

For the years 2016 | 2017 | 2018

SUSTAINABILITY REPORT

Our Responsibility for the Future



So much for the »grey Ruhr area, where chimneys smoke everywhere and the laundry hung out to dry immediately becomes dirty« – this cliché still persists, but is long outdated. Guests who let their gaze wander over the city and the western Ruhr area from the roof of the Gasometer – Oberhausen's most famous landmark – are usually amazed at how green it is here. And the city's forests, parks, lakes, green spaces and ponds have a lot to offer: there are also some rare species, such as the bird of the year 1998 and 2019, the skylark, whose population in Germany has declined to such an extent that it is now on the early warning list of the Red List. Skylarks can be regularly observed on an industrial wasteland near the institute's premises (see photo). In cooperation with NABU Oberhausen (NABU = German Society for Nature Conservation), photos were selected for the illustration of the current sustainability report, which were taken by the NABU Nature Photography Working Group in Oberhausen and the immediate vicinity. They vividly show the exciting variety of flora and fauna the city and the region have to offer. We would like to thank NABU Oberhausen and the Working Group for Nature Photography for their advice and support in selecting and providing the fascinating photographs.



Skylark, photo: Ekkehard Psotta

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Entrance of Fraunhofer UMSICHT

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*Prof. Dr.-Ing. Gorge Deerberg, Deputy Director of the institute, Prof. Dr.-Ing. Eckhard Weidner, Director of the institute
Photo: Fraunhofer UMSICHT/PR photography Köhring*

Dear Readers,

it took a little longer this time – fortunately, sustainable projects are now so much in demand that our day-to-day business is extremely busy and therefore unfortunately leaves us little time for our own sustainability reporting – but now you are holding it in your hands: the sixth sustainability report of our institute for the headquarters in Oberhausen and the branch office in Willich. The report is based on the current Sustainability Reporting Standards of the Global Reporting Initiative.

In this report, for the first time we make concrete reference to the Sustainable Development Goals (SDGs), which were adopted by all member states of the United Nations at the end of 2015 as the core of the »Agenda 2030 for Sustainable Development«. In the preamble to Agenda 2030, we also identify five core messages that serve as guiding principles for action for the 17 SDGs function, the so-called »5 Ps«: People, Planet, Prosperity, Peace, and Partnership.

As a pioneer of a sustainable energy and raw materials economy, Fraunhofer UMSICHT focuses in particular on the second core message »Protect the planet: limit climate change, preserve natural resources«.

We strive for efficient processes, environmentally friendly technologies and sustainable products. In this way we can make meaningful contributions to the achievement of individual SDGs through our projects and developments. In chapter 7 we present some examples and assign them to the corresponding SDGs.

In the run-up to the report, we again conducted a stakeholder dialog to obtain feedback on our activities and suggestions for our future course (for details, see chapter 2). The exciting and inspiring exchange with our stakeholders always provides us with important impulses for our work and helps us to find the right path with our prudent research.

We are also happy to receive your feedback on our Sustainability Report and would appreciate to receive ideas for sustainability projects – because together we can best achieve the SDGs. But now we wish you an enjoyable read!

We send you our best regards

Handwritten signature of Eckhard Weidner in blue ink.

Eckhard Weidner

Handwritten signature of Gorge Deerberg in blue ink.

Gorge Deerberg

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SUSTAINABILITY AND APPLIED RESEARCH

Motivation for the report and global developments

Sustainability is one of the most important issues in global politics. As a milestone in international sustainability policy, the United Nations has adopted the »2030 Agenda for Sustainable Development« in 2015 with a total of 17 Sustainable Development Goals (SDGs). The Fraunhofer-Gesellschaft also feels called upon to support the achievement of these goals with its expertise within the scope of its possibilities and in close interaction with politics, industry and society.

For this reason, within the organization-wide portfolio management it was analyzed for which of the 17 Sustainable Development Goals the scientific and technological developments of the Fraunhofer-Gesellschaft are particularly relevant and how its competencies can contribute to solving these social challenges in the future. For six of these global challenges (health, water, clean energy, sustainable industrialization, sustainable cities and sustainable production), the Fraunhofer-Gesellschaft's online sustainability report describes the research contributions.

There have been further significant developments in the field of sustainability reporting. In October 2014, Directive 2014/95/EU of the European Parliament and Council on financial reporting was amended. The new directive stipulates that certain large companies of public interest with more than 500 employees must report on corporate social responsibility (CSR) issues in addition to financial reporting. Since 6 December 2016, companies have been obliged to disclose information on strategies, risks and results on the following topics: environment, social, and labor issues, human rights, combating corruption and bribery, diversity in management, and supervisory bodies. The aim of this directive is to increase the transparency of social and environmental reporting by companies in all sectors in all EU member states to a high level.

Sustainability reporting according to Sustainability Reporting Standards

With the help of sustainability reporting, companies and organizations demonstrate the effects – both positive and negative – of their activities in relation to the economy, environment, and society. The standards of the Global Reporting Initiative are globally established standards to which numerous companies orient themselves. Guidelines developed by the Global Reporting Initiative in a participatory process together with numerous stakeholders support companies in their reporting and create a certain degree of

comparability between reporting companies. At the same time, they help companies to set and track their sustainability targets.

In order to reduce reporting to the essentials, companies only have to report what is really of decisive importance for themselves and their stakeholders. For this reason, the GRI Sustainability Reporting Standards require reporting companies to involve their internal and external stakeholders in

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SUSTAINABILITY AND APPLIED RESEARCH

determining the essential aspects of their reporting. These can be shown in a materiality matrix (see page 9).

Our sustainability report uses elements of the GRI standards. These include information on strategy and analysis, the organizational profile, the material aspects and boundaries identified, as well as the involvement of stakeholders in their identification, corporate governance, and the topic of ethics and integrity. Key figures on human resources, finance and the environment are also based on the standards.

What have we achieved since the last report?

Since the publication of the last sustainability report in 2016, Fraunhofer UMSICHT has consistently pursued its sustainability activities. Thus, the transfer of knowledge has been strengthened by two further position papers, this time on the subject of »Plastic bags« and »Recycling of bioplastics« and two thematic booklets: »Future of the carbon economy« and »Questions on a biological technology«.

As announced in the previous Sustainability Report, in this report we present the concrete reference of some example projects to the Sustainable Development Goals. We have also increased the number of staff in the area of personnel development and have begun to draw up concrete personnel development plans for individual employees. In order to optimize the quality of our offers, reports, and applications, a professional editorial office was set up.

Feedback on the previous report and changes

We see our commitment to sustainability as an incentive for continuous improvement. We have therefore requested feedback on the previous report, including from cooperation partners who are also intensively involved in the topic of sustainability management. We are very pleased that our request was willingly accepted and that we received valuable input in great detail and numerous constructive suggestions. On the basis of this feedback we have made the following improvements:

- Clear assignment of objectives and measures to the main fields of action (see chapter 8)
- Greater focus on research results and their social impact (see chapters 6 and 7)

Furthermore, targets for the reduction of energy consumption were demanded. Here, however, it is still the case that energy consumption is very much dependent on our respective research and development activities and we are therefore unable to set targets.



Building complex of Fraunhofer UMSICHT, photo: Fraunhofer UMSICHT/aviate aerial photos

Mission, strategy, and research projects

The institute's greatest influence with regard to sustainability lies in its research activities and their strategic orientation. Our mission is:

Fraunhofer UMSICHT is a pioneer for sustainable energy and raw materials management by supplying and transferring scientific results into companies, society, and politics. The dedicated UMSICHT team researches and develops, together with partners, sustainable products, processes, and services that inspire.

During the period under review, the foundation was laid for a number of major projects that will help to further implement this mission.

The joint project »Carbon2Chem®«, funded by the German Federal Ministry of Education and Research (BMBF), aims to close cross-industry carbon cycles and develop flexible, dynamic processes for load changes. Carbon dioxide, which is produced during steel production, can replace crude oil as a raw material in the chemical industry by using renewable energy. Such new production processes in the steel and chemical industry can significantly reduce CO₂ emissions. As part of the joint project Carbon2Chem®, Fraunhofer and its partners are developing technologies and system solutions for gas purification, for adapting the catalytic production of methanol and higher alcohols, and for fuel production.

Fraunhofer High Performance Centers organize the close cooperation of university and non-university research with industry. They are characterized by binding, consistent roadmaps of the participating partners in the performance dimensions of research and teaching, promotion of young scientists, infrastructure, innovation and transfer. The DYNAFLEX® High Performance Center is intended to make a significant contribution to the success of the energy transition and raw

materials shift. Here, dynamic, adaptive and flexible processes and corresponding technologies are to be researched and developed. The scientific basis for the adaptation of the energy and chemical industry to changing conditions is being developed by Fraunhofer UMSICHT in Oberhausen together with the three Ruhr Area universities of Bochum, Duisburg-Essen and Dortmund.

A further major project started in November 2018 under the leadership of Fraunhofer UMSICHT. Within the framework of the Fraunhofer Cluster of Excellence Circular Plastics Economy CCPE, the aim is to show, in collaboration with five other Fraunhofer Institutes, how energy and material flows in a recycling chain can be converted into a circular economy using plastics as an example. To this end, special system services are being developed with and for the plastics industry, including the consumer goods and trading companies associated with it and the recycling industry.

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Ethics, integrity, and management

With the freedom of research protected by Article 5 of the Basic Law, science is granted a right to self-regulation. This freedom also gives rise to a social and ethical responsibility that goes beyond legal requirements. This means that scientists must also consider the dangers arising from their research in the event of misuse and avoid direct and indirect damage to people and the environment as far as possible.

VALUES AND PRINCIPLES, CODE OF CONDUCT

Fraunhofer UMSICHT is an institute of the Fraunhofer-Gesellschaft, which regularly reports on its commitment to sustainability. The topic of sustainability has been incorporated into the guiding principles of the Fraunhofer-Gesellschaft: »Through our research we contribute to sustainable development in the sense of an ecologically intact, economically successful and socially balanced world. We feel committed to this responsibility«. In addition, the Fraunhofer-Gesellschaft joined the United Nations Global Compact (UNGC) in 2017 and voluntarily committed itself to observing and promoting ten universal principles in the fields of human rights, labor standards, environmental protection, and anti-corruption. With more than 13,000 participating companies and organizations, this initiative of the United Nations is the world's largest international network on corporate responsibility

The Fraunhofer-Gesellschaft has issued an internal Code of Conduct. The Code of Conduct has a broad range of topics and describes the main areas of responsibility, such as preventing corruption, dealing with customers, ethical responsibility for science and the conservation of resources in the workplace. For our cooperation partners, we have published the »Principles of Cooperation« as declarations for third parties, with which we position ourselves proactively and transparently on key issues.

