Fraunhofer
UMSICHT

FRAUNHOFER INSTITUTE FOR ENVIRONMENTAL, SAFETY, AND ENERGY TECHNOLOGY UMSICHT

For the years 2010 and 2011

SUSTAINABILITY REPORT 2012

Our Responsibility for the Future

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Entrance of Fraunhofer UMSICHT

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Prof. Dr.-Ing. Eckhard Weidner, Director of the Institute

Prof. Dr.-Ing. Görge Deerberg, Deputy Director of the Institute

Preface

Dear readers

It gives us great pleasure to be able to present you with our Institute's third Sustainability Report. We have developed the report further and have modeled it after the current standards of the Global Reporting Initiative (GRI 3.1). Sustainability takes a high priority for us on a personal level, for our business processes, for our strategy process, and for the direction of our research portfolio.

In the "Year of Sustainability", Fraunhofer UMSICHT is active in a fast changing environment of different societal requirements and challenges. Examples for the societal change can be found everywhere: in the transition from fossil to renewable energy, in internationalization, in the consequences of the financial crisis, in the high speed of innovation, and also in the increasing complexity of the products and solutions developed, which have to be able to satisfy ever increasing demands.

To achieve a sustainable development, efforts by all societal groups and institutions are necessary. We want to conduct sustainable research. Therefore, we ask ourselves the following question: which concrete contributions to sustainable development do our R&D products and services provide? We know that we can have an impact through our research work (e. g. in the areas of energy storage systems and biomimetics). To make this influence and its impact measurable and to assess it is difficult. In the area of product responsibility, we accept this challenge.
Of particular importance to us are our employees: they are the heart and the soul of the Institute. It is their ideas from which new technologies are created. With their commitment and expertise, projects are brought on their way, and new cooperation partners and customers are won over. It is for that reason that the employee and company chapter was expanded considerably, in comparison to the previous report.

We hope you will enjoy reading our report and that it will provide you with new impulses for your own activities. We will consistently continue to pursue the path of sustainability at UMSICHT, and it would be our pleasure to get in touch with you. Please do not hesitate to contact us if you have ideas for more sustainability. Together, we can put even more things in motion!

Many greetings

Eckhard Weidner

Görge Deerberg

1 INTRODUCTION

Building complex of Fraunhofer UMSICHT

Fraunhofer UMSICHT is an independent, innovative and quality-oriented research institute that committed itself to the topic of sustainability in the areas of environmental, safety and energy technology as early as 1990.

GLOBAL REPORTING INITIATIVE AND ASSESSMENT OF THE APPLICATION LEVEL

The report at hand is modeled after the principles of the Global Reporting Initiative (GRI). This posed a challenge to us since our R&D services do not offer a fixed product portfolio. Our actual "products" are innovative ideas and research services that are individually tailored to each respective customer's needs. Very concrete products are created with the help of our research work typically only at the respective customer's. Nevertheless, we adhered as closely as possible to the GRI specifications.

Based on our self-assessment, we are achieving Level C of GRI 3.1 with our report. A certification of the report has not been planned.

ANNUAL AND SUSTAINABILITY REPORT

In addition to the Sustainability Report for the years 2010 and 2011, our Institute has published annual reports for the years 2010 and 2011 to which we in part refer to within this Sustainability Report. The annual reports describe the situation during the previous fiscal year, while in the Sustainability Report objectives and measures are defined and the focus is on the continuous process for improvement of the Institute.

STRUCTURE OF THE REPORT

The Sustainability Report starts with the Institute's profile.In comparison to the previous Sustainability Report, this chapter has been further sharpened and expanded. The chapters following thereafter are once again aligned with our management instrument, the Sustainability Balanced Scorecard, with the chapters Economics and Finances (chapter 3), Ecology and processes (chapter 4), Employees and expertise (chapter 5) and Market and Society (chapter 6). The chapter Product Responsibility focuses on our R&D products (formerly chapter Sustainable Research).

We are convinced that, in the future, only those technologies and products will be able to establish themselves on the markets that – in addition to their function – are ecologically and socially harmless.

Here is an example for this: the increase in the efficiency of a production process can lead to lower prices and therefore increase the demand for the product at such a rate that the efficiency gains are virtually "swallowed up". Therefore, even new efficient products my not be sustainable *per se.* As an institute of applied research, we are working particularly close to the market and can see the effects of our work. For this reason, new solution strategies are necessary that deal concurrently with both efficiency improvements and consistency strategies (e. g. replacement of dangerous chemicals, recycling, and solutions compatible with nature, e. g. in power generation). The third strategy, in addition to the strategies of efficiency and consistency, the sufficiency strategy, deals with the lifestyles and needs of people. It requires the cooperative development of social and technical innovations – an important task for the future.

2 PROFILE OF THE INSTITUTE

Strategy and Management

OBJECTIVES AND STRATEGY

Fraunhofer UMSICHT regards itself as a pioneer for technical innovations in the areas of process technology, energy technology and material sciences. We realize innovations with our partners and to an increasing degree in discourse with and under inclusion of relevant societal groups in the environment.

The shift towards sustainable raw materials & energy supply is at the focus of our work. To us, classic energy topics such as regenerative energies, renewable resources and energy efficiency, but also energy storage systems, bio-based plastics, water and wastewater engineering, innovative materials as well as knowledge and resource management are among the areas of research of the future. The specialist colleagues involved with sustainable technical innovation processes receive internal advice from the Sustainability Working Group (WG) and our sustainability management as well as Fraunhofer-wide from the Fraunhofer "Sustainability" network initiated by various Fraunhofer Institutes.

Our sustainability strategy was created holistically and is anchored in the Institute as a whole. Accordingly, the employees, management and the Institute's Steering Committee are equally involved in the implementation of the sustainability management. Herein, new ideas for a sustainable research and the critical questioning of business endeavors and innovation processes are central elements, as is, most importantly, a dynamic vivid development.

SUSTAINABILITY MANAGEMENT

Fraunhofer UMSICHT has been using the Sustainability Balanced Scorecard (SBSC) as a controlling instrument since 2009. The four perspectives of the Scorecard are mapped in this report (Economics and Finances, Ecology and Processes, Employees and Expertise, Market and Society). Aspects of sustainability have been integrated into the four perspectives. The SBSC serves to monitor the achievement of objectives.

In addition to the typical financial indicators (results, economic stake in the proceeds, etc.) and structure data (new customers, etc.), additional indicators for the exterior area are captured (e. g. number of press releases, events and trade fairs). Furthermore contained are indicators regarding the number of cross-divisional project and success rates (projects applied for, offers). But also figures regarding the number of publications and promotions, supervised professional student qualifications, patents, fixed-term employments, percentage of women and number of training days are included in the assessment of the eight operative business units (cf. organizational chart) and of the Institute. For the infrastructure departments, no Scorecards are being prepared.

The business unit targets of the Scorecard are agreed upon in a personal employee interview between the Institute's Steering Committee and the heads of the business units, and serve to monitor success. This way, sustainability indicators are integrated into business management. From the indicators and targets, measures are derived – as necessary – to achieve the Institute's and business units' objectives. These measures then are implemented on the various levels (e. g. corresponding training on the employee level).

A further development of the Scorecard for the next years is planned, in which in the long run also ecological and social indicators with respect to the external effects of the R&D work shall be captured on the business unit level.

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Selected indicators of the Scorecard, such as percentage of women, composition of staff, promotions, etc. are featured in the following chapters.

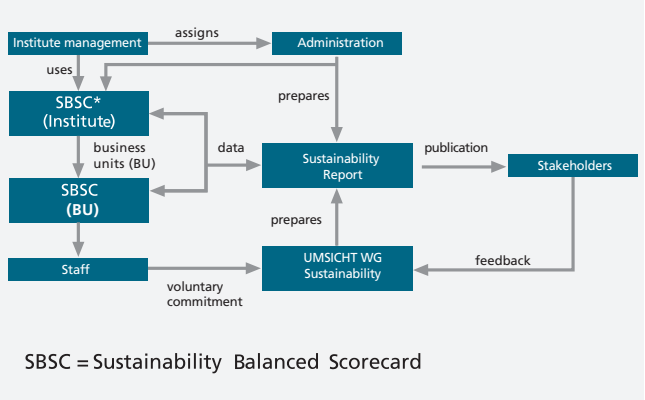


Fig. 1: Responsibilities and Sustainability Report

PATENT STRATEGY

One important component for the success of Fraunhofer UMSICHT is the patent strategy that is behind the Scorecard's corresponding indicator. Herewith, lines of research can be protected against imitation and license proceeds can be generated.

In 2010, a patent portfolio process was started at Fraunhofer UMSICHT. In this context, the Institute's patent portfolio was assessed, clustered and cleaned up to optimize the basis for the marketing of industrial property rights. The process continues: at present, concrete strategies for the marketing of individual patent clusters are being worked on.

In February 2012, the Institute possessed more than 84 active patent cases, for 22 of them with patents filed abroad, and 35 brands, with 9 of them filed abroad. There are existing license contracts with 8 licensees. The Institute's most important word trademarks are CryoSol®, DUBAnet®, Q-TE-C®, rodentics®, polymerO®, sustainnovate®, inFARMING® and euCEP®. The most important word/image trademark is BIO-raffiniert®.

In parallel, the Institute is intensely dealing with the legal and ethical aspects of the democratization and opening of innovation processes.

We established our own open innovation platform (www.sustainnovate.eu) and will be intensely promoting and using it starting in fall 2012.

TARGET GROUPS AND INDUSTRIAL SECTORS

As a member of the Fraunhofer-Gesellschaft, the institute follows the tradition of applied, market-oriented research and development. Since its founding in 1990, Fraunhofer UMSICHT has been committed to the structural change of the city and the region, acting as a catalyst for science and economy. This has been done through technology transfer, spin-offs and the setting-up of R&D networks. Internationally, the Institute is primarily active in Europe, but also in Africa, Asia and South America. Depending on the customer's needs, we offer R&D services to be able to flexibly react to market requirements. You can find our service portfolio on the Internet.

CHALLENGES

The following important challenges and objectives will be approached at the Institute in the next three to five years:

- integration of a new site (ATZ Entwicklungszentrum in Sulzbach-Rosenberg),
- acquisition of new customers from the industry,
- constant focusing of key topics (scientific profile sharpening) and
- continuous implementation of the results of the employee survey.

2 PROFILE OF THE INSTITUTE

Organization Profile, Governance

As an Institute of the Fraunhofer-Gesellschaft, we are bound by its rules of association and do not have any legal capacity of our own. The following graphic illustrates the organizational structure of the Fraunhofer-Gesellschaft. The highest body and decision maker is the Board, consisting of the President and up to four full-time members. The Board presides over the Presidential Council, in which the speakers of the seven Institute Groups are represented. Fraunhofer UMSICHT is a member in the Fraunhofer Group for Production.

The Presidential Council is advised by the Scientific-Technical Committee (STC) which constitutes the representation of the Fraunhofer Institutes towards the Board. In the STC of the Institutes, the Institute's Steering Committee and an elected representative of the scientifically working employees are represented.

The Fraunhofer-Gesellschaft has the legal form of a not-for-profit association, i. e., there is a general meeting of the members that has to approve the Board, and an elected Senate which appoints the Board.

BOARD OF TRUSTEES OF FRAUNHOFER UMSICHT

The Board of the Fraunhofer-Gesellschaft, in consultation with the Institute's Steering Committee, appoints the members of the Board of Trustees. The Board of Trustees (Annual Report 2011/2012, page 90) consists of representatives of science, economy and public administration. These are presented in the annual report. At least one member of the Board of the Fraunhofer-Gesellschaft attends the annual meetings. The Board of Trustees advises the Institute's Steering Committee and the Board on questions of thematic orientation and structural changes of the Institute.

