup>2</sup>, the unsealed area is 12,300 m<sup>2</sup>.
- The proportion of renewable energy in the direct energy consumption in 2010 was nearly 70 %.
- The recycling quota for the entire waste produced in 2011 was 82 %.

<sup>1)</sup> Global emissions model for integrated systems

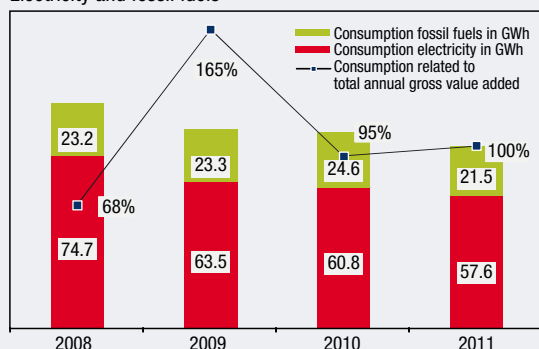
<sup>2)</sup> For the calculations, assumptions were made where detailed data were lacking; the CO<sub>2</sub> equivalents were taken from GEMIS.

### MICRONAS FREIBURG

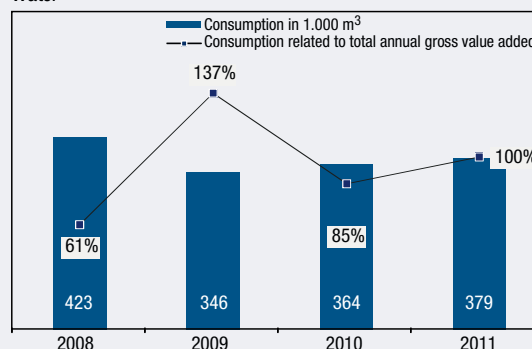
■ Absolute consumption

— Consumption related to the total annual gross value added in %, normalized to the year 2011

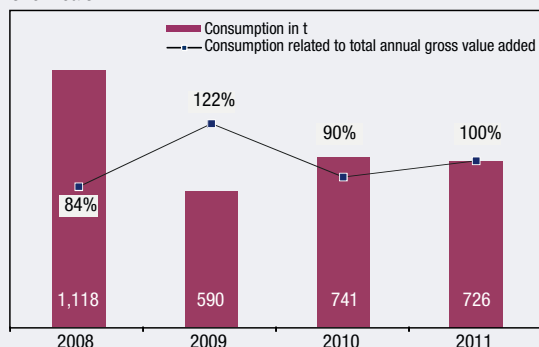
#### Electricity and fossil fuels



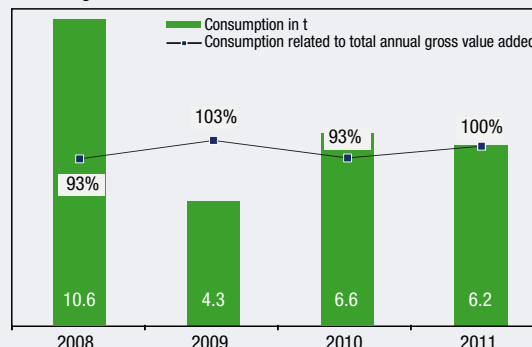
#### Water

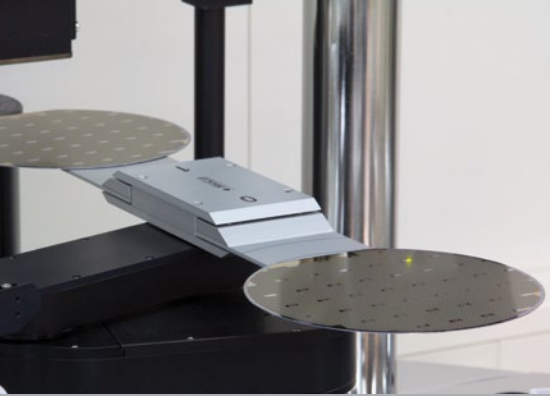


#### Chemicals



#### Process gases





## Environmental Data 2011

### Safety at work and health protection

At Micronas in Freiburg, the accident figures are well below the comparative index of the Employers' Liability Insurance Association. In 2011, there were three minor reportable accidents, without any particularly frequent occurrence in any one area.

### Activities of the working group for health protection in 2011

Advice sessions by the company medical service:

- Inoculations, e.g. also foreign travel and flu jabs
- Smoker consultation sessions

- Health activities with blood pressure, pulse and blood sugar measurements
- Cholesterol checks, body fat / water / muscle analysis
- Dietary counseling
- Hygiene recommendations
- Skin care and skin protection counseling
- Health days with the relevant health services

### Occupational health examinations, medical treatments, and support

- Compulsory examinations according to legal requirements
- Possibilities for massage treatment

- Examination of offerings for all employees who do not require any legally prescribed examination but nevertheless want a precautionary examination
- Yoga
- Support of sports groups: running, mountain biking