The Fraunhofer-Gesellschaft has set up a Corporate Responsibility (CR) Board at company level, which is supported by an UMSICHT employee.

To support and advise scientists, a central ethics advisory service for research ethics issues was established in 2015. By the end of 2018, over 45 requests had been processed.

Experts from the Research Department and the Main Finance, Controlling and Organization Department are available as contact persons for ethics.



House sparrow, photo: Werner Haverkamp

In addition to the already established ethics consultancy, the Fraunhofer Executive Board has decided to set up an ad hoc committee to provide advice on ethical principles in security-related research (KEF). The KEF deals with issues of great importance for the consultation and assessment of ethical aspects – also beyond topics of security-related research, unless the use of specialized ethics committees is obligatory. In this context, security-relevant means research activities that are associated with considerable risks to human dignity, life, health, freedom, property, the environment or peaceful co-existence. Safety-relevant risks exist in particular in the case of scientific work which can be assumed to produce knowledge, products or technologies that can be used to the detriment or harm of people and the environment.

By establishing its own KEF, the Fraunhofer-Gesellschaft is also responding to external impulses. In 2014, the German Research Foundation (DFG) and the Leopoldina – National Academy of Sciences called on all German research institutions and universities to create a framework for ethically responsible research, preferably by establishing a Commission on Ethics in Security Research, with the recommendation »Scientific Freedom and Responsibility«.

Fraunhofer is also committed to responsible research in Europe and has been working together with the Dutch research organization TNO in the EU-funded project JERRI since 2016. Under the leadership of the Fraunhofer Institute for Systems and Innovation Research ISI, the »Ethics« subproject is developing process models for ethics scanning of internal research programs, and developing and piloting cross-institute formats (for further information on JERRI, see p. 28).

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MATERIAL REPORT CONTENT AND STAKEHOLDER DIALOG

At our third stakeholder dialog, which we conducted in September 2018 at Vondern Castle in Oberhausen, our stakeholders were pleased to see that many of the suggestions for improvement made in previous stakeholder dialogs had already been implemented. In particular, the increased visibility of the institute through statements, publications and position papers as well as the increased research commitment of and with the City of Oberhausen and the Ruhr Area were expressly praised. For the future, even stronger activities were called for with regard to educational measures – especially for children and young people. These aspects were then also reflected in the developed materiality matrix, in which the aspect of economic stability was assessed as more important than in the last stakeholder dialog.

KEY TOPICS FOR THE CURRENT SUSTAINABILITY REPORT

For our stakeholders, the topic of »social responsibility and research responsibility« continues to rank very high. The dialog positively highlighted the institute's already existing contributions to citizens' laboratories. A continuation of this type of social commitment was considered desirable. Further concrete contributions to sustainability were also called for. Examples of topics that were discussed included sustainable mobility, smart city, waste avoidance, and recycling.

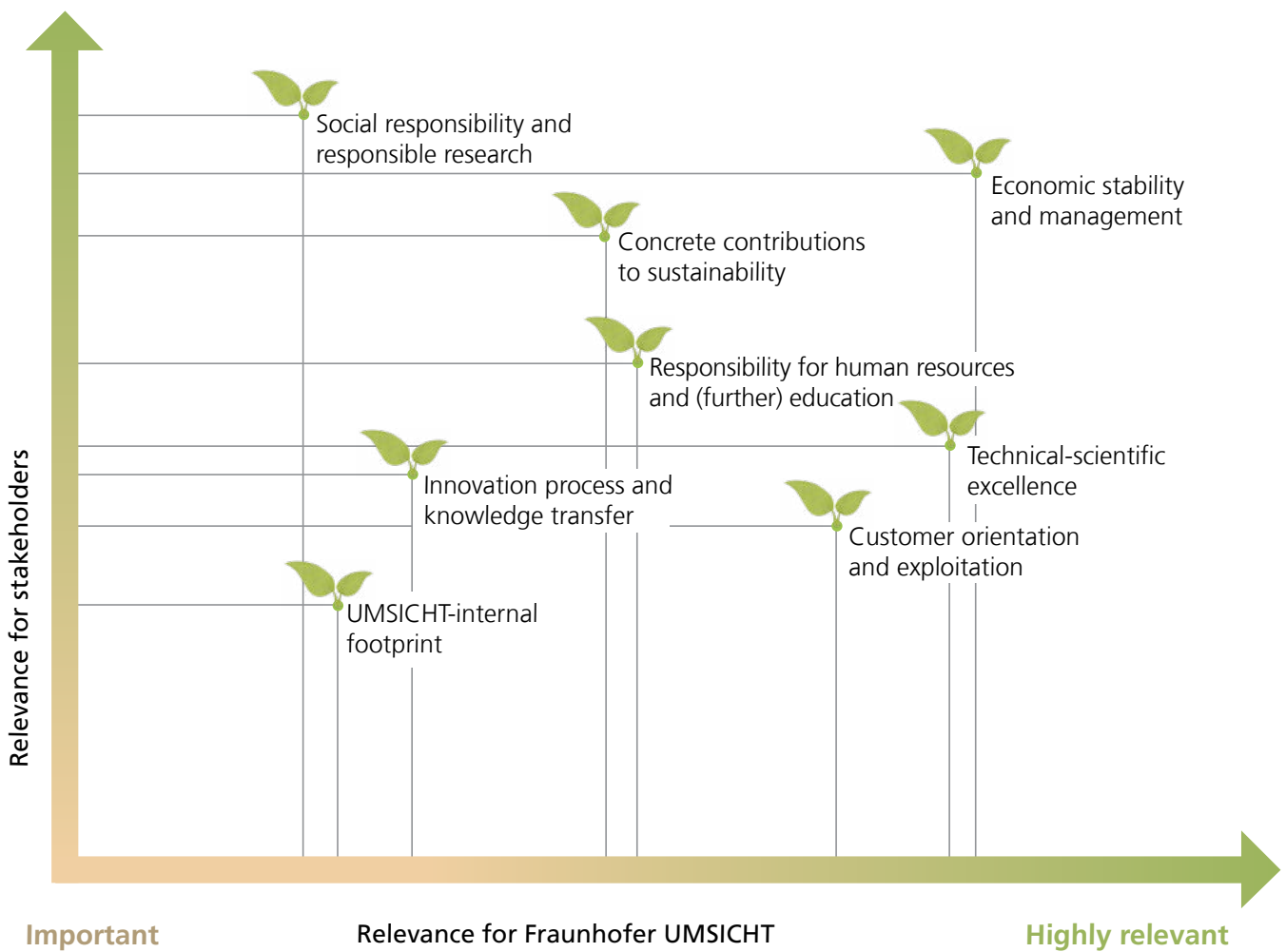
The topic with the highest relevance both for our stakeholders and for the institute itself is »economic stability and management«. This was weighted higher than in the last materiality matrix. The topics »technical and scientific excellence« and »human resources responsibility and (further) training« are also of great importance for both sides. For the stakeholders, the topic of (further) education seems to be relevant not only as an internal issue within the institute, but it should be taken more broadly and extended to society, especially children and young people.

The following materiality matrix for Fraunhofer UMSICHT results from the input of external stakeholders and from discussions with the works council, the equal opportunities representative, and the institute management.



Winter guest waxwing, photo: Ekkehard Psotta

Figure. 1: Materiality matrix Fraunhofer UMSICHT 2018



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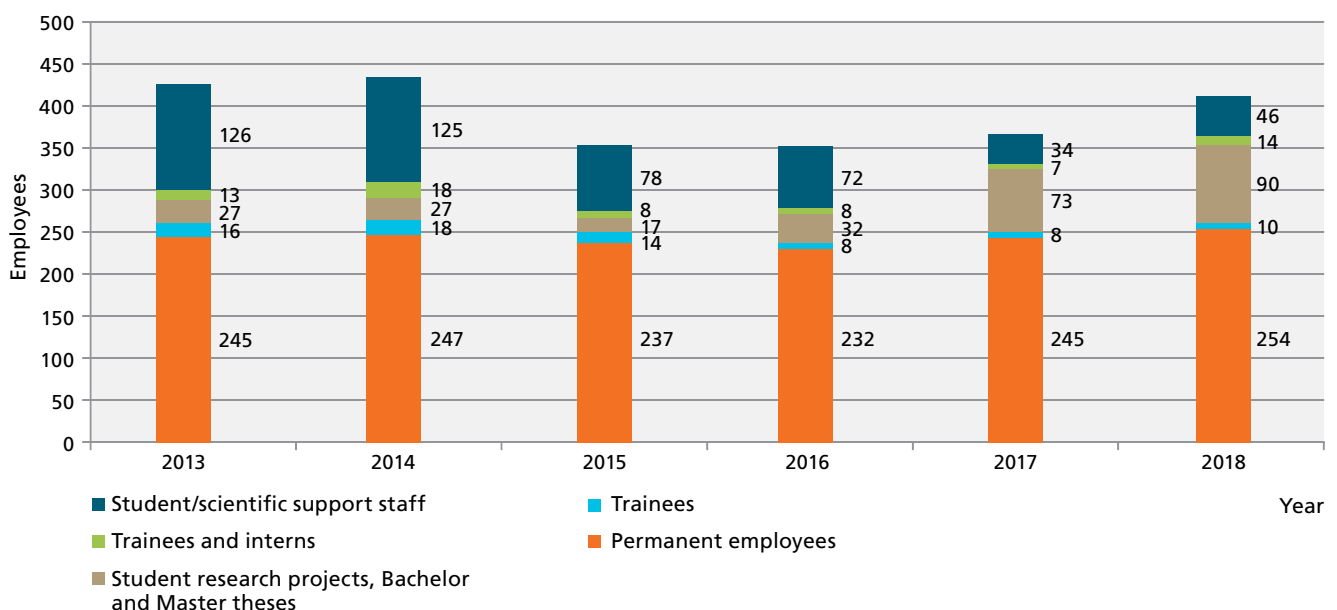
RESPONSIBILITY FOR EMPLOYEES AND HUMAN RESOURCES DEVELOPMENT

Development of the workforce

Due to the good economic situation, there has been an increase in personnel since 2016. This was mainly achieved through the recruitment of doctoral students. This trend has continued so far, so that further hiring under collective bargaining agreements can be expected. The number of student assistants and people writing their thesis at the institute is also rising steadily. The rate of permanent contracts is rising moderately.

The Fraunhofer-Gesellschaft's guideline on fixed-term contracts has become well established at the institute in recent years. It ensures fair handling of temporary contracts and gives employees a high degree of planning security by enabling them to make decisions as early as possible.