Structure of the Fraunhofer-Gesellschaft

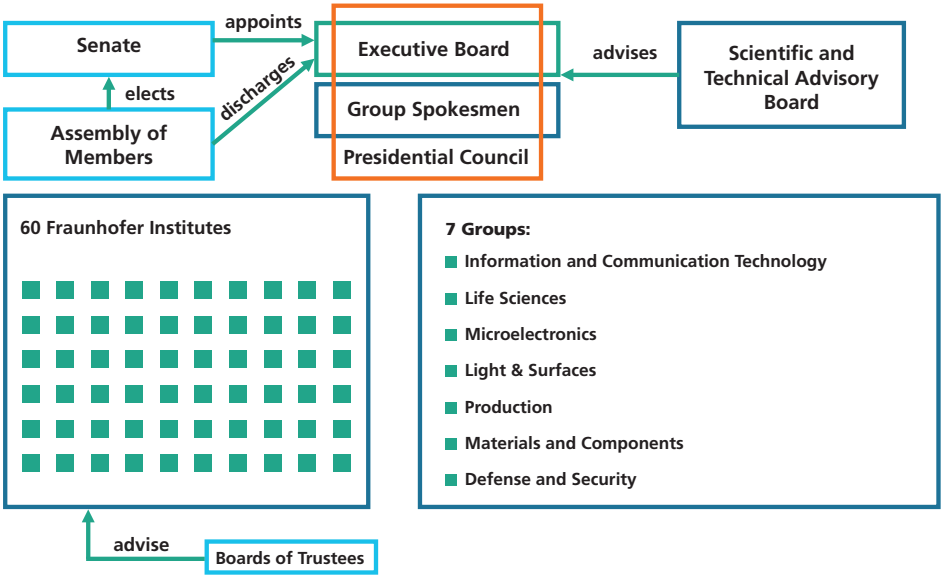
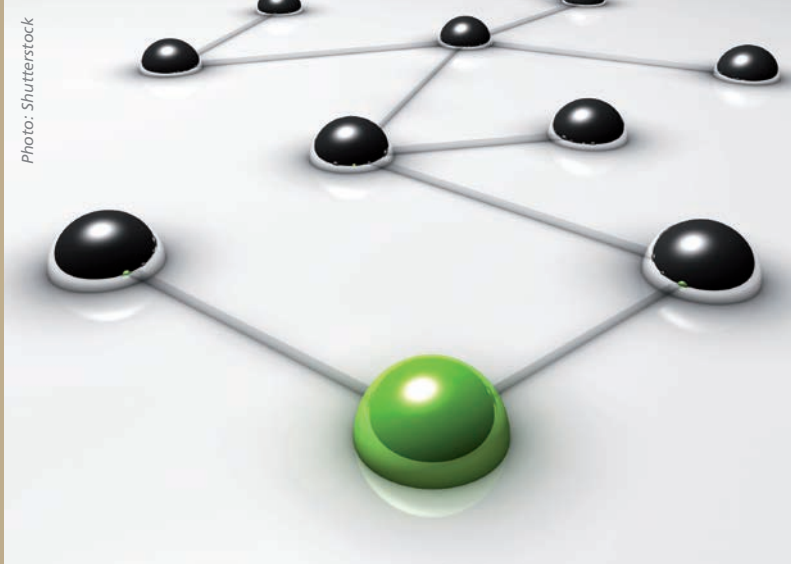


Fig. 2: Structure of the Fraunhofer-Gesellschaft



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ORGANIZATIONAL CHART

Eight business units with team sizes between six and more than twenty employees, supported by eight infrastructure departments, shape the Institute, our day-to-day work, and our future topics. Since the release of the last Sustainability Report, reorientations have taken place at some business units. This applies to the business units Energy Technology (now Energy and Recycling Materials), Special Materials (now Materials and Interaction) and Energy Systems (now Energy Efficiency Technologies). For information regarding the respective new portfolio, see the corresponding Internet pages of the business units.

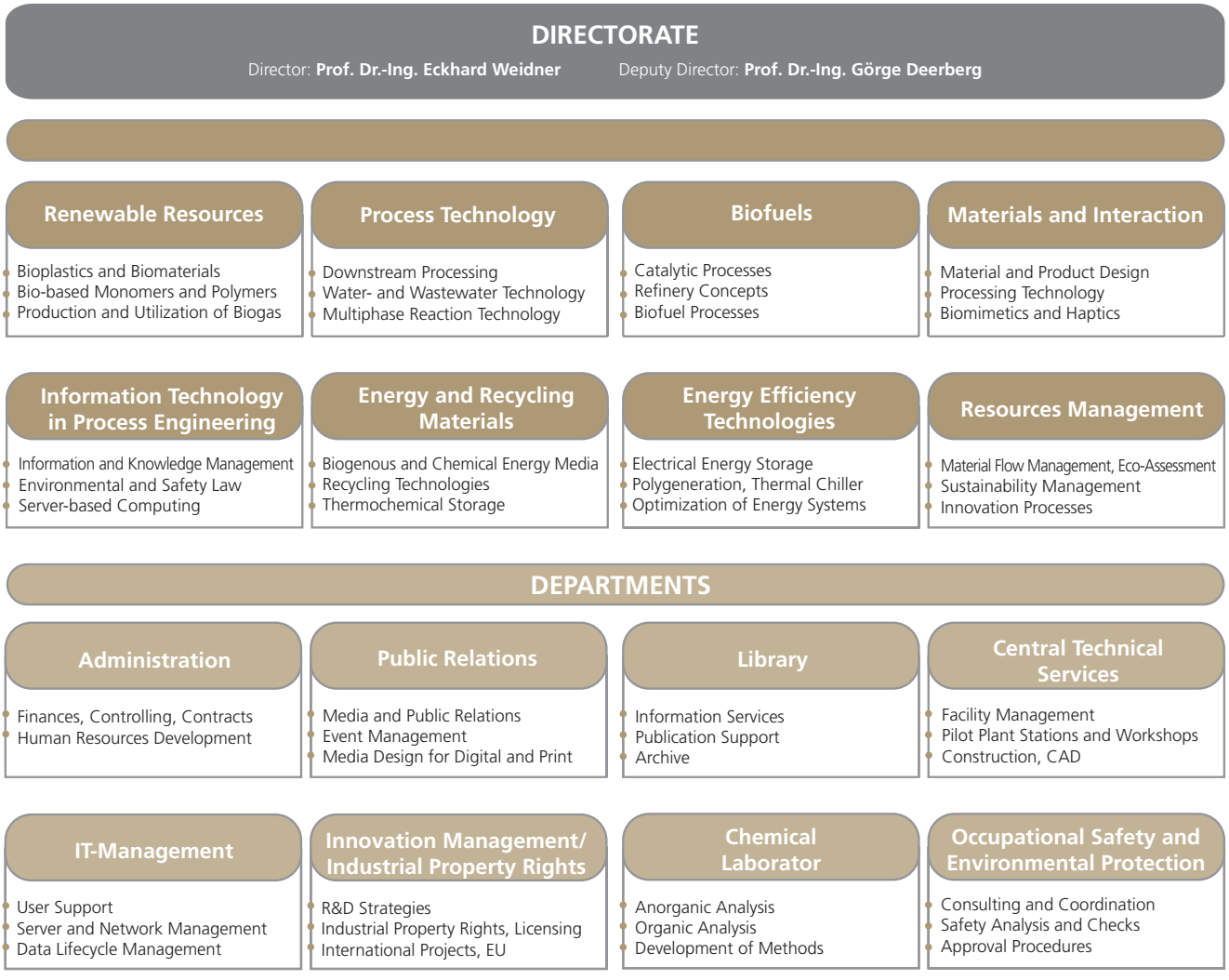


Fig. 3: Organizational chart of Fraunhofer UMSICHT / as of: January 18, 2012

2 PROFILE OF THE INSTITUTE

LEADERSHIP STRUCTURE AND COMMITTEES AT FRAUNHOFER UMSICHT

The highest committee is the Institute's Steering Committee. The heads of the business units and the heads of the departments report to the Institute's Steering Committee.

The Steering Committee is supported by the Managing Advisory Committee (MAC) which consists of the members of the Institute's Steering Committee and the heads of the business units and departments as well as the elected representative of the Scientific-Technical Committee (19 members). At monthly meetings, resolutions regarding organizational, thematic and strategic questions are passed and provided to the Institute's Steering Committee as recommendations, and the Institute's strategy is being planned as well. The Managing Advisory Committee advises the Institute's Steering Committee and therewith contributes to the decision-making. Results and other important information are communicated to the employees in a timely manner, e. g. in regular business unit and department meetings, at general meetings of the Institute, or via email newsletter. We value the culture of short paths, through which it is possible for each employee to approach the Managing Advisory Committee and the Institute's Steering Committee directly.

OTHER COMMITTEES AND OFFICERS (SELECTION)

In the Industrial Safety Committee which, according to ASiG (German Workplace Safety Act), has to convene at least quarterly and which advises the Institute's Steering Committee in questions of occupational safety, representatives of the employers and members of the works council are represented as well as the company's medical officer and the specialists for occupational safety, the safety officers and other specialist officers, e. g. the fire prevention officer(s), hazardous materials officer(s), radiation protection officer(s) and waste management officer(s). Additional functions with respect to occupational safety and environmental protection are realized through members of the Institute and through contracted external resources (e. g. respiratory protection, laser protection, hazardous materials transportation, pressure equipment, disposal).

Tasks in the area of IT security are handled by the IT security officers. A technical shop circle coordinates the planning and setup of test systems as well as the utilization of areas and infrastructure facilities.

The equal opportunity officer, the officers for business integration management (BIM) and the personnel and development coordinator also support the Institute and the Institute's Steering Committee.

ELECTED COMMITTEES AT THE INSTITUTE:

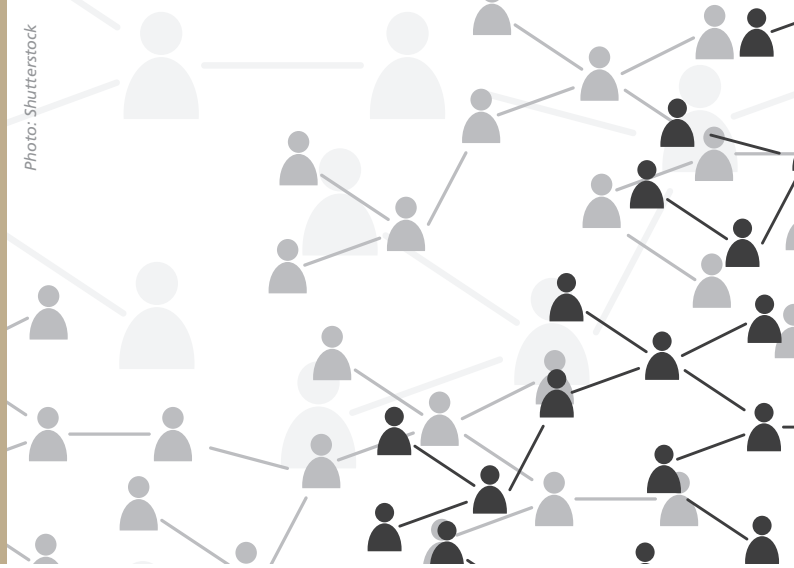
- Works council (4-year term, 9 members)
- Equal opportunity officer (elected for 4 years)

VOLUNTARY CIRCLES

Additional voluntary circles have constituted themselves at the Institute. Among them are the Sustainability WG, Chemist's Circle, Biogas Circle and Catalysis Circle.

Report Parameters

The reporting organization is Fraunhofer UMSICHT. The report encompasses the fiscal years 2010 and 2011. The last reports encompassed the years 2006/2007 and 2008/2009. In comparison to them, the new report differs, since here, for the first time, all Institute sites (Oberhausen and plastics technical shop Willich) are integrated. The next report will once again encompass two years (2012/2013). This will provide us with time for the implementation of measures and for a research-specific



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further development of the report's form – here, we also perceive a need for development at the GRI. The central contact for questions regarding the report and the email address of the sustainability team are listed in the editorial notes. On the Internet, you will find a feedback form for the report.

The report's content was selected in the Sustainability WG in a participatory process. In this group, the whole staff is mapped (operative and administrative areas). Stakeholder participation has not yet taken place. Data was acquired at both UMSICHT sites and at the Fraunhofer headquarters in Munich. In the data acquisition some data that previously was acquired on a per capita basis is now presented in accordance with the GRI guidelines as timelines with absolute values.

Commitments and Involvement

Both the Institute and many employees of Fraunhofer UMSICHT received awards for various achievements. These awards are a good evidence of the high scientific level and reflect the broad thematic portfolio of the Institute. (see also AR 2011/2012, page 105).

- Waste to energy + recycling AWARD for Andrea Gerstner
- Biogas Innovation Prize of the German Agricultural Industry for Ute Merrettig-Bruns
- Heinz Nixdorf Prize of the Chamber of Industry and Commerce of Essen, Germany and the Heinz Nixdorf Foundation for Florian Schnellhase as the best trainee in the IT sector
- Nicolaus August Otto Prize 2011 of the city of Cologne for Helmut Geihsler, Manfred Renner and Prof. Eckhard Weidner
- Recognition by the UNESCO Commission for the interdisciplinary distance learning program "Environmental Sciences" infernum (Fraunhofer UMSICHT/ distance learning university in Hagen), for 2012/2013 as "Project of the UN Decade of Education for Sustainable Development".
- Award as "Exemplary family-oriented company 2012" from the city of Oberhausen, Germany
- In 2011, Fraunhofer UMSICHT was a "Selected Location in the Land of Ideas", (landmark initiative "Germany – Land of Ideas" in cooperation with Deutsche Bank), especially for the project "Smell-induced recognition of critical tears" by Prof. Dr. Anke Nellesen, Andreas Sengespeick and Christina Eloo

NETWORKS

The institutes of the Fraunhofer-Gesellschaft cooperate in groups, alliances and networks. This way, they assure their leading position in the development of system solutions and the implementation of holistic innovations. Through participation in external committees, such as VDI (Association of German Engineers), VDMA (German Engineering Federation), Dechema (Society for Chemical Engineering and Biotechnology) etc., the Institute is promoting the exchange regarding relevant new technological developments or societal challenges.

Among our additional networks (AR 2011/77; AR 2012, p. 89-92) are the Board of Trustees of Fraunhofer UMSICHT, the Institute's Friends and Patrons Group, and the Fraunhofer Technology Academy. As an institute that, with its applications and market-oriented services and products, is acting at the intersection of research at the university and industrial practices and products, we are relying particularly on strategic partnerships with universities and cuniversities of applied sciences in Germany and Europe. As such, we are incorporating basic research in our projects and maintain a connection to the scientific community. There is an active exchange between universities and universities of applied sciences, students, and the Institute. In addition to joint projects, many employees teach at universities or universities of applied sciences in the region.