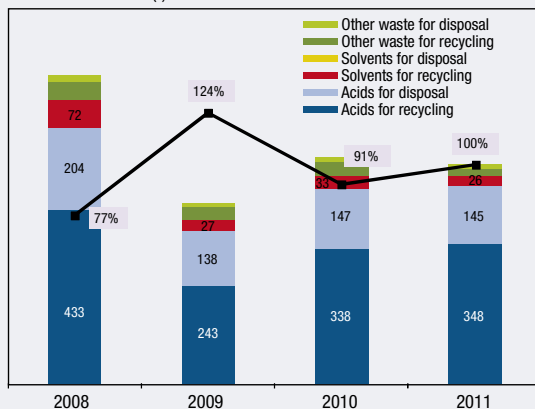
### Fire protection

The insurance company (loss and damage) has again awarded Micronas the AAA certificate for the Freiburg site for 2011, documenting the fact that the company consistently attains an outstanding standard of risk management.

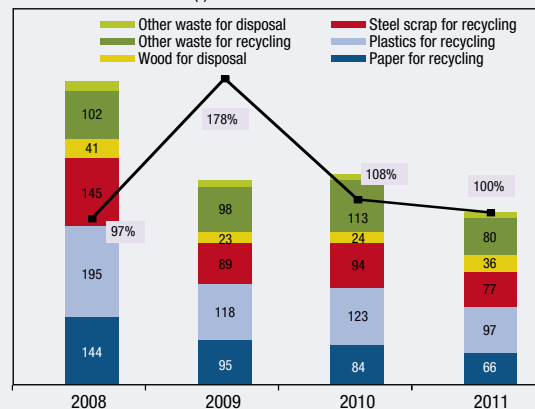
## WASTE

Waste in t  
Waste related to total annual gross value added in %, normalized to the year 2011

Hazardous waste (t)



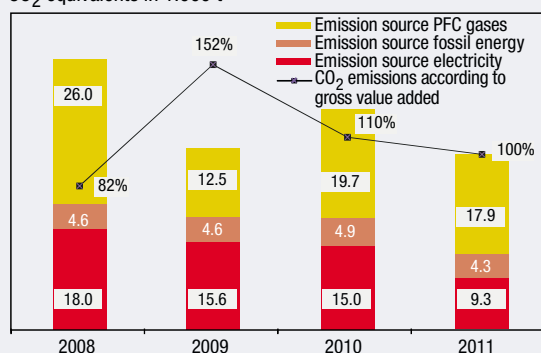
Non-hazardous waste (t)



## CO<sub>2</sub> EQUIVALENTS

CO<sub>2</sub> equivalents  
CO<sub>2</sub> equivalents related to the total annual gross value added in %, normalized to the year 2011

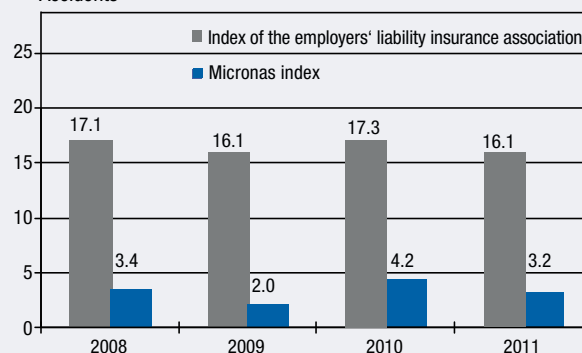
CO<sub>2</sub> equivalents in 1.000 t



## ACCIDENTS

Notifiable accidents per 1,000 employees

Accidents





### Environmental Statement

The next consolidated Environmental *Statement* will be submitted for validation at the latest in July 2014. The next updated Environmental *News* will be submitted for validation in July 2013.

### Environmental Verifier / Environmental Verifier Organization

The authorized environmental verifier / environmental verifier organization are as follows:

Dr.-Ing. R. Beer (Permit-No. DE-V-0007)  
Intechnica Cert GmbH (Permit-No. DE-V-0279)  
Ostendstr. 181  
90482 Nuremberg

### Validation

Dr. Reiner Beer, with EMAS environmental verifier registration number DE-V-0007, accredited or licensed for the scope 26.1 (NACE Code Rev. 2), Manufacture of electronic components and boards, declares to have verified whether the site as indicated in the consolidated environmental statement with registration number D-126-00053 meets all requirements of Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organizations in a Community eco-management and audit scheme (EMAS).

By signing this declaration, I declare that

- the verification and validation has been carried out in full compliance with the requirements of Regulation (EC) No 1221/2009,
- the outcome of the verification and validation confirms that there is no evidence of non-compliance with applicable legal requirements relating to the environment,
- the data and information of the updated environmental statement of the organization/site reflect a reliable, credible and correct image of all the organizations activities, within the scope mentioned in the environmental statement.

Nuremberg, July 2012

Dr. Reiner Beer, Environmental Expert

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July 2012

Order No. U-0012-1E

The German version is legally binding.

Printed on environmentally friendly paper, composed of 50% recycled paper fibers and 50% FSC (Forest Stewardship Council) fibers.