Figure 2: Development of the composition of the workforce





Parent-with-child-office at Fraunhofer UMSICHT, photo: Fraunhofer UMSICHT/Katrin Scholten

Diversity and equal opportunities

The Fraunhofer-Gesellschaft supports measures for equal opportunities and practices active diversity management: All employees are treated without prejudice and valued – regardless of gender, nationality, ethnic origin, religion or belief, disability, age, sexual orientation and identity. Fraunhofer recognizes that work and family life must be compatible and we offer our employees flexible options to achieve this. Throughout Fraunhofer, these include flexible work and time models, workshops on the topic of reconciling work and family, emergency childcare, advisory and support services in the area of home and elder care, and professional coaching by the pme Familienservice. In addition, Fraunhofer UMSICHT offers special location services such as holiday care for school children between 6 and 12 years of age as well as a parent-with-child office.

Since 2011, diversity and the compatibility of work and family life have been declared Executive Board topics and are supervised by Prof. Dr. Alexander Kurz, Executive Board member of the Fraunhofer-Gesellschaft in charge of Human Resources and Legal Affairs, reflecting their importance for Fraunhofer.

In order to ensure that the workforce receives appropriate support and, if necessary, encouragement, a representative for equal opportunities (BfC, elected for four years) must be appointed as a mandatory body at each institute, in addition to the centrally provided services. These representatives – including the BfC of UMSICHT and her deputy – are strongly networked with each other and also work beyond the institute's boundaries with local equal opportunities representatives of the respective cities and municipalities as well as with the local universities and universities of applied sciences.

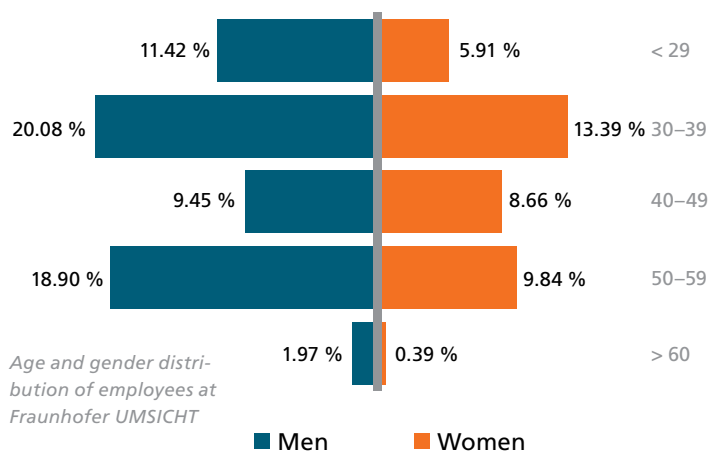
A total of €250,000 per year is available to all Fraunhofer Institutes to establish measures to improve the compatibility of work

and family life (examples include the acquisition of places in kindergartens, equipping a parent-with-child office, or the use of services to organize holiday care).

AGE PYRAMID AND NATIONALITIES

To illustrate the diversity of the workforce, age pyramids were drawn up for the first time for the last Sustainability Report in order to obtain an age-related overview of the permanent workforce. The age pyramid in 2018 is as follows.

Figure 3: Age pyramid Fraunhofer UMSICHT 2018



The average age of the scientific staff in 2018 was 41 years.

In 2018, 22 employees had a foreign nationality, including one manager. This corresponds to a ratio of approximately 5 % in relation to the total number of employees. Of these 22 employees, 45 % came from Europe.

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RESPONSIBILITY FOR EMPLOYEES AND HUMAN RESOURCES DEVELOPMENT

Share of women

The Fraunhofer-Gesellschaft had set itself the task of increasing the proportion of female employees – starting with scientists, through the first and second management levels, to institute directors – by a total of 3.1 % to a total of 22.2 % in the years 2013 to 2017. Fraunhofer UMSICHT was able to achieve this goal and, with a proportion of women in the scientific field of 32 % and 36 % at the 2nd management level, exceeds the goals of the Fraunhofer-Gesellschaft.

Various measures are being taken to achieve the target figures for the proportion of female scientists. One of the central measures is the Fraunhofer-Gesellschaft's TALENTA program, launched in 2013. »Fraunhofer TALENTA« is a two-year support and development program for attracting and developing female scientists, which is available in three different forms at different levels of career development. As many as 12 female candidates of Fraunhofer UMSICHT have already been or are being supported within the program.

Human resources development

The success and performance of Fraunhofer UMSICHT is decisively influenced by the competence of its employees. Human resources management and human resources development are therefore regarded as central tasks in the institute. In addition to the promotion of junior staff, human resources marketing and recruiting, the human resources development focuses on the needs-based qualification and individual development planning of the employees.

MINT-SUPPORT FOR YOUNG TALENTS

Fraunhofer UMSICHT is committed to the systematic promotion of young scientists and offers established formats, which are aimed annually at pupils and students in MINT subjects. These include the »Fraunhofer Talent School« and Girls'Day. In addition, internships for school pupils and guided tours of the institute are offered for school classes and students. Due to the high demand, however, the institute must make a targeted selection and limit the range of offers.

QUALIFICATION AND DEVELOPMENT OF THE EMPLOYEES

As part of the systematic human resources development at Fraunhofer UMSICHT, the institute relies on individual qualification plans. These are filled with concrete measures in the structured employee appraisals as well as in the intra-year exchange between managers and employees. Some of the formal offers are provided by the institute or the Fraunhofer-Gesellschaft in the respective training catalogue, others are visited externally. In addition, on-the-job measures are implemented. In this way, the institute implements not only the legal requirements and Fraunhofer's internal guidelines, but also the goals defined for the institute in the area of further training. Thematically, the measures promote both technical and personal or process skills. Central topics are, for example, business models, acquisition techniques, scientific writing, and conversation skills. A new format has been established in 2018 with the Wissen@UMSICHT workshop series. Here, important core topics are presented in mostly 90-minute workshops for all interested persons at the institute. The event is led by employees who are competent in the topics.



Kingfisher, city forest Osterfeld, photo: Ekkehard Psotta

The coordination is the responsibility of the human resources development department. Participation in the seminar »New in the role of manager« is mandatory for all managers. In addition, there are numerous other offers that are also relevant for experienced managers. In 2018, the institute set up its first exploitation-oriented programme, the »UMSICHT Business Manager«, which initially also addressed executives. In this programme, five two-day individual modules were held to provide in-depth knowledge in the central topic areas of the acquisition of business projects. The program is being maintained permanently and is to be opened up to other internal target groups.

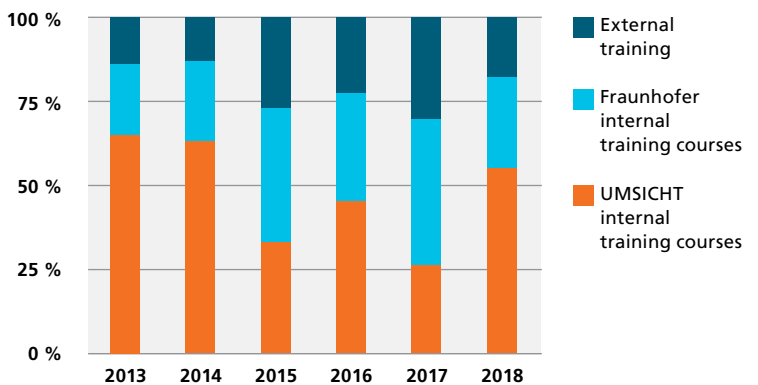
All employees can apply for the »UMSICHT Scholarship«, which supports stays abroad or assignments at other institutes. Up to six places are available each year. In 2018, three applications were received and all of them were accepted.

In 2018 there were a total of 763 qualification days. Of these, 420 days were accounted for by internal UMSICHT training, 208.5 days by external training and 134.5 days by training at headquarters. In 2017, the total number of training days was 298. The enormous increase is due to a change in recording. This is now much more comprehensive, as conference participation and lectures are also recorded as part of individual training. In addition, it is now possible to quantify language courses, coaching, scholarship stays, and further education courses. Furthermore, more continuing education courses were actually attended.

| Qualification measures | Unit | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------------------------------|--------|-------|-------|-------|-------|-------|
| Qualification days total per year | [d/a] | 623.8 | 207.5 | 320.5 | 298.0 | 763.0 |
| Qualification days per employee | [d/MA] | 2.5 | 0.9 | 1.5 | 1.2 | 3.0 |

More than 50 % of the qualification measures were carried out internally.

Figure 4: Distribution of further training opportunities in UMSICHT by provider



RESEARCH SCHOOL

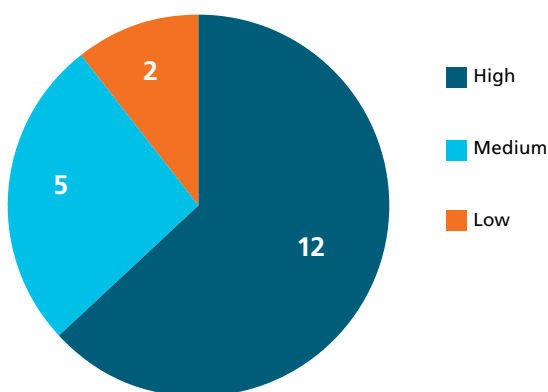
Doctoral students represent a decisive pillar of scientific work at the Fraunhofer-Gesellschaft. Since 2016, Fraunhofer UMSICHT has been supporting and supervising this group through a Research School. The aim is to develop doctoral students during their time at Fraunhofer UMSICHT in reliable structures in the best possible way for their individual career. To this end, Fraunhofer UMSICHT offers a wide range of professional and interdisciplinary qualifications and provides an understanding of the inherent application orientation in the Fraunhofer-Gesellschaft.

In addition to the professional supervision by a professor and a day-to-day supervisor, the coordinator of the Research School holds confidential status meetings every six months. With the support of the staff of the Human Resource Development Department, a training plan is drawn up together with the doctoral students, which is tailored to their needs and includes support and qualification measures as well as coaching for doctoral students.

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RESPONSIBILITY FOR EMPLOYEES AND HUMAN RESOURCES DEVELOPMENT

Figure 5: Feedback on the quality of promotional coaching (survey in 2018)



For the challenging parallel processing of the project tasks and the writing of the doctoral thesis, joint solution proposals

are developed as required. In case of problems with supervision, low motivation or other obstacles, the coordinator of the Research School is available for confidential discussions.

To get to know each other within the Research School, a barbecue is celebrated once a year and the Oberhausen Christmas Market is visited. Potential employers in the region are visited in the course of excursions that are held every six months.

INTERNSHIPS AND TALENT SCHOOL

In order to promote young scientists, UMSICHT supervises interns and carries out the »Talent School« format. This is a programme for talented and technically interested pupils in the grades 9 – 12/13 who enjoy dealing with current scientific topics.