3 ECONOMICS AND FINANCES

Economic Feasibility as a Foundation for Business Activity

Research into and development of sustainable solutions for industry and society are based on conducting business in a solid manner and on balancing income and expenses. For the Fraunhofer Institutes, this means focusing on a solid mix of public sector basic funding and acquisition of public sector and private sector contracts.

Each Fraunhofer Institute is operating as an independent business unit. In the sense of a profit center it is therefore responsible for adhering to a budget and covering expenses through income generated. The special Fraunhofer financing mix plans on supplementing the basic funding by the federal government with the generation of public sector and private sector income. Since the basic funding of the Institute depends in part on the acquisition of private sector funds, an additional economic incentive is created to align its services and products with the requirements of the market.

The expenses of Fraunhofer UMSICHT are modeled after the acquired funds and consist of the expenses for personnel and material resources as well as investments. As a non-profit institution, our Institute considers it its obligation to use the public sector funds frugally, effectively and efficiently in the spirit of the tax payer and to strive for a balanced household. Any positive carryover is reinvested in the expansion of the staffing level and the expansion of the infrastructure.

Economic Performance Indicators

The continuous economic growth of Fraunhofer UMSICHT in the past years is based on a solid expansion of revenues from the public sector and industry.

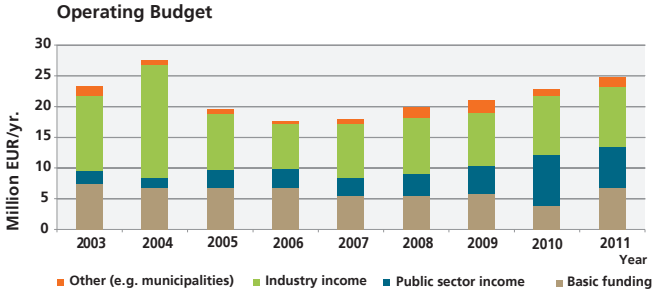

Fig. 4: Development of operating budget since 2003

Fig. 4 illustrates the development of the size of our operating budget based on the contribution of the different revenue carriers. The public sector basic funding with funds from the German Ministry for Education and Research (BMBF) always covers approx. one third of the financing while acquired public sector projects – which includes federal funding as well as funding from the German state of North Rhine-Westphalia and the EU – cover another third.

Also generated as a result of competition are the contracts from private sector companies as well as the contracts from other institutions such as municipalities, universities and associations. In the years 2010 and 2011, a positive trend towards the strived for balanced funding can be recognized.

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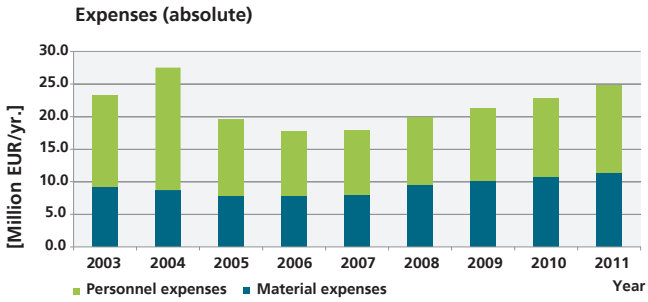


Fig. 5: Expenses in million EUR since 2003

The personnel and material expenses illustrated in Fig. 5 reflect the Institute's positive growth trend. In terms of personnel costs, the years 2010/2011 were subject to slight collective agreement increases. The consumption of material resources also remains relatively constant at approx 50 percent of the overall expenses, which – given the steadily rising costs of electricity, gas and water – leads to the conclusion of savings in their consumption.

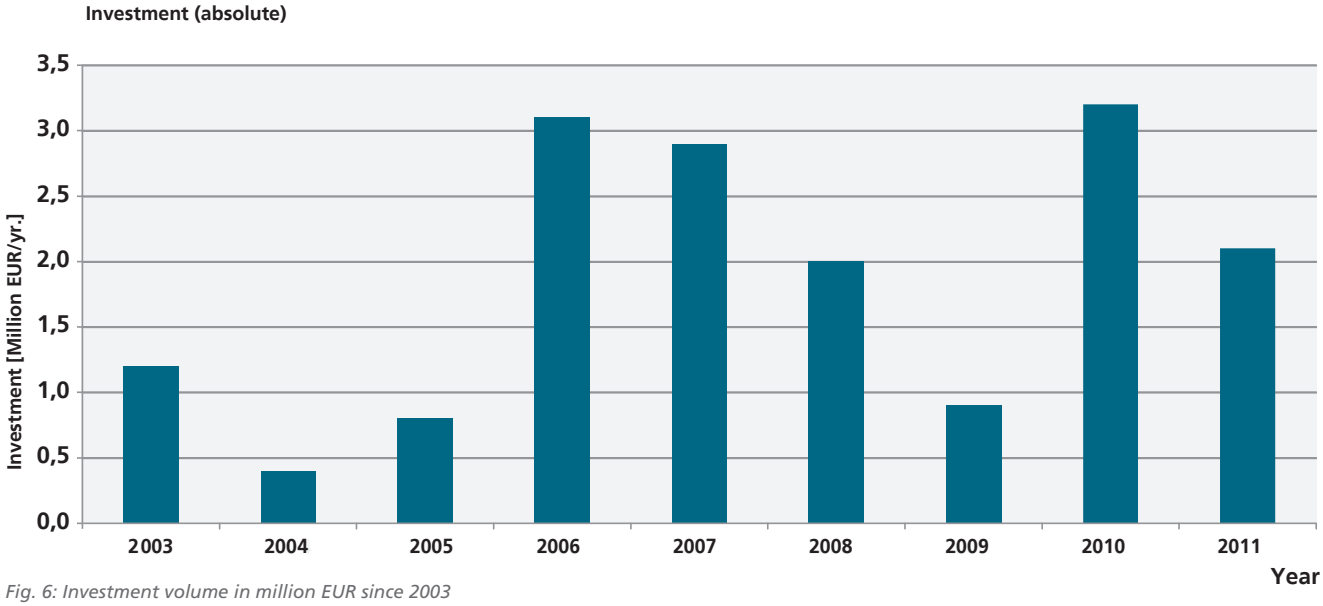


Fig. 6: Investment volume in million EUR since 2003

In the years 2010 and 2011, it was possible to increase the expenditures for devices and equipment as part of the investment budget to the level of earlier years. This was possible due to an increase in investment measures funded by the public sector, in particular in the subject areas of Organic Rankine Cycle (ORC), tanning leather, as well as through Fraunhofer-internal funds with which strategic subject areas such as catalysis and laser technology for membrane technology can be started to be worked on as well as the expansion of the plastics technical shop.

In the Institute's growth, people – as partner, customer, employee and part of society – are the focal point. This means, to pave the way towards a way of conducting business that is characterized by sustainable, qualitative growth and that allows for a society that has particular regard for social welfare and environmental compatibility. As such, we develop and create new values. Jointly with our customers, we drive forward the processes necessary for this.

4 ECOLOGY AND PROCESSES

Ecology as the Driver of our Business Activity

Against the background of increasing resource depletion and the objectives of Germany's federal government to increase the raw material and energy productivity, Fraunhofer UMSICHT wants to make a significant contribution to resource-saving. On a smaller scale, this objective can be achieved by designing internal processes and processing structures resource-efficiently, but in particular also by using and/or implementing and thereby utilizing and applying resource-saving technologies and concepts at other companies that were developed at Fraunhofer UMSICHT. Therefore, the efficient handling of electricity, gas and water as well as consumables also plays an important role in the day-to-day work at Fraunhofer UMSICHT.

Ecological Objectives

The ecological objectives to be identified according to GRI are primarily focused on producing companies and are not always sensibly applicable in the area of science and research. The products of Fraunhofer UMSICHT are research and development results which quite often are intended to increase the efficiency of processes and companies with respect to ecological effects, such as climatic effectiveness (CO_2 emissions). These "research products" therefore indirectly lead to a frugal and efficient use of resources as well as potentially a reduction of business-related CO_2 emissions of companies (cf. Product Responsibility chapter). At the same time, test and practical development activities in the labs and technical shops temporarily lead to high consumption of resources. As a result, higher consumptions of resources due to intense development activities at Fraunhofer UMSICHT do not necessarily have to be considered negatively. Faced with this background, it seems to make only limited sense to align the ecological objectives of Fraunhofer UMSICHT exclusively with the resource consumptions tied to the development activity.

Therefore it is even more important to properly record the amounts of electricity, gas and water as well as consumables Fraunhofer UMSICHT is consuming in the course of day-to-day work, and – based on this data – to achieve a handling of these resources that is as efficient as possible. At the same time, the resources needed as part of the research activity should be utilized as efficiently as possible. For this, it is necessary to capture the consumption resulting from activities in the laboratories and technical shops separately.

Since it was not possible to implement a separate capture to date, the essential ecological indicators are not listed separately by source in the next chapter. Among the essential ecological performance indicators are, in particular, energy consumption (electricity and gas) caused by the business activity as well as the environmental impacts caused by business trips. In terms of environmental impacts, the focus is on the preservation of resources as well as the climatic effectiveness.

Photo: Shutterstock

Ecological Performance Indicators

To deal frugally and thereby efficiently with resources and to reduce greenhouse gas emissions due to conducting business, Fraunhofer UMSICHT is capturing the energy consumption caused by conducting business. In accordance with the "Greenhouse Gas Protocol"[1], the direct energy consumptions (consumption of gas at the Fraunhofer UMSICHT site including the Willich site) as well as the indirect energy consumptions (purchased electricity since 2010, including the Willich site) are recorded. Additionally, since 2010 other indirect energy consumptions from business trips are taken into consideration.

ENERGY

The total of the direct and indirect energy consumption of Fraunhofer UMSICHT is illustrated in Figure 7 and amounted to approx. 16 million megajoule (MJ) in 2010 and to approx. 18 million MJ in 2011. The comparison of the final energy consumption of natural gas and electricity shows that electricity constitutes approx. 2/3 of the final energy consumption. Furthermore, it becomes apparent that the total final energy consumption slowly increased until the year 2009. After 2009, there is a considerable increase in final energy consumption, since the Willich site was included for the first time. At the Oberhausen site, the final energy consumption has remained almost constant, despite an increasing numbers of employees.

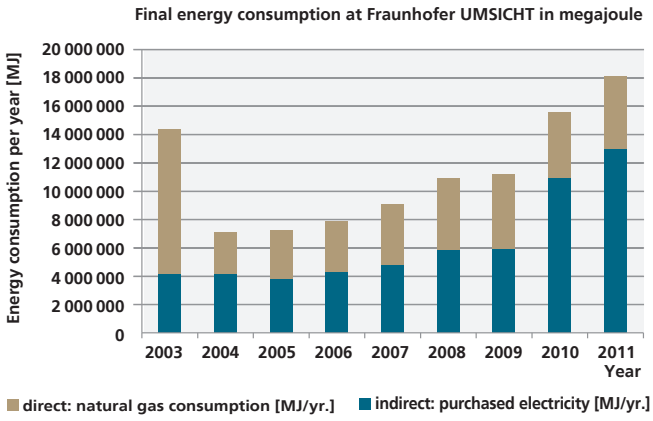


Fig. 7: Final energy consumption at Fraunhofer UMSICHT

For providing the final energy illustrated in Fig. 7, a larger amount of primary energy needs to be spent. This includes the mining and/or extraction and the transport of the energy sources as well as the efficiency of systems for energy conversion (e. g. power plants) and – in the case of electric power – the network losses. The primary energy expenditure is a meaningful and practicable indicator for the assessment of the utilization of energy resources and the energy-related environmental pollution such as emissions of greenhouse gases and air pollutants.

The total primary energy expenditure caused by the electric power and natural gas consumption at the Oberhausen and Willich sites as well as due to business trips amounted to approx. 47.5 million MJ in 2011. In Fig. 8, the primary energy expenditure per employee for the electric power and gas consumption as well as due to business trips is illustrated. The primary energy expenditure caused by business trips has only been recorded since 2001 and is accordingly missing for the years prior. Business trips include trips by train, trips by passenger car incl. the use of rental cars, as well as trips by airplane.

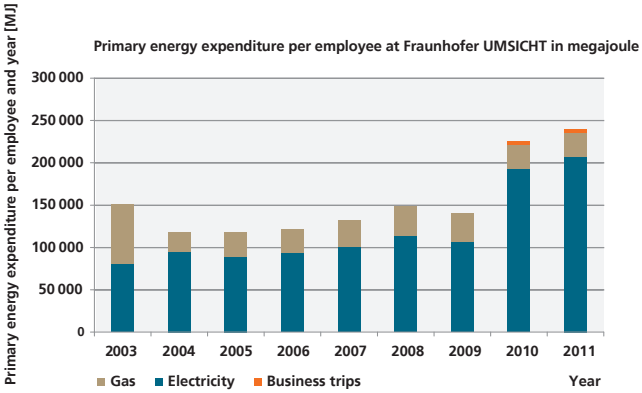
It becomes apparent that the primary energy expenditure caused by the consumption of electric power is significantly higher than the primary energy expenditure caused by the consumption of gas and by business trips. The primary energy expenditure per employee for electric power has kept increasing until 2008 and dropped slightly in 2009.

1 *The "Greenhouse Gas Protocol" differentiates between direct, indirect and other indirect energy consumptions.*

4 ECOLOGY AND PROCESSES

Between 2003 and 2009, the total primary energy expenditure for business trips, gas and electricity fluctuated between 120,000 and 150,000 MJ. The distinct primary energy increase after 2009 is due to the inclusion of the Willich site. The primary energy expenditure per employee for gas has remained relatively even over the years, with the exception of the year 2003. In comparison to the primary energy expenditure as a result of electricity usage, the primary energy expenditure caused by gas usage is significantly lower, but higher than the primary energy expenditure caused by business trips.

Fig. 8: Primary energy expenditure per employee



The emission of greenhouse gases is one of the main sources of environmental pollution caused by energy. The greenhouse gas emissions (GHG emissions) that the primary energy expenditure is faced with are illustrated in Figure 9. As expected, the highest GHG emissions per employee are caused by the consumption of electric power. In 2011, approx. 10.88 t $CO_{2equivalents}$ per employee were emitted due to the consumption of electricity, another 0.75 t due to business trips, as well as 1.25 t CO_{2e} due to the consumption of gas. In comparison to 2010, in 2011 there was an increase of GHG emissions caused by business trips of 37 percent. The analyses (cf. graphics p. 14) have shown that this increase was caused by an increased number of air miles.

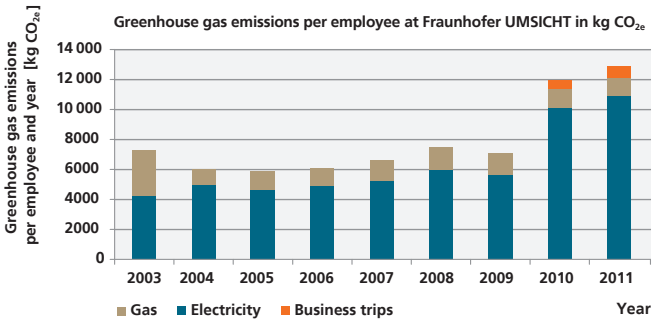


Fig. 9: Greenhouse gas emissions per employee

BUSINESS TRIPS

Figures 10 and 11 illustrate the total number of business trip kilometers per year as well as the GHG emissions and nitrogen oxide emissions (in kg)] with them. They are differentiated based on mode of transportation (train, passenger car, airplane). In comparison to 2010, in 2011 the kilometers traveled increased for all modes of transportation used. This does, however, apply in particular to the kilometers flown which almost doubled. This increase is due to a 26 percent increase in the number of flights booked. The increase of flights applies to both flights within the EU and outside the EU. Nevertheless, on an absolute level, more kilometers of distance were traveled by train than by air. Since 2010, electricity from regenerative sources is used for the train tickets of the Fraunhofer-Gesellschaft, so that the factual greenhouse gas emissions are lower than the calculated emissions.

In 2011, approx. 172 t CO_{2e} and 460 kg NO_x were emitted across all modes of transportation. The NO_x emissions caused by trips via airplane are significantly higher than the NO_x emissions caused by the other modes of transportation.

Photo: Shutterstock

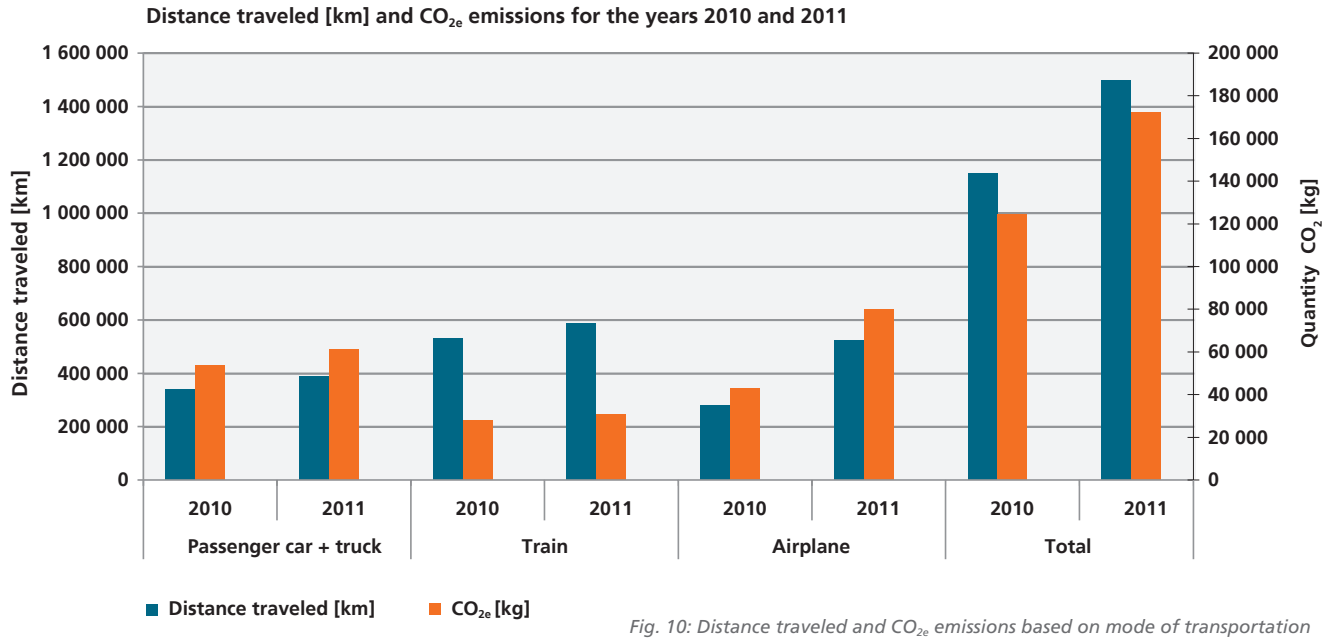


Fig. 10: Distance traveled and CO_{2e} emissions based on mode of transportation

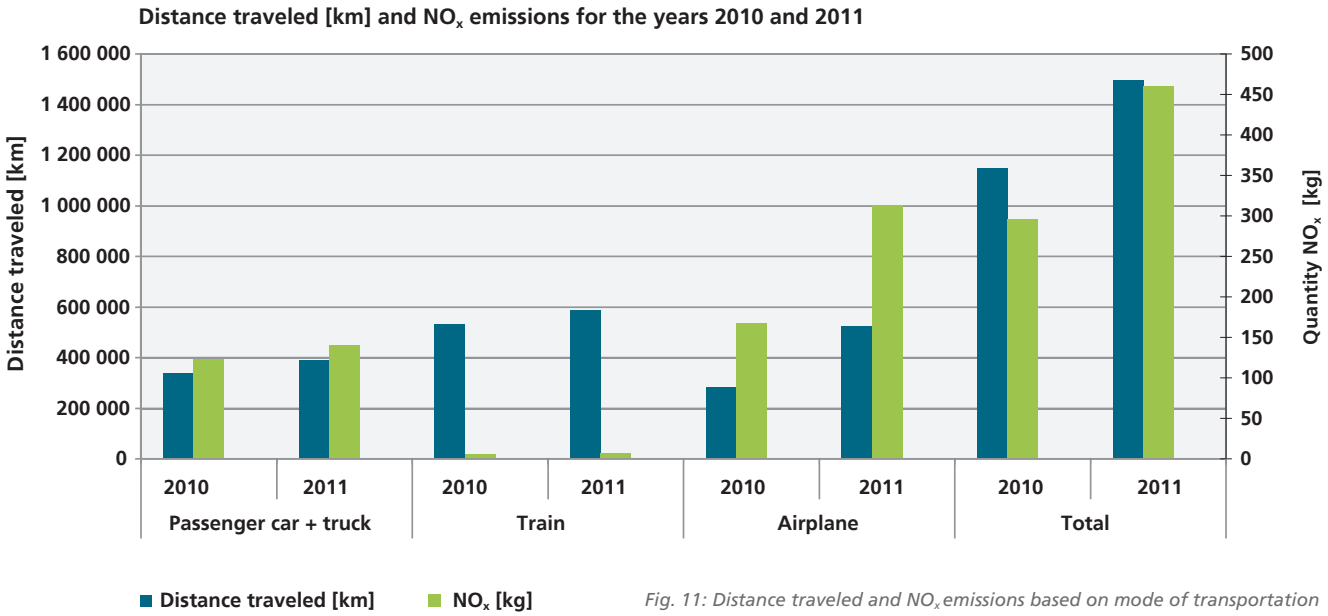


Fig. 11: Distance traveled and NO_x emissions based on mode of transportation

4 ECOLOGY AND PROCESSES

ENERGY EFFICIENCY MEASURES

Fraunhofer UMSICHT is counting on energy-efficient IT to reduce the environmental impacts caused by the consumption of electric power as a result of business activities, and to achieve cost savings. As such, approx. 200 thin clients are currently in operation at Fraunhofer UMSICHT which, according to a 2011 study prepared by Fraunhofer UMSICHT, reduce the CO_2 emissions at the workplace by almost 63 percent in comparison to standard desktop PC systems. The procurement of 63 energy-saving LCD monitors in 2010 and 147 in 2011 is part of the Green IT concept. Another project for this is the "Green Data Center". The objective is to realize an energy-efficient operation of server rooms and computing centers at the Fraunhofer-Gesellschaft.

In addition to Green IT, Fraunhofer UMSICHT counts on energy-saving lighting. To that extent, protection and compatibility circuitry for LED tubes was developed that can be used as a retrofit lamp in luminaires for T8 fluorescent tubes with integrated inductive ballast and starter and allows for energy savings of up to 60 percent compared to a conventional T8 fluorescent tube. The LED tubes with the protection circuitry developed by UMSICHT have been installed on one whole floor at Fraunhofer UMSICHT and lead to annual energy savings of approx. 5,500 kWh which corresponds to CO_2 savings of approx. 3 tonnes.

PAPER

We were able to also further reduce paper consumption by only allowing for the digital filing of requests for time off, by increasingly using digital copies, and by setting all printers' default to double-sided black&white print mode. Despite increasing staffing levels, all these measures have led to a continuous reduction in paper consumption from 1.05 million DIN A4 sheets of paper in 2008 to 764,738 DIN A4 sheets of paper in 2011[2]. This corresponds to a reduction of paper consumption by almost 30 percent. At the time the report was prepared, we are examining to what extent the paper used by Fraunhofer UMSICHT is compliant with international sustainability requirements (FSC, PEFC).

PLANT DOCUMENTATION SYSTEM

As part of energy efficiency considerations, Fraunhofer UMSICHT has procured a mobile data capture system for the monitoring of electric power consumption and temperature profiles. The mobile system is equipped with a GPRS3[3] modem to send the collected energy data to an Internet portal. With this an energy transparency is possible virtually in real-time. Currently, there are measurements being taken at a municipal sports hall in Oberhausen to determine the energy consumption and the starting behavior of the lighting system. The insights gained here will make the decision easier as to whether and when a conversion of the current lighting with fluorescent lamps to the LED tubes equipped with the protection and compatibility circuitry developed by UMSICHT would pay off. The measuring system is also used for eco-balancing at UMSICHT. To date, at Fraunhofer UMSICHT, the energy consumption of a laser sintering machine was measured during the manufacturing of components. Further measurements are planned for the use of an injection molding machine.

PURCHASING AND PROCUREMENT

In its purchasing, Fraunhofer UMSICHT is following the Fraunhofer Terms and Conditions of Awarding and Purchasing. Additional information is not yet captured. In procurement, no life cycle costing (LCC) tools are used. This is difficult since a lot of the purchases are special devices (e. g. measuring instruments), for which initially the function is the focal point, which reduces choice. In a lot of cases, there are not even a sufficient number of suppliers to allow for making a selection based on sustainability criteria.

2 The paper consumption does include external print orders. All paper formats were converted into DIN A4 .

3 GPRS: General Packet Radio Service

LED lighting on the third floor of an Institute building

In addition to the pure price criterion, Fraunhofer may also take other assessment criteria into consideration when purchasing. In accordance with the German Awarding and Contract Regulation for Services VOL/A § 18 Sec. (1) the following applies: "The awarding [of the contract] shall go to the most economic offer, taking into consideration **all** circumstances. The lowest price offered is in and by itself not decisive." The social conditions in the manufacturing of products, e. g. coffee, in third countries could be assessed as indicator via fair-trade labels.

Since the end of 2011, Germany's Fourth Regulation for the Amendment of the Regulation for the Awarding of Public Sector Contracts (VgV) is in force which implements a corresponding EU Directive. Here, with respect to devices relevant to energy consumption, the energy efficiency and, where applicable, a review of the life cycle costs have to be taken into consideration[4].

WATER

In the period of March 2011 to March 2012, 15,710 m³ of fresh water were consumed at Fraunhofer UMSICHT. At the Oberhausen site, the water is provided by RWW Rheinisch-Westfälische Wasserwerksgesellschaft mbH and is withdrawn from the Ruhr river. At the Willich site, the fresh water is withdrawn from the ground water via various wells.

At present, the used water is not recycled but fed to the wastewater system. There is no indication that the wastewater volume would be damaging to the ecosystem.