External scientific continuing education

Fraunhofer UMSICHT is active in the field of further education and qualification of specialists and executives. The UMSICHT Academy department bundles comprehensive competences and many years of experience in the areas of scientific further education and human resources development. On the basis of this expertise the department develops scientific study programmes for professionals and advises companies and institutions in the development of further education and personnel development concepts.

STUDY OFFER INFERNUM

Since the year 2000, Fraunhofer UMSICHT has been offering the interdisciplinary distance learning course in environmental sciences (infernum) in scientific cooperation with the Fern-Universität in Hagen, which enables future-oriented further education in the fields of environment and sustainability

parallel to family and career. infernum is part of the Fraunhofer Academy and cooperates with the Centre for Sustainability Management (CSM) of the Leuphana University Lüneburg, the Wuppertal Institute for Climate Environment Energy GmbH and the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI).

With currently about 500 students enrolled, the Master's programme, which has already been successfully reaccredited for the second time, is characterized by its interdisciplinary orientation, the breadth of the range of courses, and the flexibility of the organization. With these unique selling propositions infernum is unparalleled in university continuing education in Germany.



Banded demoiselle, photo: Ekkehard Psotta

Already in 2014 infernum was awarded the title of »Place of Progress« by the Ministry of Innovation, Science and Research of North Rhine-Westphalia. After several awards as a UN Decade Project in previous years, infernum was also awarded the distinction of being a »Network of the UNESCO Global Action Programme on Education for Sustainable Development« for the second time in 2018 by the German UNESCO Commission and the Federal Ministry of Education and Research.

The infernum course of studies opens up additional qualification options for the employees of Fraunhofer UMSICHT. By taking on teaching activities such as writing study letters or video lectures, lecturing or leading face-to-face seminars and supervising presentations, term papers or master theses, experience in academic teaching can be gained and consolidated.

CONSULTING SERVICES FOR COMPANIES AND INSTITUTIONS

The UMSICHT Academy department provides its expertise in the areas of scientific continuing education and personnel development in the form of consulting services. In this context, Fraunhofer UMSICHT creates further education and personnel development concepts for companies and institutions and advises them on the topics of qualification and further development of specialists and executives, training as well as recruitment and promotion of young talents.



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RESPONSIBILITY FOR EMPLOYEES AND HUMAN RESOURCES DEVELOPMENT

Activities of the works council

Co-determination is an important topic at the Fraunhofer-Gesellschaft. In 2018, the regular works council elections were held in 71 Fraunhofer Institutes. The UMSICHT works council, which was established in 2003, currently comprises nine colleagues from all areas of the institute's work: administration, science and technology, non-management staff, and three group managers. This diversity is important in order to represent the interests of all employees in the best possible way. The Youth and Trainee Representative (JAV), elected for the first time in 2018, and the Equal Opportunities Officer (BfC), who is responsible for personnel issues, also take part in the weekly meetings.

In addition to fulfilling its statutory duties under the Works Constitution Act, the UMSICHT works council has been advising on the »New Work« process initiated throughout Fraunhofer since 2018. »New Work« stands for the idea of the social philosopher Frithjof Bergmann, who at the end of the 1980s already addressed today's consequences of globalization and digitalization. Bergmann's original idea of dividing up working life into shortened wage labor, work for self-sufficiency and work that we »really, really want to do,« is now transferred to wage labor. Keywords are »flexibility in terms of time and place«, »agility« and »meaningfulness«. The compatibility of family and career, demanding, self-determined work, transparency, appreciation, and trust in dealing with each other as well as participation and social involvement are the topics that are important for »New Work«.

The works council has long had a strong interest in the introduction of flexible working time models for all employees who need and want flexibility and whose workplace permits this work organization.

The »New Work@UMSICHT« survey carried out in 2018 showed that in some departments of the institute there are already individual agreements in place that allow employees to work flexibly and to compensate for overtime that is incurred as a result of the situation. The task now is to create a common mindset among both managers and employees and to slowly but steadily drive forward a cultural change so that Fraunhofer UMSICHT is well positioned in times of Work 4.0.



Mute swans, photo: Ekkehard Psotta

New Work fair

Changes in the world of work are also having an increasing influence on Fraunhofer UMSICHT, with the result that the institute's managers and employees are becoming increasingly familiar with new forms of work. In January 2019, an internal trade fair was held on the subject of »New Work«. Visitors were able to obtain general information on the topic and exchange views on specific topics with the stand supervisors. A short video and explanatory slides introduced the day of the fair. The fair took place for the first time at a management conference in autumn 2018.

Currently, the topic of »New Work« is being promoted mainly by COPs (communities of practice). These deal with the topics »agility«, »flexible working« and »places of work«. The impulses that have resulted from the queries and discussions

at the individual stands are taken up in the COPs with the aim of developing options for action for Fraunhofer UMSICHT. These will be made available to the institute management in the form of position papers as decision documents. The institute management also showed great interest in the trade fair results and experiences. In addition, Fraunhofer UMSICHT has been selected by the headquarters of the Fraunhofer-Gesellschaft as one of four pilot institutes for the topic »New Work« in 2019. In a six-month pilot phase, three departments from different areas are specifically concerned with »leadership and self-organization in the context of New Work«.

Health management

Those who work need balance. For this reason, UMSICHT introduced health management several years ago, which can provide a balance to work through sporting and mental distraction. The offers can be used by every UMSICHT employee including student assistants and trainees. Ideas and suggestions from employees are taken up for the program. The success of the program is reflected in the increasing demand.

The courses are organized in cooperation with the Techniker Krankenkasse. The aim of health management is to find suitable offers for the needs and wishes of the employees.

In addition to exercise programmes such as the »back mobile«, QiGong courses or LifeKinetik brain development training, health management also offers lectures (for example on nutrition or stress management), measurements and analyses (for example eye tests, skin cancer screening, hemogram) in collaboration with the company doctor. Each year focuses on another topic. After the topic »stress« in 2018, we devoted our full attention to the topic »relaxation« in 2019.

4

UMSICHT-INTERNALFOOTPRINT

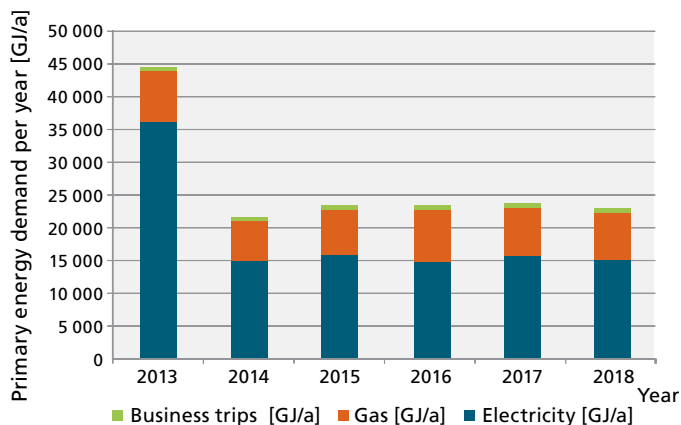
Global resource consumption has increased in recent years and the Federal Government's climate targets for 2020 are unlikely to be met. Instead of the target of a 40 % reduction in greenhouse gases, the German government's 2018 climate protection report predicts that only 32 % will be achieved.

As a pioneer for technical innovations in the fields of energy, processes, and products, Fraunhofer UMSICHT wants to drive forward sustainable management, the circular economy, environmentally friendly technologies, and innovative behavior in order to improve the quality of life of people and promote the capacity for innovation within the economy. At the same time, Fraunhofer UMSICHT wants to contribute to the raw materials shift and energy transition with its developments.

Even if the own footprint seems to be relatively small compared to the potential savings through the development of innovations, Fraunhofer UMSICHT wants to improve the efficiency of its own resource consumption in the research process.

As Figure 6 shows, electricity consumption accounts for the largest share of the primary energy input at Fraunhofer UMSICHT. As a result of the fact that Fraunhofer UMSICHT switched to 100 % electricity from hydropower at the beginning of 2014, the total primary energy demand of Fraunhofer UMSICHT could be reduced from approx. 44,000 GJ (gigajoules) in 2013 to approx. 23,000 GJ in the period 2013 - 2018. By converting to green electricity, Fraunhofer UMSICHT is also making a contribution to the energy transition and conserving fossil resources.

Figure 6: Primary energy demand per year



Furthermore, Fraunhofer UMSICHT is working on an exact recording of energy consumption. For this purpose, the institute has had an energy audit carried out in 2015, which revealed potential savings. In addition, monthly energy consumption measurements have been carried out at 44 locations since 2016 in order to identify consumption hotspots and cost-efficient savings measures. Independently of this, an energy saving measure has already been carried out: The entire lighting in the workshop was converted to LED in 2017. The technical shops are also being converted; other new buildings are also equipped with them. The energy audit will be repeated.

Green IT measures are being continuously pursued. For example, energy requirements have been reduced by renewing the existing storage and compute infrastructure (see pp. 22/23).



Stock dove, photo: Werner Haverkamp

Absolute final energy consumption by gas and electricity fell in 2018 compared with the two previous years from approx. 20.5 million MJ to approx. 19.8 million MJ. Consumption at Fraunhofer UMSICHT depends heavily on the research and development projects carried out in the respective years.

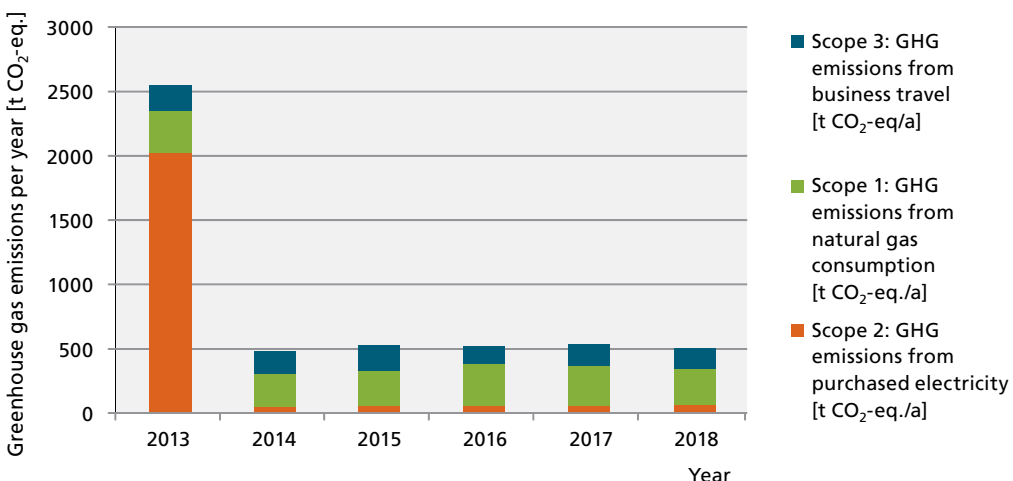
In addition to the absolute energy requirement, air pollutant emissions from the provision of electricity and heat play a major role in their environmental friendliness. These are explained in the following.