AIR POLLUTANTS NO_x AND SO_2

The release of nitrogen oxides (NO_x) is linked to both health impacts (e. g. irritation of and damage to the respiratory organs) as well as ecological effects (acidification, tropospheric generation of ozone, climatic effectiveness). Sulphur dioxide (SO_2) contributes in particular to the acidification of ecosystems. Both gases are created when electricity is being generated, when burning natural gas and/or when burning fuels in modes of transportation. Overall, approx. 1.99 tonnes of nitrogen oxides and 2.05 tonnes of sulphur dioxide were emitted due to energy consumption (electricity and gas). Business trips were responsible for the emission of 460 kg of NO_x and 282 kg of SO_2, respectively, in 2011, which is equivalent to approx. 23 percent and 13 percent, respectively, of the emissions due to providing energy.

WASTE

At UMSICHT, the amounts of waste are recorded by means of a waste code as part of a waste balance sheet. This is of particular relevance for hazardous wastes which, however, are not regularly generated as part of the research and development activity. For residential and paper waste as well as glass waste, collection receptacles are available which, however, are not weighed. Because of this, the amount of waste has to be estimated based on container size, density and emptying interval. Since there has been no change in container sizes since 2009, the amount of waste was calculated as 29 t/yr. for residential waste, 15 t/yr. for paper waste, and 5.5 t/yr. for glass. The total amount of waste per year was 56 t (2010) and 61 t (2011).

4 If devices and equipment relevant to energy consumption are purchased in the future, the highest performance level and – where available – the highest energy efficiency class in the measuring of the German Energy Consumption Labeling Regulation must be demanded in the requirements specifications with respect to energy efficiency. This means that concrete information regarding energy consumption and – in suitable cases – an analysis of minimized life cycle costs (or a comparable method) must be demanded in the requirements specifications. Exempt from this shall only be goods/technical devices/equipment available on the market that differ only minimally with respect to the permissible energy consumption. Furthermore, energy efficiency has to be sufficiently taken into consideration as a criterion for awarding a contract.

5 EMPLOYEES AND EXPERTISE

Our Employees as the Backbone of the Company

The staff is the backbone of the company. UMSICHT employs numerous staff who differ in the type of their area of work at the Institute: starting with the trainees, interns, student assistants, doctoral students, technicians, graduates all the way to post-doctoral scientists. Some of these scientists received appointments to professorships. We not only advance our employees subject-area-specifically through continuing education offers, but also pay attention to advancing the "soft" skills. To increase the percentage of female employees in applied research, and to assure and improve how well family and work life get along with one another is among our declared goals.

Work Practices and Employment

Innovative, creative and future-oriented: those are three keywords that are on the mark when describing the objectives of UMSICHT. At UMSICHT the focus is on independent and creative work, without losing sight of the end result in the process. The resources necessary for this are made available. New ideas are openly discussed and further developed. The relationship between the employees, but also between the executives and the Institute's Steering Committee is characterized by trustful interaction and flat hierarchies.

The working conditions at the Institute are continuously being improved to address the employees' need for being able to combine work, family and personal life. At present, we are offering our employees a "With-Child Office" in which parents can work during bottlenecks in child care and can at the same time keep an eye on their offspring, as well as flexible work time models, providing work from home workplaces, and the option to utilize a holiday program for school-aged children. Suggestions from our staff are always welcome and are, where possible, e. g. implemented by the works council or by the Equal Opportunity Officer.

Through regular general meetings of the Institute, a newsletter from the Institute's Steering Committee and the Institute's own employee magazine (for:um), the staff is comprehensively informed and can bring itself in. With the help of working groups such as the Sustainability Group, the employees have the opportunity to get personally involved in their Institute. After a longer period of sickness, employees are carefully reintegrated and supported by the corresponding officers at the Institute. Staying in touch with employees who are on parental leave, is everyday life at the Institute. So that all information specific to the Institute is provided to all employees, each and every new employee has the opportunity to participate in an employee immersion seminar which is intended to serve as a starting and orientation aid.

In 2011, all employees had an opportunity to participate in the Fraunhofer-wide employee survey and thereby assess the employer, area of work, working conditions and special circumstances of their own Institute. We are pleased that at UMSICHT 86.8 percent of the staff took advantage of this opportunity and provided their opinion. The results of UMSICHT are very positive and are for the most part located in the top third of all 60 Fraunhofer Institutes. At present, a follow-up process is on the way which is planned to be completed in fall 2012 with the corresponding measures.

Currently, the key topics of the Institute are also being redeveloped. The employees can actively participate in the design of this strategy process, and already contributed their ideas at workshops which then were presented to the Institute's Steering Committee.

Open Space Workshop Employee Survey

Performance Indicators Employees and Employment

EMPLOYMENT

Figure 12 shows the number of all employees by type of employment between 2003 and 2011. The staff's structure is split into permanent staff, trainees, students working on a graduate/bachelor's/master's thesis, interns, persons doing community service (only until August 2011) and student assistants.

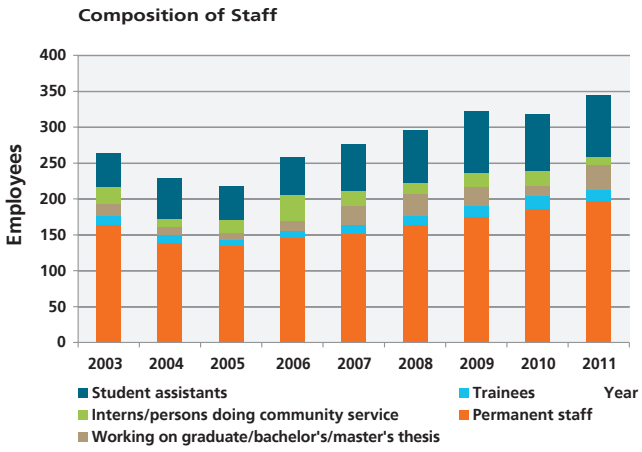


Fig. 12: Employee by type of employment

In comparison to the previous year, an increase in the number of permanent staff is apparent. The number of students working on a graduate/master's thesis and of student assistants has also developed positively. The number of interns and trainees has dropped instead. However, this trend was recognized and at present measures are being initiated to counteract this.

EMPLOYEE/EMPLOYER RELATIONSHIP

Permanent staff is compensated in accordance with Germany's Collective Agreement for Public Service Employees (TVöD), trainees in accordance with Germany's Collective Agreement for Public Service Trainees (TVAöD). Student assistants are remunerated in accordance with the central company agreement regarding the employment of assistants. If contracts expire, the employees are informed of this at least three months ahead of time.

Effective December 31, 2011, of the 198 permanent staff at Fraunhofer UMSICHT 113 people had fixed-term contracts and 85 had open-ended ones. The permanent staff consists of 129 full-time and 69 part-time employees. 100 percent of the staff employed under the terms of the collective agreement, except trainees, has received a formal performance review during the reporting period.

OCCUPATIONAL SAFETY

Fraunhofer UMSICHT has an internal department that deals in a consulting and coordinating function with issues of occupational safety and environmental protection. The head of this department is a member of the Managing Advisory Committee. This activity is flanked by the Occupational Safety Committee which monitors and discusses the occupational safety programs. In the reporting year 2010, there were three commuting accidents and in 2011 two occupation-related accidents subject to registration. The following table illustrates the development of the number of accidents at UMSICHT.

Table 1: Development of work and commuting accidents

Occupation-related accidents	2003	2004	2005	2006	2007	2008	2009	2010	2011
Occupation-related accidents subject to registration requirements (abs.)	1	1	1	0	3	3	1	0	2
Work path accidents (abs.)	1	0	1	1	0	0	0	3	0

Occupational preventive medical checkups in accordance with the statutory requirements (ArbMedVV) are performed as mandatory, offered and optional checkups as well as supplementary suitability inspection for certain activities, primarily as in-house appointments. In the fall, staff is regularly offered free flu shots.

5 EMPLOYEES AND EXPERTISE

During the reporting period, two business health days took place in which under the leadership of the company's medical officer information events took place in combination with medical screening checkups (e.g. vein function, blood parameters, advanced vision tests) were offered. Main topics of the health days 2010 and 2011 were stress prevention and the concerns of the age group over 40 years.

To promote exercising, Fraunhofer UMSICHT also in 2010/2011 participated in the "Bike to Work" campaign and thereby achieved a reduction in emissions caused by driving to work. Numerous employees participate in the Metro relay marathon in Düsseldorf every year and, in addition to their health, are also boosting the team spirit.

ABSENCE DUE TO SICKNESS

Fraunhofer UMSICHT defines the sick rate as follows: Absence due to sickness (rate) [%] = (absences paid by employer + absences outside of continuance of salary) / planned working hours.

The figure was 3.12 percent during the 2010 reporting period and increased to 3.71 percent per employee in 2011. As such, the figures are below comparable figures in the industry.

TRAINING AND CONTINUING EDUCATION

In 2011, more than 35 students received further qualifications by working on a diploma, bachelor's or master's thesis at the Institute as part of a qualification agreement. In addition, numerous external qualification theses are being advised. The number of trainees is 15 and is, as such, at a high level. The topic of a cooperative education at Fraunhofer will continue to be heavily advertised so that a continued high influx of qualified trainees is achieved.

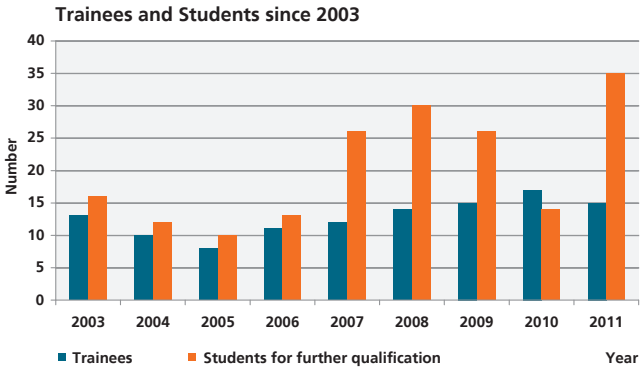


Fig. 13: Number of trainees and students for further qualification

Fraunhofer UMSICHT is offering twelve different cooperative education professions. Among them are natural science and technical cooperative educations as well as cooperative educations in the areas of IT and administration. All professions are listed in the Annual Report 2011/2012 on pages 76 and 77 with a description of the cooperative education.

CONTINUOUS EDUCATION

Continuous education is a central element of personnel development and encompasses qualification measures that serve the further development of thematic, scientific, business and social expertise of the Institute's scientific and non-scientific employees. Among the qualification measures are seminars, training sessions and workshops that can take place in-house (such as acquisition seminars, communication training) or externally (for example, management training), as well as events such as congresses, conferences and trade fairs, insofar as they serve the objective of the aforementioned development of expertise.

As part of the systematic personnel development, a comprehensive qualification program is offered that includes thematic and cross-thematic qualification measures.

Photo: Shutterstock

To achieve a level of knowledge and expertise and/or a comparable level of qualification for officers at the Institute that is as consistent as possible, part of the qualification program is mandatory for managers and for employees with certain functions and/or areas of work (e. g. project managers).

In addition to this mandatory program, qualification measures are offered that – in principle – are available to all employees upon coordination with their supervisor, e. g. in-house English courses. A special scientific qualification program is geared towards employees (in particular, students working on a doctoral thesis), who are looking for a scientific career in research or industry.

The qualification program is each year adjusted to the Institute's current requirements and needs. The determination of the needs primarily takes place via staff appraisal interviews which are carried out at least once a year. For the future, the preparation of individual personnel development plans is planned.

DIVERSITY

The Fraunhofer-Gesellschaft supports equal opportunity measures and is actively pursuing diversity management: all employees are treated and valued without prejudice – independent of gender, nationality, ethnicity, religion or world view, disability, age, sexual orientation and identity. Fraunhofer acknowledges that work and family need to get along with one another and in this respect supports its employees with flexible offers. At the end of 2011, Fraunhofer signed the **Diversity Charter.**

Our employees with migration background and our guest scientists are indispensable to our international projects and cooperations.

So that all employees can be taken care of accordingly and supported as necessary, it has to be ensured that there is an Equal Opportunity Officer at each Institute.

EQUAL OPPORTUNITY

The Fraunhofer-Gesellschaft is striving for a balance in the distribution of women and men in research. As can be seen in the following tables and graphics, this has not yet been sufficiently implemented. For this reason, effective 2012, we are striving for an increase in the percentage of women for the research area. In addition, when executive positions open up, women in particular will be checked for their suitability for those positions in an effort to straighten out the imbalance in terms of female managers at UMSICHT.

The following table shows the distribution of employees by women and men.

Table 2: Composition of staff women/men – Relative to permanent staff (198 people)

Topic	No. of Men	No. of Women	Total
Number	124	74	198
of those Executives	12	3	15

The following graphics show the ratio of the basic salary of women and men by salary group. The illustration shows the percentage rate distribution at the Institute relative to the permanent staff, distributed by women (orange) and men (blue). If the person is located in a salary group between EG 13 and EG 15 Ü, he or she is a scientist (S). If the person is located in a salary group between EG 9 and EG 12, he or she is a graduated employee (G). Below these salary groups, between EG 2 and EG 8, he or she is a technician (T).

5 EMPLOYEES AND EXPERTISE

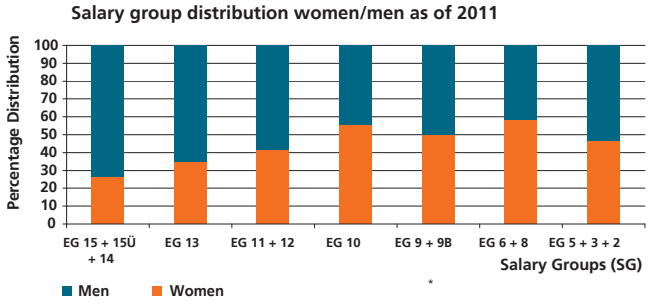


Fig. 14: Distribution of Salary Groups
** Deviations in the number of staff (salary groups) relative to total number due to staff fluctuation*

The imbalance between men and women in the scientific area has been recognized. To counteract this, the Fraunhofer-Gesellschaft has set itself as a quantitative objective an annual increase of the percentage of female scientists by 0.5 percent in the next 4 years. For this, every fourth new position would need to be filled by a woman.

Additional measures for promoting the future generation of scientists can be found in the Fraunhofer mentoring and female doctoral student program. In the other areas there is a virtually balanced ratio of women to men.

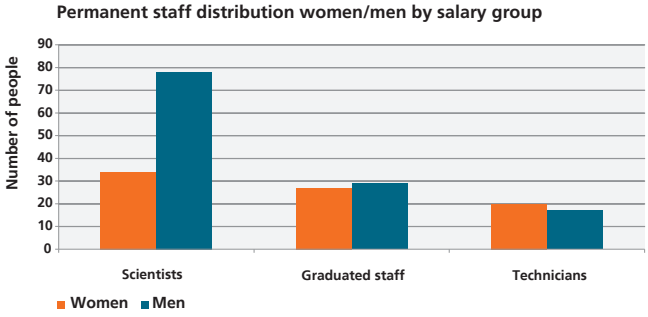


Fig. 15: Distribution of permanent staff, men and women by employee category in 2011

Human Rights

In Germany, the contents of the general Declaration of Human Rights are centrally anchored in Article 1 of the German Constitution. In addition, they constitute a central demand of the national sustainability strategy (cf. provision 10 of the management provisions of sustainability in the Progress Report 2012 on the National Sustainability Strategy). There, it is demanded that the international framework conditions must be jointly designed such that people in all countries can live a life in proper conditions in line with their perceptions and in harmony with their regional environment and that they can participate in the economic growth and development.

Fraunhofer UMSICHT considers this topic highly significant and is taking it into consideration in accordance with the statutory requirements in all internal processes as well as in project implementations. Procurements essentially take place via German dealers. The direct procurement of capital goods from countries with critical human rights situation to date has practically played no role for Fraunhofer UMSICHT. Details regarding the implementation can be found in the corresponding part of the GRI Content Index in chapter 9.

6 MARKET AND SOCIETY

Our Responsibility

Fraunhofer UMSICHT is an active part of society and interacts with it on numerous levels through knowledge and technology transfer and as innovation partner of companies. As a research institute in the Ruhr area, the Institute considers itself a catalyst for science and business and co-designs the structural change in the city and region. The Institute is an important regional employer. Above and beyond the research service and professional contacts, the Institute promotes the dialog with the interested public and with pupils and university students.

Objectives of Interaction

Through contractually agreed upon application-oriented business cooperations, UMSICHT shapes the market in the areas of environment, materials science, process technology and energy technology. In particular for smaller and medium-sized companies, UMSICHT is a competent innovation partner. One important characteristic for the quality of customer contacts is customer loyalty. In the past five years, 64 to 70 percent of the industry customers have contracted us more than five times (Figure 16). A further technology transfer takes place through company start-ups with market-ready products or services of the Institute, the spin-offs.

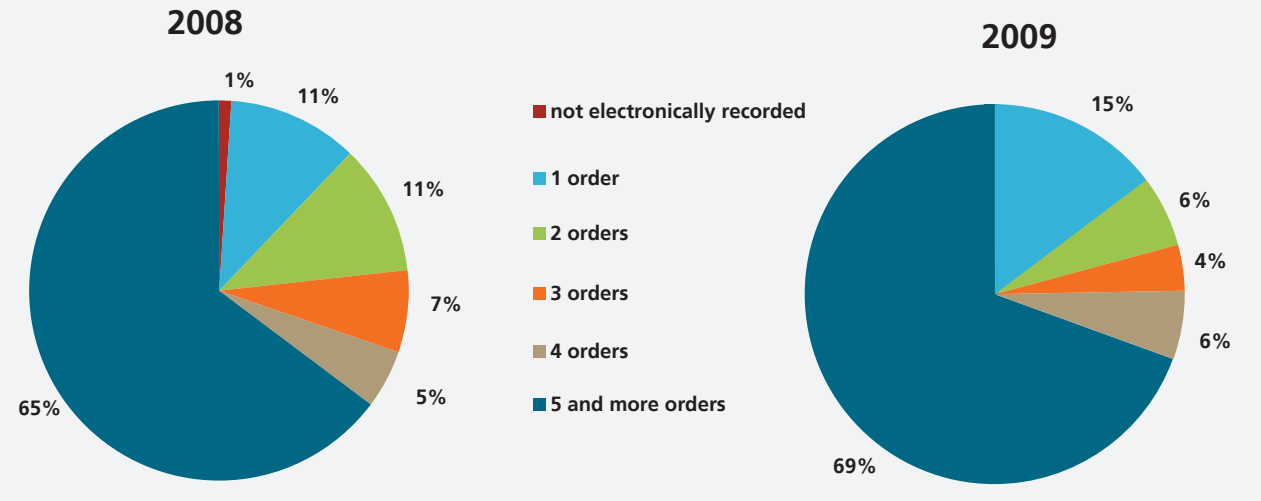


Fig. 16: Customer loyalty

6 MARKET AND SOCIETY

THE PUBLIC

Societal changes require new technological developments. These can only be accepted if they are communicated and understood. The Institute therefore considers it to be an important task to regularly provide information about the current research developments. Through comprehensive public relations work, regular guided tours of the Institute for visitor groups and public events, we allow for insights in our Institute's work, into the technical workshops and the laboratories and to make it possible to experience research.

Numerous events and workshops promote the exchange between experts and bring relevant partners together. The visually appealing traveling exhibition regarding the topic of biomimetics also provides UMSICHT with an opportunity to bring a special subject area closer to different audiences.

*Table 3: Development press release, events and trade fair participation**

	Number in 2010	Number in 2011
Press releases	42	50
Events	23	30
Trade fair participation	16	15
Visitor groups	23	27

**In this report, for the first time the number of press releases published by the Institute is communicated and not, as done previously, the number of press clippings, i.e., the number of reports regarding the Institute published in the media. The background is that while the press clippings represent a part of the media monitoring, they are, however, of limited meaningfulness since a statistical analysis of the media presence based on quantitative and content analysis criteria such as reach, positive or negative tendency in reporting, or a statistical association with subject areas is not taking place.*

INVOLVEMENT IN THE REGION

To strengthen regional ties, UMSICHT is involved in the areas of art and culture. Of their own initiative, employees organized three art exhibitions at the Institute during the reporting period. Under the label "46D – Art and Culture at Fraunhofer UMSICHT" events regarding general socio-political topics are organized at irregular intervals. This promotes the exchange with the public and allows for contact with target groups that do not bring a direct scientific connection to the Institute with them.

The debate culture is also being continued. To that extent, a debate regarding the topic of "Sustainable Development Beyond Growth Orientation" took place in 2010 and a debate regarding the topic of "Slow Food" in 2011. In addition to the voluntary involvement of the employees, the Institute is striving to support social institutions in the region – within the framework of options of the awarding law – by awarding contract for mailing campaigns and for the maintenance of the Institute's own green spaces, e. g. to the Oberhausener Lebenshilfe.

UMSICHT SCIENCE AWARD

The UMSICHT Science Award, which the Institute's Friends and Patrons Group is awarding annually, is intended to advance innovative thinking and acting in the areas of environmental, safety, and energy technology. In 2012, the prize will be awarded for the third time in the categories of science and journalism. It promotes the interaction between science, society and entrepreneurial activity, since particular value is placed on which benefit the technology and/or the journalistic work has for society.

Photo: Shutterstock

KNOWLEDGE TRANSFER

Fraunhofer UMSICHT is working closely with universities and research institutions to also integrate basic research. In 2011, the work of 69 student theses (diploma, master's, or bachelor's theses) was supported by advice. The employees have teaching assignment at surrounding institutes of higher education and additionally participate in various groups and associations, such as VDI (Association of German Engineers), DECHEMA (Society for Chemical Engineering and Biotechnology), VGB (European technical association for power and heat generation), VDMA (German Engineering Federation). The infernum study program that the Institute offers in cooperation with the Hagen Distance Learning University (FernUniversität in Hagen) and in which numerous UMSICHT employees are working as lecturers, is providing knowledge about the environment and enables interdisciplinary thinking and acting as extra occupational training. Scientific publications show the Institute's technical expertise and promote its expert status in the industry. Fraunhofer UMSICHT has made it its objective to increase the number of scientific publications.

To awaken an interest for the natural sciences also and especially in children and teenagers, we are participating in numerous campaigns for pupils. For the past six years already, the Girls' Day has been very well received, and with the Fraunhofer Talent School, in which middle school and high school students deal with current scientific topics, we promote a thinking and design that is oriented towards sustainability in future generations of scientists. The alumni of Fraunhofer UMSICHT are another important target group for the Institute. Staying in touch regularly beyond the employment also promotes professional exchange.

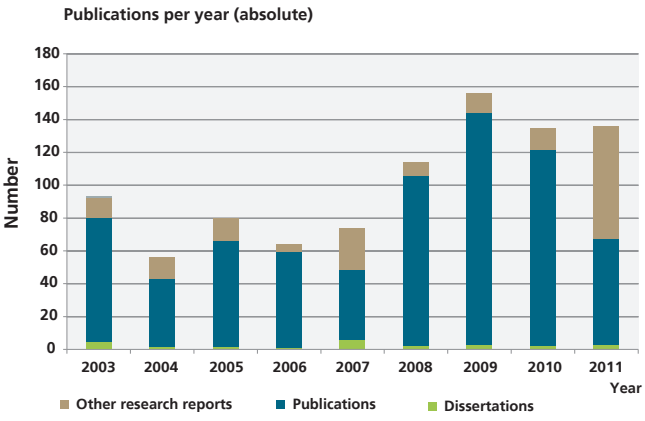


Fig. 17: Development of Publications

CORRUPTION

All employees are instructed regarding the prevention of corruption and confirm this with their signature. Each and every new employee receives an introduction to the topic together with aspects of IT security and occupational safety. To date, no cases of corruption have occurred.

7 PRODUCT RESPONSIBILITY

The Responsibility of Science in the Innovation and Value-Added Chain

The Global Reporting Initiative considers product responsibility to be first and foremost to be the effects of a product or service with respect to the health and safety of the users and customers (cf. Indicator Protocol "Product Responsibility" in GRI 3.1). The reporting focuses on the questions whether and to what extent these aspects are analyzed throughout the life cycle phases, to what extent they are a starting point for improvements, and what information the company is providing to the customers and users with respect to the product's effects. The resource expenditures, emissions and social effects associated with the use and end of life and/or recycling of a product, however, are not taken into consideration. This is insofar acceptable as these aspects are already taken into consideration in the balancing process and assessment of the business operations as part of a gate-to-gate review and here in particular through the indicator protocols "Environment" and "Human Rights".

However, for application-oriented research, this form of reporting regarding product responsibility has to be rethought. Its main purpose is to develop concepts and prototypes which form the foundation for new competitive business activities. If this is achieved, the results of the R&D activity can – due to their implementation outside the research institution – have an impact on various sustainability dimensions that cannot be captured by the balancing process and assessment of the business operations of the research institute alone. Research and development is therefore generating option values for the future conduct of business which may be tied to great opportunities but also to risks. Therefore, these option values have to be taken into consideration in an expanded understanding of product responsibility. This requires a reworking of the GRI Indicator Protocol for product responsibility specific to the research sector.

However, in the reporting and assessment of research results, the focus is not on expanding the research organization's balance sheet or to already take the future impact of an innovation qualitatively into consideration in current business operations (cf. the decision tree of the GRI, Fig. 18). This would also be problematic insofar as this would result in double-counting and would falsify a data aggregation at super-ordinate levels.