Greenhouse gases and other air pollutants

The Greenhouse Gas Protocol has established itself as the reporting standard for greenhouse gas emissions in companies. It assigns greenhouse gas emissions in and by a company to three different so-called scopes. A distinction is made between direct greenhouse gas emissions that can be generated or controlled by the company (scope 1), emissions caused by the purchase of electricity (scope 2) and other indirect emissions, e.g. through the purchase of materials or transport (scope 3). Currently, Fraunhofer UMSICHT records greenhouse gas emissions from the combustion of natural gas for heating, from the purchase of electricity, and from travel activities (excluding means of transport). Figure 7 shows the development of greenhouse gas emissions between 2013 and 2018. It can be seen that the majority of greenhouse gas emissions, which were determined by the purchase of electricity before 2014, have been significantly reduced since 2014 by switching to electricity from hydropower.

The reduction of greenhouse gas emissions through the purchase of electricity means that the share of greenhouse gas emissions from the combustion of natural gas and from business travel activities is increasing in importance. In 2018, for example, approx. 59 % of greenhouse gas emissions were caused by the combustion of natural gas and approx. 31 % of greenhouse gas emissions by business travel. The business trip distance per employee and year has decreased by about 17 % from about 6 950 km in 2015 to about 5 760 km in 2018. In addition, the share of kilometers travelled by rail, as shown in Figure 8, has increased since 2015, whereas the share of flight kilometers tends to decrease. As a result of the redistribution of transport use, the associated greenhouse gas emissions per employee have decreased by approximately 24 % from 820 kg CO₂-eq. in 2015 to 620 kg CO₂-eq. in 2018.

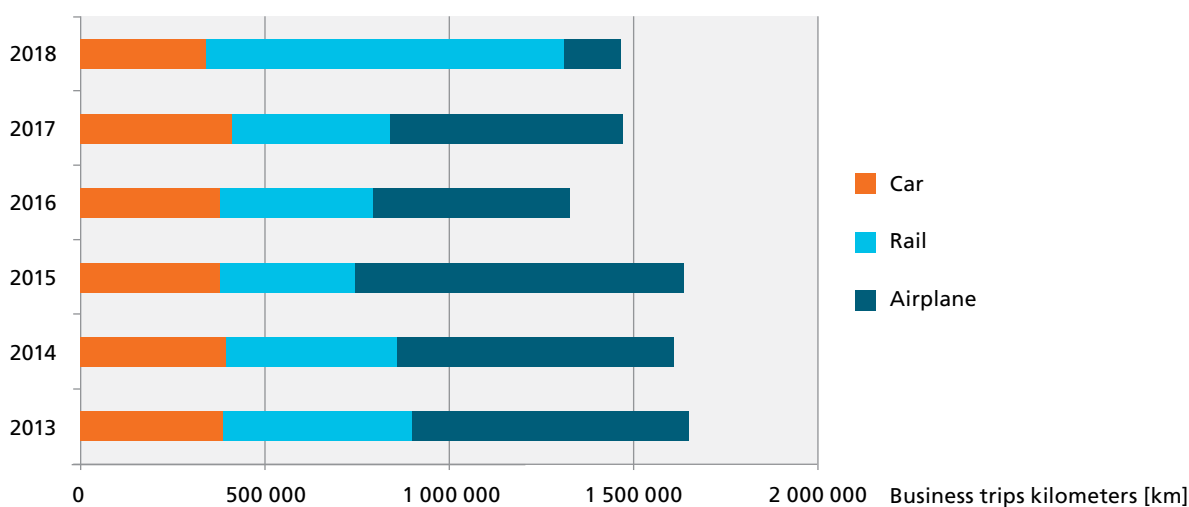
Figure 7: Greenhouse gas emissions at Fraunhofer UMSICHT



4

UMSICHT-INTERNALFOOTPRINT

Figure 8: Distribution of business trips kilometers



No greenhouse gas emissions were taken into account for rail travel, since Fraunhofer UMSICHT only books green electricity from Deutsche Bahn. It should be noted that Deutsche Bahn does not use real green electricity, but buys renewable energy through certificates, and regional transport is not included. According to the Federal Environment Agency, the greenhouse gas emissions of Deutsche Bahn in the reference year 2017 amounted to 36 g CO₂-eq. per passenger kilometer (TREMOD 5.82, Federal Environment Agency 13.11.2018). According to this, Deutsche Bahn will have emitted an additional 63 kg CO₂-eq. per employee in 2018.

In 2016, 2017, and 2018, Fraunhofer UMSICHT employees were again involved in the »Cycle to Work« campaign (www.mdrza.de, abbreviated to MdrZA) and »City Cycling« (www.stadtradeln.de). Participation in MdrZA took place individually in each of these campaigns following appropriate advertising at the institute, so no figures are available here. Within the framework of »City Cycling«, for example, the team of the Fraunhofer UMSICHT in Oberhausen covered a total of 6,639 km in 2018 with 23 employees; the CO₂ savings amounted to 943 kg.

In 2017 Fraunhofer UMSICHT has expanded its company car fleet with an electric vehicle and participates in the initiative »LamA - Laden am Arbeitsplatz« (= charging at the workplace). The vehicle's power consumption was included in the Scope 2 category.

In addition to greenhouse gas emissions, other pollutants such as nitrogen oxide emissions are also relevant. Across all means of transport, 528 kg NO_x were emitted in 2018. This means that NO_x emissions have decreased compared to 2015 (665 kg NO_x).



Tinder fungus, photo: Werner Haverkamp

Water

Fresh water consumption has been reduced despite the increasing number of employees in the last two years. In 2018, 12,700 m³ of fresh water were consumed; in 2016, the figure was 14,800 m³.

The volume of wastewater from precipitation remains constant at approx. 16,700 m³, so that in 2018 a total of approx. 29,500 m³ of wastewater was discharged.

Waste

Fraunhofer UMSICHT records its waste quantities in a waste balance sheet according to the waste code. The total waste quantities have remained constant over the last three years at around 80 t. Minor differences in volume are due to the fluctuating number and size of containers for mixed municipal waste.

The list of »hazardous waste« of recent years shows that some chemicals are required on a regular basis and then appear in the waste balance sheet. These figures should always be considered in relation to the respective ongoing projects.

In order to further improve the collection systems, work was carried out in 2019 on a waste management concept to reduce misplaced light packaging into residual waste and thus improve the recycling rate. The concept will be implemented in 2020.

Resource consumption

Over the past five years, paper consumption has been almost halved from around 4000 sheets per employee in 2014 to around 2000 sheets per employee per year (in 2018). The measures implemented included optimized standard print settings such as double-sided printing, increasing digitalization of administrative processes such as digital travel requests, digital time sheets, digital salary statements, and the now common practice of submitting offers, applications, and reports digitally.

4

UMSICHT-INTERNALFOOTPRINT

IT infrastructure

At the end of 2017 and the beginning of 2018, central hardware components critical for the operation of the IT infrastructure were replaced at Fraunhofer UMSICHT. This included systems responsible for the storage of data as well as for its processing (compute) in the form of a server virtualization environment. Together these two systems build the foundation for the operation of essential IT services at the institute. In addition to increasing the performance and capacity of the basic IT infrastructure and thus adapting it to the requirements that have increased in recent years and are expected to increase in the future, enabling the use of new technologies that are conducive to secure, stable, and high-performance operation, the reduction of power consumption and the required cooling capacity also played an important role. By replacing the existing storage and compute infrastructure with up-to-date, more energy-efficient components, the energy and cooling load required for their operation was to be reduced. This should save operating costs and reduce energy requirements.

The server virtualization infrastructure operated on blade servers now provides higher computing power with fewer required computing nodes, thus increasing the energy efficiency of the overall solution. The share of compute infrastructure components in the total power consumption of all IT systems located in the server rooms at Fraunhofer UMSICHT (Oberhausen site) is reduced by 5 %. The heat load and power consumption of the current compute systems has been significantly reduced compared to those previously operated. The following average values were determined:

| | Old compute infrastructure | New compute infrastructure |
|------------------------------|----------------------------|----------------------------|
| Power consumption | 3 950 watt | 2 985 watt |
| Heat load | 3 950 watt | 2 985 watt |
| Percentage power consumption | 17,5 % | 12,5 % |

The current systems consume a total of 965 watts less power than the previously operated solution, which also corresponds to a reduction of 965 watts in the cooling power to be provided. At the same time, higher computing power was made available in the form of CPU cores and RAM.

| | Old compute infrastructure | New compute infrastructure |
|----------------------|----------------------------|----------------------------|
| RAM (GB) | 3 904 | 4 864 |
| CPU (physical cores) | 192 | 392 |



Green-leaved sulphur tuft, photo: Werner Haverkamp

The storage infrastructure was also modernized. The reduction in the number of components used with increased capacity and performance already significantly increases energy efficiency. Additionally, the energy consumption of the entire system is further reduced by the use of energy-saving SSDs (solid-state drive – storage medium with low access time). The following values were determined for the heat load and power consumption of the new and old overall system:

| | Old storage infrastructure | New storage infrastructure |
|------------------------------|----------------------------|----------------------------|
| Power consumption | 6 141 watt | 3 716 watt |
| Heat load | 6 139 watt | 3 715 watt |
| Percentage power consumption | 22,5 % | 15,5 % |

The current systems consume a total of 2 425 watts less than the previously operated solution. The share of storage infrastructure components in the total power consumption of all IT systems located in the server rooms at Fraunhofer UMSICHT (Oberhausen site) is reduced by 7 %. By replacing the hardware components, the heat load and power consumption of the centrally operated IT components was significantly reduced, thus contributing to energy savings. At the same time, the usable storage capacity of the systems was significantly increased.

| | Old storage infrastructure | New storage infrastructure |
|------------------------------|----------------------------|----------------------------|
| Usable storage capacity (TB) | 120 | 223 |

By modernizing the compute and storage infrastructure at Fraunhofer UMSICHT, the goal of consuming fewer resources while providing better performance was achieved. This made a valuable contribution to energy saving.