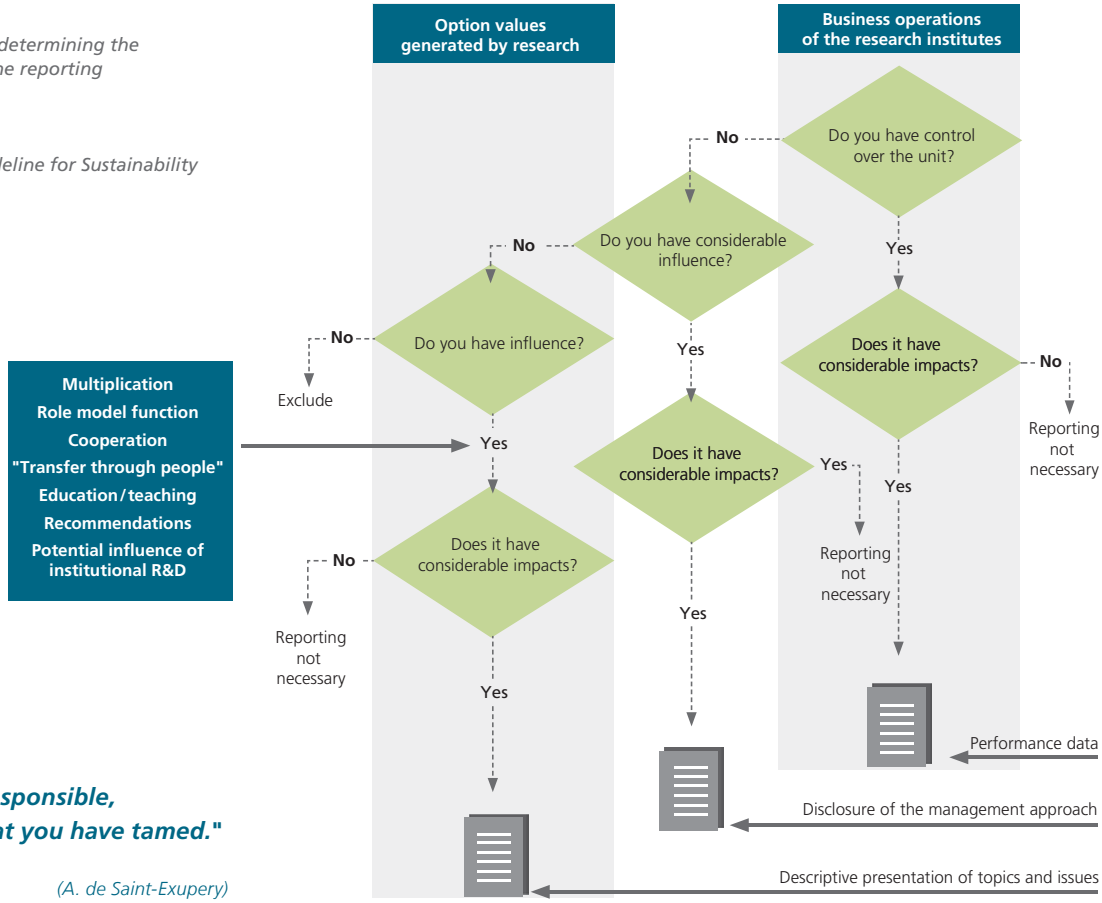
Nevertheless, research institutions have a not insignificant impact on cooperating companies due to their activities. They influence the future directions of production, provide recommendations for strategic investments and, last but not least, also via the "transfer of smarts". For this reason it should be expected in the reporting of research institutions that they explicitly comment on the often-made promise that innovation is the key for sustainable development. In principle, in many places, this responsibility of science has already been carved in stone today. The German Closed Substance Cycle and Waste Management Act explicitly assigns responsibility for the disposal and recycling of products also to the developers (Krw-AbfG § 22). Efficiency regulations such as the ErP energy-related products directive (2009/125/EC) for energy-operated and energy consumption relevant products are representing important guidance systems for future R&D. The advertising of innovations in terms that relate to environmental compatibility and consumer protection interests have to comply with the requirements of the German Act Against Unfair Competition (UWG §§ 5 und 5a) and the DIN ISO 14020 ff. standard that can be derived from it. And last, but not least, an expanded term of "Scientific Diligence" already results from the Social Responsibility of Ownership anchored in the German Constitution (§ 14 (2)). To what extent the latter does not just apply to the research infrastructures but

Innovative leather tanning process

also to the "intellectual property" is an interesting question of social and research politics. A prospective technology assessment therefore must have the objective to early on identify the opportunities and risks associated with new technologies and to feed this knowledge into the R&D process accompanying the innovation. This way, research and development can become more focused on a specific direction with respect to sustainability objectives. At the same time, the numerous effects of innovations are better understood and thought through, which also improves the data foundation and the likelihood of a successful utilization by businesses. Unfortunately, to date there are no established and robust methods for technology assessments accompanying innovation.

Fig. 18:
Decision tree of GRI for determining the system boundaries for the reporting

Source:
Changed based on: Guideline for Sustainability Reporting / page 18



> ***"You become responsible, forever, for what you have tamed."***
>
> *(A. de Saint-Exupery)*

Quotations from the guidelines of Fraunhofer UMSICHT:
"... Fraunhofer UMSICHT is independent. It supports clear, understandable, and interdisciplinary consolidated positions and aligns its objectives according to these positions. ... The Institute promotes effective management, environmentally friendly technologies, and environmentally conscious behavior in order to enhance society's overall quality of life."

7 PRODUCT RESPONSIBILITY

Objectives Regarding Product Responsibility

One of the essential objectives of Fraunhofer UMSICHT is to further develop methods for a technology assessment accompanying innovation and to increasingly use it in its own R&D projects in the future. From our point of view, it is insufficient for this to anchor the technology assessment institutionally and centrally. Instead, the technology assessment accompanying innovation must be part of each and every responsible scientist's canon of methods.

A technology assessment accompanying innovation has to be scalable and must be developable in steps. In the early stages of brainstorming, the focus is primarily on identifying and including as boundary conditions the numerous requirements that result from the objective of a sustainable development. In the subsequent prototype development, catalogs of "best available technologies" are needed for the system components. Tools for substituting substances and components that are critical from an ecological point of view would also be helpful. When and how a quantitative assessment (e.g. in form of a lifecycle assessment (LCA), lifecycle costing (LCC) or social life cycle assessment (SLCA) that is robust with respect to data availability and data quality is sensible in the course of an R&D project has not yet been answered.

But especially for innovations it seems to make sense to focus on the absolute impact (end-point) in the impact assessments of a product – since only those can be aligned with the political objectives and can live up to the claim that research and development can achieve not just relative contributions but also absolute ones for the unburdening of the ecosystems and social systems while concurrently maintaining competitiveness. Furthermore, we are asking ourselves which form of R&D project would best correspond to the objective of sustainable development. We perceive participation, interdisciplinarity and transdisciplinarity as important "enablers" that we want to strengthen in our projects in the future.

Performance Indicators

Numerous projects at Fraunhofer UMSICHT pursue the objective to contribute to the energy transition and to the sustainable utilization of resources. Storage concepts for energy, bio-based raw materials and materials, but also the intensification of utilization through a better understanding of the interaction between humans and technology or novel repair concepts are among them or are part of them. At the same time, we perform strategy analyses, holistic assessments and balancing processes of products and processes for our customers in which we reveal deficits with respect to sustainability objectives and provide suggestions for improvements. In 2011, six out of eight business units carried out sustainability assessments within their projects. Overall, however, the number only amounted to 24 out of 310 projects (approx. 8 percent) – here is a considerable need for improvement. Of these 24 sustainability assessments, 13 were accompanying innovation, in eight cases they were external contracts for technology assessment, two dealt with developing a method for sustainability analysis (Figure 19). Of the 13 analyses accompanying innovation, eight specified a concrete method for material and/or impact balance processing, three of these projects furthermore used checklists for a quick and comprehensive analysis.

Photo: Shutterstock

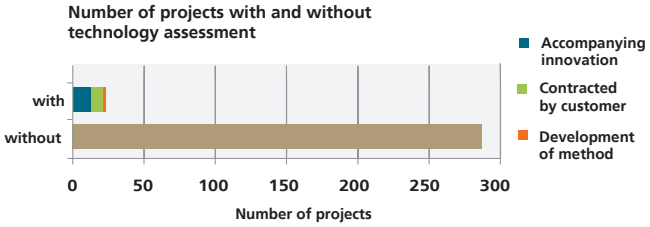


Fig. 19: Technology assessment in projects at Fraunhofer UMSICHT 2011

CUSTOMER HEALTH, SAFETY, LABELING

With respect to the GRI-required aspects customer health and safety as well as labeling of products and services, all relevant statutory requirements as to the safety of products (and services) are being adhered to. Hazard and risk analyses are furthermore a binding prerequisite for taking up work at a laboratory or technical shop. In cases in which UMSICHT is developing marketable technologies that serve for testing at an industrial scale or market introduction, the user is provided with all relevant information. This includes e. g. material and safety data sheets, operating instructions and safety instructions. Concrete examples for this are

- planning, construction, setup and commissioning of Organic Rankine Cycle facilities (ORC) for customers,
- planning and performing of smoke extraction tests and
- development of elastomer powder modified thermoplastics (EPMT).

There are no known violations of the obligation to due diligence and obligation to inform with respect to health and safety as a result of R&D services rendered at Fraunhofer UMSICHT.

CUSTOMER SATISFACTION

The introduction of a systematic assessment of customer satisfaction has already been discussed and conceptualized multiple times. The implementation of the Fraunhofer central company agreement, in which such a process is described, would – to date – however result in an unreasonable expense due to data protection provisions.

QUALITY ASSURANCE IN ADVERTISING

First, it has to be pointed out that the Institutes of the Fraunhofer-Gesellschaft may not conduct conventional advertising campaigns. This results from Article 1.1 of the German General Ancillary Regulations Regarding the Funding of Institutional Support (ANBestI – Allgemeine Nebenbestimmungen für Zuwendungen der institutionellen Förderung). "The funding has to be used economically and frugally". They are a component of the annual grant notice by the BMBF (Federal Ministry of Education and Research) and adherence to them is therefore binding. For this reason, the term "advertising" is replaced by "communication".

At Fraunhofer UMSICHT, the Public Relations department is responsible for quality assurance in communicating its own research. There have been no known violations of applicable law. Guidelines regarding the information practices with a focus on social media are under development, as is an increased consideration of the requirements of DIN ISO 14020 ff. for publications.

In the past, the secondary use of information by external parties has proven to be problematic. Here, quite often facts are cut short or modified so that the status of the works and results was not presented correctly. A problem that occurs often is that either the opportunities or the risks are over-emphasized to achieve a pointed statement. This is undesirable from a sustainability perspective. There is a need for action here.

CUSTOMER PROTECTION COMPLAINTS

There were no complaints regarding a violation of customer protection during the reporting period.

8 OBJECTIVES AND MEASURES

In Table 4, implemented measures are presented by subject area. We present a transparent look back onto the measures mentioned in the Sustainability Report for 2008/2009 and provide a preview of the planned measures.

Table 4: Improvement measures - A look back and preview (old measures labeled with SR 2009)

MEASURE	OBJECTIVE AND PERIOD	RESPONSIBILITY	ACHIEVEMENT OF OBJECTIVE/ STATUS
PROCESSES			
Green IT (SR 2009)	Continuous	IT (p. 15)	We have 199 thin client end devices in use
Green procurement (SR 2009)	Continuous	Purchasing Dept. (p. 15/16)	Current: decision on source for obtaining paper
Lowering paper consumption (SR 2009)	Since the end of 2011, double-sided b&w printing has been configured as default for all printers	IT (p. 15)	Measure completely implemented (keep monitoring)
Setup of a photovoltaic system on Institute's roofs as employee investment	Planned for: 2012	Institute, Sustainability group	Employee investment legally not possible
Hazardous materials management and information system GEVIS II (SR 2009)	Since 2008	Employees	Is in operation
On-site plant documentation system (SR 2009)	Since 2011	Rasit Özgüc (p. 15)	
Setup of a machine and system specific mobile consumption measuring system for water, energy and other media	From 2012 on	Rasit Özgüc (p. 15)	
MARKET AND SOCIETY			
Customer survey (SR 2009)	Continuous	Sustainability WG (p. 28)	
Science Award (SR 2009)	Takes place regularly (scheduled next for July 4, 2012)	Görge Deerberg (p. 23)	
Donation of old shredded optical media (CD/DVD blanks). Proceeds go the children's cancer charity Kinderkrebshilfe Essen	Since 2002	Jörg Buck	
Shoebox campaign around Christmas	Since 2010	Christine Mühleib	

Measure completely implemented | Measure partially implemented | Measure not implemented | Measure started (no assessment possible, yet)

MEASURE	OBJECTIVE AND PERIOD	RESPONSIBILITY	ACHIEVEMENT OF OBJECTIVE/ STATUS
EMPLOYEES AND EXPERTISE			
With-Child Office (MiKi-Büro) (SR 2009)	Completed, is accepted	Christine Mühleib (p. 17)	✹
Information at general employee meeting regarding the topic sustainability (SR 2009)	Takes place	Sustainability WG (Markus Hiebel)	✹
Poster campaign "Sustainable Behavior" (SR 2009)	Is made available on the Internet from 2012 onward	Public Relations Department	✹
Vacation childcare for UMSICHT children between age 5 and 13	Since 2011	Christine Mühleib (p. 17)	✹
U3 Care	In planning for 2013	Christine Mühleib	▰
PED Family Service (Partner for Employee Development)	Since 2011, info event in planning	Christine Mühleib + Central Administration of Fraunhofer	▰
Implementation of measures from signing the Diversity Charter, e.g. in the area of equal opportunity	Since the end of 2011	Board of Fraunhofer (p. 20)	▰
Internationalization, exchange on doctoral student level	Planning from 2013 on	Andreas Weber	▰
MANAGEMENT			
Training and nomination of Sustainability Officer; sustainability as agenda item each quarter at MAC	From 2012 on	Institute's Steering Committee	▰
Further development of SBSC as management instrument	Continuous	Administration, Sustainability working group (p. 3)	▰
Prepare essentiality matrix/stakeholder dialog	2013	Administration, Sustainability working group	▰
Employee survey start in 2011	Analysis and implementation of measures from 2012 on	Institute's Steering Committee (p. 17)	In progress, results were presented to staff in January 2012. ▰
Capturing of continuing education days by external and internal training	From 2013 on	Anja Gerstenmeier (p. 19)	▰
PRODUCT RESPONSIBILITY			
Development of an internal policy with respect to the communication of R&D results	From 09/2012 on	Iris Kumpmann, Jürgen Bertling, heads of business units (p. 28)	▰
Creation and commissioning of a web platform for sustainable open innovation (sustainnovate)	From 2012 on, completion at the end of 2012	Jürgen Bertling, Sabrina Schreiner	▰
Compendium: Invent the Future – A Handbook for Sustainable Innovations	From 2013 on; Completion 2014	Jürgen Bertling	Funding application at BMBF planned ▰

9 GRI CONTENT INDEX

GRI	INDICATOR DESCRIPTION	COMMENT	DEGREE OF FULFILLMENT	REFERENCE
1. STRATEGY AND ANALYSIS				
1.1.	Statement by Executive Management		☀	p. 1 | AR 2011 p. 4
1.2.	Key Impacts of business activity as well as risks and opportunities		☀	pp. 3, 4
2. ORGANIZATION PROFILE				
2.1.	Name of the Organization		☀	pp. 2, 7 | AR 2011 p. 9
2.2.	Primary brands, products and services	84 active patent cases and 35 brands	☀	pp. 4, 27, 28 | AR 2011 p. 89
2.3.	Organizational structure		☀	pp. 5-8 | AR 2011 p. 8
2.4.	Headquarters of the organization	Fraunhofer-Gesellschaft in Munich; Fraunhofer UMSICHT in Oberhausen, Willich branch	☀	pp. 8, 10
2.5.	Countries of business activity	Primarily countries in Europe	☀	p. 4
2.6.	Nature of Ownership and legal form		☀	pp. 7, 8 Fraunhofer-Gesellschaft
2.7.	Markets served		☀	p. 4
2.8.	Scale of the Organization		☀	pp. 2, 9, 18 | AR 2011 p. 11
2.9.	Significant changes of size, structure, or ownership	None	☀	
2.10.	Awards/Prize	Family-friendly company, awards for individuals	☀	p. 8 | AR 2011 p. 105
3. REPORT PARAMETERS				
3.1.	Reporting period	2010 to 2011	☀	pp. 2, 7
3.2.	Date of most recent previous report	2010	☀	p. 7
3.3.	Reporting cycle every	2 years	☀	p. 7
3.4.	Contact point for questions regarding the report	Dr. Markus Hiebel	☀	p. 35
3.5.	Process for defining report content		☀	p. 2
3.6.	Boundary of the report	Oberhausen and Willich site	☀	p. 7
3.7.	Specific limitations on the scope or boundary of the report	None	☀	p. 2
3.8.	Basis for reporting on joint ventures etc.	No joint ventures	☀	
3.9.	Data measurement techniques and bases of calculations	Not listed, GEMIS database for calculation of the environmental effects	☁	
3.10.	Re-statements of information	Not listed	☀	
3.11.	Significant changes from previous reporting periods	Uniform review of the company incl. Willich site	☀	pp. 7, 8
3.12.	GRI index		☀	pp. 31-34
3.13.	External assurance for the report	Not externally verified	☀	p. 2
4. CORPORATE GOVERNANCE, COMMITMENTS AND INVOLVEMENT				
4.1.	Governance structure		☀	pp. 5, 7
4.2.	Independence of the Chair of the highest governance body		☀	pp. 5, 7
4.3.	Number of independent members of the highest governance body		☀	pp. 5, 7
4.4.	Employees' and shareholders' right to provide recommendations or direction	Input for Managing Advisory Committee	☀	p. 7
4.5.	Linkage between compensation of the Board and the organization's sustainability performance	Not yet captured	☁	
4.6.	Processes in place for avoiding conflicts of interest	Not yet captured	☁	
4.7.	Expertise of the members of the highest governance body relevant to economic, environmental, and social performance	Not yet captured	☁	
4.8.	Statements of mission or values, codes of conduct and principles regarding sustainability	Not yet captured	☁	

☀ fully reported ⛅ partially reported ☁ not reported


Photo: MEV Verlag GmbH

GRI	INDICATOR DESCRIPTION	COMMENT	DEGREE OF FULFILLMENT	REFERENCE
4.9.	Procedures of the highest governance bodies for overseeing the organization's sustainability performance	Not yet captured		
4.10.	Process for evaluating the highest governance body's own performance with respect to sustainability	Not yet captured		
4.11.	Taking into consideration of the precautionary approach	Not yet captured		
4.12.	Support of externally developed economic, ecological and social activities	Not yet captured		
4.13.	Membership in associations and advocacy organizations	Not yet captured		
4.14.	Stakeholder groups engaged by the organization	Stakeholder management in planning		pp. 8, 30
4.15.	Basis for the selection of the stakeholders	Stakeholder management in planning		pp. 8, 30
4.16.	Approaches to stakeholder engagement	Not yet captured		
4.17.	Key topics of stakeholders	Not yet captured		
ECONOMICS				
EC1	Direct economic value generated and distributed			pp. 9, 10
EC2	Financial implications due to climate change	Indirect, through adjustment of the research portfolio		
EC3	Scope of organization's social benefits	Not yet captured		
EC4	Significant financial assistance received from government	Share of basic funding		p. 9
EC5	EC5 Ratio of standard entry level wage to local minimum wage	TVöD for employees		p. 18
EC6	Policy, practices and proportion of spending on locally-based suppliers	Not relevant		
EC7	Hiring of locally-based employees and proportion in senior management positions	Not relevant		
EC8	Development and impacts of infrastructure and service investments provided primarily for public benefit			pp. 9, 10
EC9	Type and scope of significant indirect economic impacts	Not yet captured		
ENVIRONMENT				
EN1	Materials used by weight and volume	Not captured		
EN2	Percentage of materials used that are recycled input materials	Not captured since this is not a producing company		
EN3	Direct energy consumption	5.1 million MJ (natural gas)		p. 12
EN4	Indirect energy consumption	13.0 million MJ (electricity)		p. 12
EN5	Energy savings			p. 15
EN6	Energy-efficient products and services	Services of Fraunhofer UMSICHT		p. 4
EN7	Initiatives to reduce indirect energy consumption	Not yet captured		
EN8	Total water withdrawal	15,710 m³ from March 2011 to the end of February 2012		p. 16
EN9	Water sources significantly affected by the withdrawal of water	Processed water from the Ruhr river (Oberhausen) and/or ground water (Willich)		p. 16
EN10	Recycled and reused process water	No treatment		p. 16
EN11	Utilization of land in protected areas	No utilization		
EN12	Significant impacts of the business activity on biodiversity in protected areas	None		
EN13	Habitats protected or restored	None		
EN14	Strategies and management of the impacts on biodiversity	Not relevant		
EN15	Endangered species at locations of business activity	Not relevant		

9 GRI CONTENT INDEX

GRI	INDICATOR DESCRIPTION	COMMENT	DEGREE OF FULFILLMENT	REFERENCE
EN16	Total direct and indirect greenhouse gas emissions	Indirect: 2,155 t, direct: 397 t CO_{2e} (2011)		pp. 13, 14, 16
EN17	Other relevant greenhouse gas emissions	None / not captured		
EN18	Initiatives to reduce greenhouse gas emissions and reductions achieved	e. g. Green IT		pp. 11, 15
EN19	Emissions of ozone-depleting substances	Ozone-depleting substances are not used at Fraunhofer UMSICHT		
EN20	NO_x, SO_2 and other significant emissions	1.99 tonnes NO_x and 2.05 tonnes SO_2 for 2011		pp. 14, 16
EN21	Total wastewater discharges	34,582 m^3 (2011)		p. 16
EN22	Total weight of waste by type and disposal method	56.32 tonnes (2010) and 61.28 tonnes (2011)		p. 16
EN23	Total number and volume of significant spills	Note captured		
EN24	Transported, imported, exported and treated waste deemed hazardous	Not captured		
EN25	Impacts of wastewater discharges on the biodiversity value and the habitats	No impacts		
EN26	Initiatives to mitigate environmental impacts of products			pp. 27, 28, 30
EN27	Accepting packaging back	Not relevant, since this is not a producing company		
EN28	Significant fines and non-monetary sanctions for non-compliance with environmental laws and regulations	None		
EN29	Significant environmental impacts of transporting products, materials and employees	Business trips reported		pp. 11-14
EN30	Total environmental protection expenditures and investments	Not yet captured		
LABOR PRACTICES AND DECENT WORK				
LA1	Total workforce by type of employment and region			pp. 17, 18, 21
LA2	Employee turnover and new hires			
LA3	Benefits provided to full-time employees only	None		
LA4	Percentage of employees covered by collective bargaining	100 %		p. 18
LA5	Minimum notice periods regarding significant operational changes			
LA6	Percentage of workforce represented in occupational safety committees			p. 18, p. 7
LA7	Rates of injury, occupational diseases, lost days, and number of work-related fatalities			p. 18, 19
LA8	Preventative healthcare, counseling and training			p. 19
LA9	Occupational safety agreements with unions			
LA10	Training and continuing education measures			pp. 19, 20
LA11	Skills management and life-long learning			pp. 19, 20
LA12	Performance review and development planning			pp. 18, 19, p. 20
LA13	Diversity of employees and managing bodies	Percentage of women captured		p. 20
LA14	Ratio of basic salary and remuneration of men to women	TVöD, no differences		pp. 18, 21
LA15	Return to work and retention rates after parental leave, by gender	Not yet captured		
HUMAN RIGHTS				
HR1	Investment agreements with human rights clauses	No significant investments		p. 21
HR2	Screening of significant suppliers for adherence to human rights	Primarily German suppliers, therefore no need to screen		p. 21
HR3	Employee training on human rights	No need		
HR4	Incidents of discrimination and corrective actions taken	None		

GRI	INDICATOR DESCRIPTION	COMMENT	DEGREE OF FULFILLMENT	REFERENCE
HR5	Business activities in which the right to freedom of association and collective bargaining is put at risk	None	☀	
HR6	Business activities and significant suppliers at which a risk of child labor exists	None determined, the TVöD and/or Fraunhofer-internal collective agreement for the employment of auxiliary employees applies	☀	p. 21
HR7	Business activities in which there is a risk of forced and compulsory labor	None	☀	p. 21
HR8	Training of security personnel in the aspects of human rights relevant to the business activity	No necessity	☁	
HR9	Incidents of violation of right of indigenous people	None	☀	p. 21
HR10	Percentage and number of operations that have been subject to human rights reviews	No necessity	☁	
HR11	Number of human rights violations filed, addressed and resolved	None	☀	p. 21
SOCIETY				
SO1	Impacts of the business activity on communities or regions	Impacts are of an indirect nature, not yet captured	☁	
SO2	Business units that were analyzed for risks related to corruption	None	☀	p. 24
SO3	Employee training with respect to anti-corruption	100 % already upon being hired	☀	p. 24
SO4	Incidents of corruption and actions taken in response	None	☀	p. 24
SO5	Public policy positions and participation in public policy development and lobbying	Fraunhofer is required to maintain its independence and neutrality	⛅	
SO6	Contribution to parties and politicians	None	☀	
SO7	Legal actions for anti-competitive behavior	None	☀	
SO8	Significant fines for non-compliance with laws and regulations	No fines. Fines for exceeding the speed limit or other traffic offences during business trips were charged to the respective employee	☀	
SO9	Operations with a significant potential or actual negative impacts on local communities	None	☀	
S10	Prevention and mitigation measures implemented in operations with significant potential or actual negative impacts on local communities	None	☀	
PRODUCT RESPONSIBILITY				
PR1	Life cycle stages assessed with respect to health and product safety	Takes place only in part, further indicator development necessary	⛅	p. 25 ff.
PR2	Non-compliance with regulations concerning health and product safety	None	☀	p. 25 ff.
PR3	Statutory information required by law for products and services	Fulfilled	☀	p. 25 ff.
PR4	Incidents of non-compliance with statutory and voluntary information requirements for products and services	None	☀	
PR5	Capturing customer satisfaction	Not met	⛅	p. 25
PR6	Adherence to laws, standards and voluntary codes of conduct with respect to advertising	Met	☀	p. 26
PR7	Incidents of non-compliance with statutory and voluntary regulations with respect to advertising	Not applicable, since Fraunhofer UMSICHT is not allowed to advertise	☀	
PR8	Substantiated data protection complaints	None	☀	
PR9	Significant fines for non-compliance with statutory regulations with respect to the acquisition and use of products	None	☀	p. 26

☀ fully reported ⛅ partially reported ☁ not reported

2011: Annual report (AR) for the year 2011

Items marked gray (1. to 4.) from page 31 on do not yet have to be listed according to GRI Level C/Indicators marked gray: additional indicators

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SCAN QR CODE,
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ON WILL BE DISPLAYED