5

ECONOMIC STABILITY AND MANAGEMENT

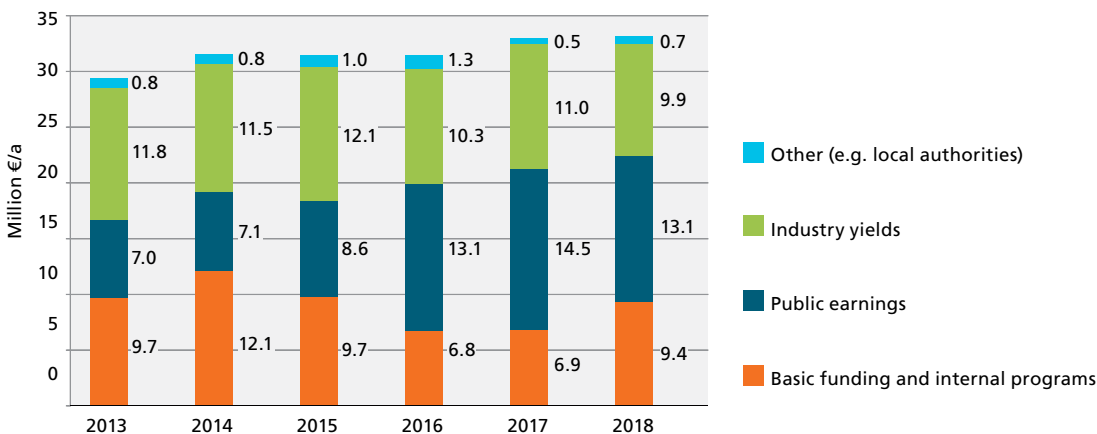
Economic development 2016–2018

Fraunhofer UMSICHT has benefited economically from a solid financing mix over the past three years. An average of 10 million euros in research and development contracts with partners from industry and public project funding of over 13 million euros from federal ministries, the state of North Rhine-Westphalia, local authorities, and the EU have contributed to this. The budget was supplemented by 7 to 9 million euros of basic annual funding for innovation-driven in-house research and for the implementation of predominantly inter-institute Fraunhofer research projects. The Oberhausen and Willich locations thus generated a total annual budget of over 31 million euros. Together with the Sulzbach-Rosenberg branch, the institute increased its total budget from almost 39 million euros in 2016 to over 42 million euros in 2018.

On the expenditure side, in recent years Fraunhofer UMSICHT has invested primarily in the establishment and development of the staff. Firstly, due to the good project situation, engagements were made, especially in the area of young scientists, in order to ensure the long-term

maintenance and development of know-how in the strategic research lines. Secondly, measures for the individual further training of the workforce were intensified and have been consistently pursued since 2017 and supplemented by health management offerings (see chapter 3). The investments in equipment made in the period under review, which were primarily project-financed and amounted to approx. 6.5 million euros, will in future make an important contribution to the research and analytical infrastructure of the institute, particularly in the areas of CO₂ utilization and energy storage technologies. In recent years, the institute has continuously invested its own funds in the expansion and performance of its IT infrastructure. In the coming years, the institute plans to continue to intensively anchor the topic of digitalization within the framework of strategic investments, both in terms of infrastructure and in its own research agenda. In this environment, it is important to empower and motivate the workforce for the challenges of the digital business and research environment of the future through individual personnel development concepts.

Figure 9: Development of the total budget at the Oberhausen and Willich sites





Ruhr meadows, photo: Werner Haverkamp

Medium-term development perspective

The structural challenges for the institution's budget forecast in the last reporting period, such as the volatile budgetary policy of public funding agencies or the deterioration in funding conditions and the basic financing situation, have not manifested themselves to this extent or have been overlaid by parallel positive developments. For example, the clarification of the financing situation in the context of state funding in North Rhine-Westphalia has led to a much more active involvement of the institute in state initiatives.

The positive economic development trend of the institute, beginning in 2016, was essentially characterized by a balanced mix of product and technology oriented projects and larger strategic joint projects with partners from science and large industry (see chapter 1). Due to its role as a provider of ideas and system partner in numerous future-oriented topics of high

social and political relevance, Fraunhofer UMSICHT predicts positive development prospects and a reliable order backlog for the future, both scientifically and economically, which increases medium-term planning security and opens up further degrees of freedom for shaping its own research agenda.

Major strategic projects and partnerships promise long-term development and exploitation paths. The institute's task will be to actively use these and, above all, to focus on exploitation within the framework of direct contract research and licensing of know-how with partners from industry. This will be a focus of the regular strategy review process, in which the institute will identify future topics with external support in 2019/2020, with the aim of adapting the strategic and organizational focus in an evolutionary way.

6

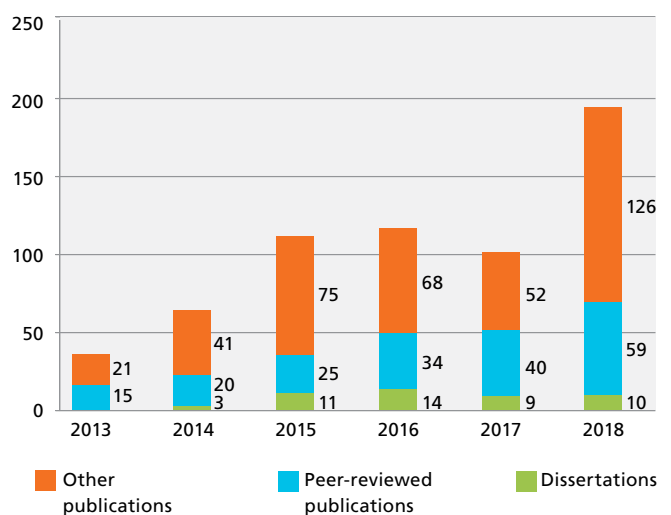
SOCIAL RESPONSIBILITY AND RESPONSIBLE RESEARCH

The freedom of science and research is a central guiding principle of our democracy and is anchored in the German constitution. This freedom is materially secured by the public (partial) financing of scientific institutions and activities. At the same time – against the background of increasingly complex social challenges – the translation of research findings and questions is becoming more important. Society is increasingly expressing a desire for transformative science, for science that is not only research and teaching, but also further education, technology transfer, participation and opening up to society. At the same time, scientific freedom and social responsibility remain in a state of tension. For, on the one hand, freedom of science and research means that scientific work is not only evaluated according to its exploitation and yields. On the other hand, activities outside of research and teaching are hardly rewarded by the science system and are rather undervalued within the scientific communities.

Questions and needs of society must continue to generate important guidelines for research in order to prevent a drifting apart of research in an ivory tower and a society to which science seems foreign and not important for its future.

Fraunhofer UMSICHT understands social responsibility as an investment in the future that improves the relationship between science and society. Communication is particularly important here – many citizens are interested in science and research, but have difficulties with technical terms or with the assumed knowledge. Our aim is to find comprehensible language forms outside specialist publications and to publish our research results not only in dissertations and peer-reviewed journals, but also in many detailed press releases, radio and TV reports (Fig. 10).

Figure 10: Publications - absolute number



The UMSICHT Science Award, which is awarded annually by the Institute's Friends and Patrons Group, honors people who report on research in the media in an understandable way and thus contribute to the dialog between science and society in the fields of the environment, safety in process engineering, and energy. As with all events of Fraunhofer UMSICHT, interested citizens are always invited to attend the presentation of the UMSICHT Science Award. Employees of Fraunhofer UMSICHT are involved in the lecture series »Wissenschaft im Wirtshaus« (Science at the pub), which is organized by the Wissenschaftsforum Ruhr and the Oberhausen Economic and Tourism Promotion Agency: Lectures on current scientific topics such as micro plastics, energy system transformation and digitalization are held in the Oberhausen pub »Gdanska«. The series combines comprehensibility with participation and gives the guests the opportunity to discuss new scientific, social, and technological challenges in a direct conversation while enjoying a drink after work and to contribute their own experiences.

Under the title »Debate«, regular discussions on current topics relating to research and technology, culture and society also take place at the institute.

WISSENSCHAFT IM WIRTSCHAUS
im Gdanska

ENERGIEWENDE
Kommt die dekarbonisierte Gesellschaft?

Vortragsreihe des Wissenschaftsforums Ruhr e. V. und der OWT Oberhausener Wirtschafts- und Tourismusförderung

Die Energiewende soll bewirken, dass weniger Kohlendioxid unsere Atmosphäre mit belastet, so dass der Klimawandel und die Erwärmung eingeschränkt werden. Nun wird Kohlenstoff aus Kohle, Erdöl und Erdgas in vielen Bereichen benötigt: zum Heizen, zum Autofahren, für Strom und für viele Produkte. Am Ende der Nutzung steht dann Kohlendioxid. Also ist die Vermeidung von Kohlenstoff ein Thema, das in Wirtschaft und Gesellschaft kritisch diskutiert wird. Aber können wir denn ohne Kohlendioxid aus? Wo brauchen wir ihn, wo können wir ihn ersetzen? Was bedeutet das für uns?

Der Vortrag von Professor Gergo Oberberg von Fraunhofer UMSICHT gibt einen Überblick über die aktuellen Entwicklungen und will zu einer anschließenden Diskussion anregen.

Fraunhofer UMSICHT
Fraunhofer-Institut für Umwelt-, Klima- und Energietechnik IISG/CI

WANN: Mittwoch, 3. Juli 2019, 18 Uhr
WO: Polnisches Restaurant "Gdanska", Altmarkt 3, 46045 Oberhausen
Freier Eintritt!

Wissenschaftsforum Ruhr e. V. | OWT: Oberhausener Wirtschafts- und Tourismusförderung

WISSENSCHAFT IM WIRTSCHAUS
im Gdanska

MIKROPLASTIK
von Oberhausen bis ins Meer

Neue Reihe des Wissenschaftsforums Ruhr e. V. und der OWT Oberhausener Wirtschafts- und Tourismusförderung

Am 26. Oktober fällt mit einem Vortrag zum Thema „Mikroplastik – von Oberhausen bis ins Meer“ der Startschuss der Reihe „Wissenschaft im Wirtshaus“. In einem lockeren Rahmen sollen aktuelle wissenschaftliche Themen verständlich dargestellt und diskutiert werden.

Den ersten Vortrag zum Thema Mikroplastik hält Leandra Hornann M.Sc., Wissenschaftlerin bei Fraunhofer UMSICHT. Sie erklärt, wie Mikroplastik Teil unserer Kristalle in Wasser, Nahrung und Wirtschaft wurde, welche Gefahren drohen und was jeder dagegen tun kann. Nach dem 20-minütigen Vortrag soll das Thema direkt am Kneipentisch weiter diskutiert werden.

Fraunhofer UMSICHT
Fraunhofer-Institut für Umwelt-, Klima- und Energietechnik IISG/CI

WANN: Donnerstag 26. Oktober 2017, 19 Uhr
WO: Polnisches Restaurant "Gdanska" Altmarkt 3, 46045 Oberhausen
Freier Eintritt!

Wissenschaftsforum Ruhr e. V. | OWT: Oberhausener Wirtschafts- und Tourismusförderung

Science at the pub

No room for racism

As part of a city-wide campaign, people from clubs, cultural institutions, companies, charities and schools, city council employees, and many more had their picture taken in Oberhausen in the summer of 2018 with a banner saying »Oberhausen has no place for racism«, in order to position themselves against racism in everyday life and against discrimination on the basis of

origin and skin color. Employees of Fraunhofer UMSICHT were happy to take part, because international cooperation across all national and cultural borders is a foundation of scientific work. At the time of the campaign, people from a total of 19 nations were working at the institute itself.

Picture 11: UMSICHT participation in the campaign »Oberhausen has no place for racism«, picture: Andrea-Cora Walther



6

SOCIAL RESPONSIBILITY AND RESPONSIBLE RESEARCH

Local involvement in education

One result of the first stakeholder dialog in 2014 was the desire to transfer knowledge to the education sector and to cooperate with educational institutions. In addition to its involvement in Girls' Day and the Fraunhofer Talent School, the institute has intensified its cooperation with the Sophie-Scholl-Gymnasium High School in Oberhausen. In the three years of the reporting period, the project course of the qualification level was supervised. In two groups each, the students dealt with the topic of sustainability. While one group of the course in the 2016/17 school year designed and tested teaching units for the lower grades on the subject of sustainability, the second group dealt with the sustainable design of school buildings. The results achieved by the students were impressive. In the following school year 2017/18 the project course was continued. One of the two groups dealt with the detailed design of a sustainable

school building, while the second group, parallel to the exhibition »Wonders of Nature« in the Gasometer Oberhausen, used the examples of plastic waste and rainforest clearing to produce a multimedia documentation on how these wonders are endangered by mankind's unsustainable interaction with nature. In the project course 2018/2019, the students dealt with sustainability at different educational institutions and conducted a survey on this topic. Another topic was the illustrative presentation of the significance of all 17 Sustainable Development Goals by means of a poster exhibition.

We also describe the local and regional commitment of Fraunhofer UMSICHT using the example of a cooperation project with the City of Oberhausen in chapter 7.

Citizen involvement and research responsibility

The involvement of citizens is essential for addressing social needs and developing appropriate technologies, products and services. Citizen involvement goes hand in hand with research responsibility – Responsible Research and Innovation (RRI). As important as the individual projects are for this purpose, the institutionalization of social commitment in science is also of great importance. Traditionally, society is involved in science mainly on the basis of individual events, with citizens participating in stakeholder dialogs or interviews and expressing their ideas and wishes for relevant projects and scientific discourse. As a rule, these formats result in highly compressed and abstracted reports in which the participants hardly find their views reflected. Moreover, it is often unclear to the participants to what extent the results of the dialog have a concrete influence on the everyday workings of science or its research results.

The European Horizon 2020 project JERRI (Joining Efforts for RRI) developed transition processes for the institutionalization of social engagement. For the institutionalization of social engagement in science, Fraunhofer UMSICHT developed and tested a number of formats that ensure an active and dynamic exchange between citizens and scientists and enable science to reflect on the effects of its work on society. One of these formats is the Citizens' Café, whose experimental operation showed that research institutions can function as open platforms for localized yet diverse discourses.

The Citizens' Café was conceived as a series of meetings at which Oberhausen residents can develop and work together with researchers from Fraunhofer UMSICHT. The model is hybrid – one part of the format brings the public



Project website: www.umsicht4all.eu

into the institute; the other part brings the institute into the city and into the public sphere.

Bringing the public into the institute: Parts of the institute become public space. Interested people come to Fraunhofer UMSICHT and can contribute their ideas and opinions on site.

Bringing the institute into the public eye: Every two months, scientific staff present the institute and its research activities on Oberhausen's market square.

For a few hours at a time, citizens have the opportunity to present their concerns, questions and thoughts directly. After each appointment, the people evaluate the meetings under the aspects of transparency, responsibility, communication and participation. The formats developed within the JERRI project are to be retained as an exchange platform beyond the project's timeframe. For this purpose, a project website was developed to invite people to meetings and to communicate ongoing social activities.

From an institutional point of view, there is a need for a change in institutional values and a culture of openness to social engagement. Despite strong grassroots activities, it was found that only a handful of scientists see the value of exchange with the general public. For the majority of the research community, social and environmental goals are often seen as a compromise. This is especially true when they are compared with established performance indicators, such as peer-reviewed publications or patents. In order to democratize science at the organizational level, we need to anchor social engagement at several levels: at the project level (e.g. stakeholder dialogs, user design or citizen science projects), at the organizational level (agenda setting, citizens' office) and as an established strategy. It is a goal of Fraunhofer UMSICHT to further develop the existing approaches in order to significantly improve the participation of citizens in research, development and innovation through a true bottom-up approach.

Projects that work strongly with participatory elements are for example the »+SeniorDesignLab« and the »e:Lab - Citizens' Laboratory for Energy Innovations«. The e:Lab works with concrete ideas and suggestions from citizens on topics such as tiny houses, sustainable mobility or energy savings. In the SeniorDesignLab, practical ideas for everyday auxiliaries are conceived and implemented with the help of specially developed senior design thinking tools – innovative products and services for the generation over 50. In short: We don't develop and then ask about the benefits, but we research and develop for very concrete needs.

In the project »SAIN (Urban Agriculture: Innovative Development Together – Sustainable Integration and Networking of Small-scale Food Production)«, citizens are involved in the development of ideas and research questions: at different stages and in different areas of food production in the city (see p. 33). The »BioDisKo« project also deals with plants and agriculture. Here, development paths for biomass products (e.g. maize) and their effects on humans and the environment are analyzed together with citizens.

The annual festival »Innovative Citizen« in Dortmund is held under the motto »Democratization of Technology«. Numerous workshops are held here where technology can be encountered in practice – in the areas food + farming, Circular City, and textiles, manufacturing culture is being rethought.

7

OUR CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS

Fraunhofer UMSICHT contributes to the Sustainable Development Goals (SDGs, also known as Agenda 2030) of the United Nations (UN). The SDGs replaced the Millennium Goals in 2015 and are valid for all UN member states. The achievement of the 17 goals (including those on poverty reduction and environmental protection) and 169 concrete sub goals is intended to (re-)promote sustainable development.

Since 2002, Germany has had a national sustainability strategy that is constantly being updated. The new edition 2016 shows how the SDGs can be implemented in Germany and emphasizes the political will to achieve the SDGs.

A comparison of the research projects and the portfolio of Fraunhofer UMSICHT with the SDGs shows six goals to which we can mainly contribute. These goals largely coincide with the SDGs, which the Fraunhofer-Gesellschaft addressed in its Corporate Responsibility (CR) Report.

Our analysis shows that the SDGs are primarily aimed at countries. We have therefore decided to pick up the direction of the goals and align them with our research and development projects and our agenda in order to achieve a good overview.

- SDG 6: Ensure availability and sustainable management of water and sanitation for all | Clean water and sanitation
- SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all | Affordable and clean energy
- SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable | Sustainable cities and communities
- SDG 12: Ensure sustainable consumption and production patterns | Sustainable consumption and production
- SDG 13: Take urgent action to combat climate change and its impacts | Climate action
- SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development | Life below water





Honey bee, photo: Ekkehard Psotta

SDG 6: Clean water and sanitation

GOALS

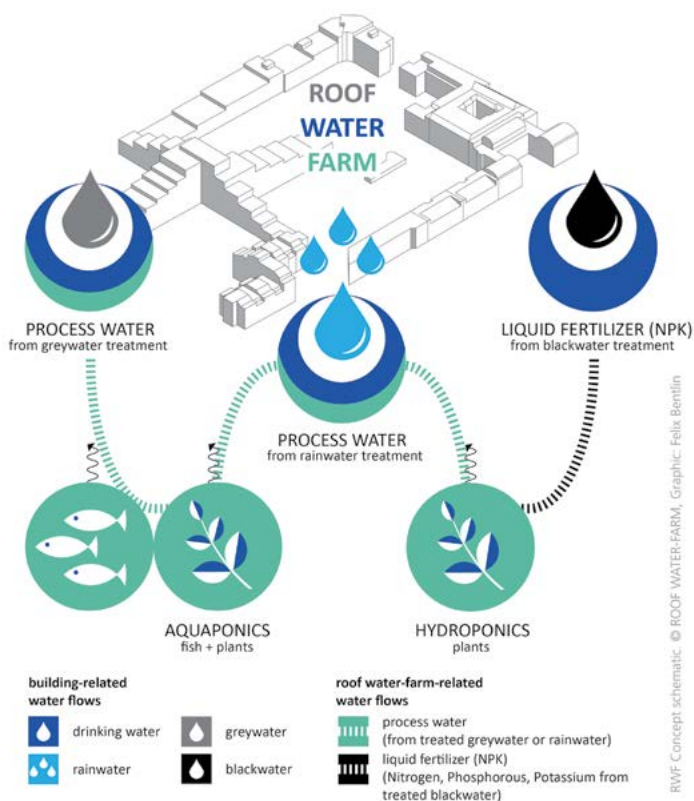
The goals of this SDG are primarily access to drinking water and sanitary facilities. In addition, there are further sub-goals for the protection and restoration of water-connected ecosystems such as mountains, forests, wetlands, rivers, and lakes. Water quality is to be improved and secured and water pollution by hazardous chemicals is to be reduced or avoided.

OUR CONTRIBUTIONS

Water and wastewater treatment is one of the central research topics at Fraunhofer UMSICHT.

Especially the topic of making urban material flows more flexible with a focus on decentralized wastewater recycling in combination with the cultivation of crops contributes to the achievement of SDG 6. The researchers expect a paradigm shift away from centralized wastewater disposal to decentralized wastewater utilization in »Nutrient Recovery Centers«. In view of the scarcity of resources, wastewater must no longer be treated as »waste«, but rather as a source of water, energy, and nutrients.

Figure 12: ROOF WATER-FARM concept scheme



Fraunhofer UMSICHT is involved in two pilot projects on the topic of value creation from wastewater – the Altmarktgarten in Oberhausen and the ROOF WATER-FARM (BMBF project) in Berlin. In Oberhausen, the research team supports the construction and operation of a roof greenhouse and a building-integrated water recycling system for the new job center. In Berlin, Fraunhofer UMSICHT operates a plant in a residential building complex for the treatment of domestic toilet wastewater to produce liquid fertilizer, which is fed directly into a neighboring greenhouse (www.roofwaterfarm.com).

7

OUR CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS

7 AFFORDABLE AND CLEAN ENERGY



SDG 7: Affordable and clean energy

GOALS

The aim of this SDG is to ensure universal access to affordable, reliable, and modern energy services. This goal forms the basis for achieving many other SDGs, such as overcoming poverty, increasing food production, providing clean water, improving public health, and much more. In this context, it is of course of central importance to significantly increase the share of climate-friendly, renewable energy in the global energy mix and to raise energy efficiency worldwide. Research in these areas should be promoted, as should investment in energy infrastructure, e.g. the development or improvement of energy storage technologies. These goals are directly related to SDG 13, which calls for immediate measures to combat climate change.

OUR CONTRIBUTIONS

The conversion to renewable energy sources from sun, wind, and biomass requires sustainable solutions for society, industry, and citizens in order to coordinate energy demand and supply. What is needed are efficient energy processes, new storage technologies, and intelligent system solutions. Fraunhofer UMSICHT develops and optimizes energy systems, works out solutions for the storage of electricity and heat, and optimizes energy and energy supply systems. Our expertise lies in the development of novel technologies and their implementation in pilot and demonstration plants as well as in system analytical studies. The energy supply of the future needs efficient storage systems that are dependent on specific economic-strategic raw materials. Fraunhofer UMSICHT is therefore not only working on the optimization of energy systems but also on the use of secondary raw materials for use in vanadium redox flow batteries. Energy transition and raw material shift are combined and the bridge to SDG 12 is built.

Figure 13: Redox flow battery



11 SUSTAINABLE CITIES AND COMMUNITIES



Altmarktgarten Oberhausen

SDG 11: Sustainable cities and communities

GOALS

One of the goals of this SDG is to reduce the per capita environmental pollution caused by cities (e.g. greenhouse gas emissions, particulate matter, etc.), especially with regard to air quality and waste management. In addition, participatory, integrated, and sustainable settlement planning is to make urban development more inclusive and sustainable. This includes general access to safe and inclusive green spaces and public spaces as well as access to safe and affordable housing and transport for all groups of people.

OUR CONTRIBUTIONS

Fraunhofer UMSICHT develops new concepts for food production directly in the city. For example, we deal with how to create and use cultivation areas for fruit and vegetables in urban areas.

With the concept inFARMING® Fraunhofer UMSICHT is pushing the integration of agriculture in cities and metropolitan areas. To this end, the researchers develop materials, vertical cultivation methods, special exposure strategies, circulation processes for nutrients, water, and energy and carry out feasibility and implementation studies as well as acceptance and participation studies (www.infarming.de).

In the »Altmarktgarten« project, an integrated rooftop greenhouse for the urban production of food in the city of Oberhausen was planned and implemented in mid-2019. This innovative construction project is characterized by closing the cycles in the city. The treated grey water from the office building will be tested as a possibility of irrigation for the plants and rainwater will be used for the cultivation of the plants. Furthermore, the waste heat and CO₂ from the office building will be fed into the roof greenhouse for plant production. In addition to the production facility, there is an area on the

roof for testing the latest technologies, including new roofing materials and new cultivation systems.

In the project »SAIN (Urban Agriculture: Innovative Development Together – Sustainable Integration and Networking of Small-scale Food Production)«, small-scale urban production is optimized with the help of citizen research. The urban space is examined using the Cities of Oberhausen and Bonn as examples. Material flows and existing small-scale technologies are taken up and options for comprehensive systemic integration are developed together with the urban population. The project is a citizens' research project, i.e. the citizens are enabled to ask and work on research questions.

In the »Future City« project, the City of Oberhausen and Fraunhofer UMSICHT dedicated themselves to the city of tomorrow. Under the slogan »Ideas Factory Oberhausen«, more than 800 ideas for a sustainable city were collected. It was also desired to anchor production more firmly in the city again. Creative urban handicraft and living spaces are being discussed and are being worked out together with creative people and Fraunhofer UMSICHT.

7

OUR CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



SDG 12: Responsible consumption and production

GOAL

The aim of this SDG is to implement the UN's ten-year programme for sustainable patterns of consumption and behavior. One focus is on the environmentally sound handling of chemicals and waste of all kinds. To increase material efficiency and reduce waste, the possibilities for recycling are to be significantly increased. In addition, food waste should be at least halved and companies should be encouraged to adopt sustainable corporate management. A further focus is on promoting sustainability criteria in public procurement.

OUR CONTRIBUTIONS

Fraunhofer UMSICHT contributes to this SDG in many ways. For example, we conduct intensive research on new products and technologies as well as on efficiency increases in the use of materials and energy.

By switching from fossil-based plastics to bio-based plastics, the consumption of non-renewable resources is reduced. This can lay the foundation for the structural change from an oil-based industry to the use of renewable resources. It is particularly efficient to use bio based polymers not just once, but to recycle this high-quality material. How this can be achieved technically and what major positive effects this has on the ecological footprint of the products was investigated in a joint research project that was completed in 2017.

Fraunhofer UMSICHT is a member of C.I.S.T., the Center for Innovation & Sustainability in Tourism. C.I.S.T. initiates projects at the interface between tourism industry, politics, society, and research and development. Together with C.I.S.T., the project »KlimaCent - Establishment of a sector-adequate financing instrument to achieve measurable greenhouse gas reductions in the national tourism industry« was initiated. This new financing instrument, which is to be developed, will specifically support sustainable tourism in local tourism destinations.

With the project »GTT - Green Travel Transformation« Fraunhofer UMSICHT supported the travel industry in the field of sustainability assessment. Various criteria were applied to the travel chain in order to make it more transparent with regard to CO₂ equivalent emissions. In addition, it was possible to make sustainable offers visible in the system for hotel bookings, so that in future it will be possible to obtain information about sustainable travel in travel agencies whose employees have been trained in this respect.

In the Fraunhofer Cluster of Excellence Circular Plastics Economy CCPE, six Fraunhofer Institutes are developing solutions for a circular plastics industry. This transformation is complex. It requires a plastics turnaround that can only be achieved with a multi-stakeholder approach – along and at the interfaces of the value chain. This cluster develops system services for the circular plastics industry.

The iCycle® process developed at our Sulzbach-Rosenberg unit helps recover valuable metals, fibers, and minerals from complex waste streams (such as composite materials or electronic scrap). In addition, iCycle® is used for the chemical recycling of plastic waste.

13 CLIMATE ACTION



SDG 13: Climate action

GOALS

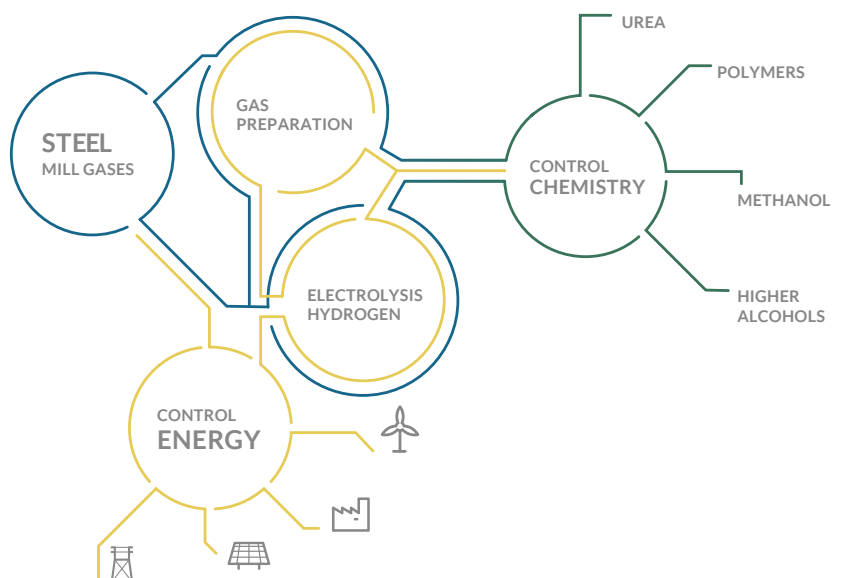
SDG 13 is designed to implement climate protection measures, measures to adapt to climate change, and measures to increase resilience to climate-related risks and natural disasters.

OUR CONTRIBUTIONS

Improving climate protection requires not only the reduction of CO₂ emissions but also a reduced use of fossil raw materials. This is where the joint project Carbon2Chem[®] comes in: The aim is to use the exhaust gases produced during production as a valuable source of raw materials for the chemical industry in the course of the defossilization of industry. The project, which is funded by the German Federal Ministry of Education and Research (BMBF) with 17 partners from industry and research, is jointly coordinated by Fraunhofer UMSICHT and two other partners (thyssenkrupp AG, Max Planck Institute for Chemical Energy Conversion). The project is scheduled to run for ten years. The first four-year phase was launched in March 2016 and a second project phase from 2020 is planned, focusing on implementation at the thyssenkrupp site in Duisburg.

The consortium is working on the implementation of a flexible carbon capture and utilization (CCU) concept for the primary industry and is delivering a modular approach to CO₂ use within cross-industry networks. With its systemic approach it combines climate protection and competitiveness for large industrial sites in Germany and other parts of the world. Research and development is carried out in an exemplary manner within a cross-industry network of steel industry, chemical industry and energy industry. Process gases from the steel mill, previously used purely for energy purposes, serve as a carbon source for the production of synthetic fuels, plastics, and other basic chemicals, thereby substituting the need for fossil raw materials in the chemical industry. The systemic approach of Carbon2Chem[®] is characterized by its adaptability to existing industrial structures as well as the possibility of timely implementation.

Figure 14:
Representation of the cross-industry network Carbon2Chem[®]



7

OUR CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS

14 LIFE BELOW WATER



SDG 14: Life below water

GOALS

The goals of this SDG are a significant reduction of all types of marine pollution and the reduction of ocean acidification to a minimum. Marine pollution, especially from land-based activities, is to be curbed primarily by avoiding marine waste and nutrient pollution. By 2020, marine and coastal ecosystems are to be sustainably managed and protected.

OUR CONTRIBUTIONS

Fraunhofer UMISCHT contributes to this SDG, especially with regard to reducing the input of microplastics into the oceans.

Plastic waste in the environment is the result of the high demand for plastics in our society and has become a major environmental problem. The topic became the focus of public attention in the last decade when small plastic particles and fibers were increasingly identified, which are summarized under the term micro plastics (plastic particles < 5 mm). Microplastics are already found in all environmental compartments and various habitats: in air, water, soil, on the beach, in the deep sea, and in the Arctic ice.

Microplastics are particularly problematic because many organisms confuse them with natural food (phytoplankton, zooplankton) and eat it. Since plastics are indigestible, they are either excreted, enriched in the digestive tract or individual chemical components are absorbed into the bloodstream. Effects mainly affect aquatic organisms, but also terrestrial organisms and humans themselves, although the extent of the effects is not yet known. Microplastics come from various sources. They result from the fragmentation of larger plastic objects already in the environment or from the loss of microplastics from cosmetics, textile fibers or tire abrasion. It cannot yet be completely retained in sewage treatment plants.

In the 2016 Environmental Awareness Study conducted by the Federal Environment Agency (UBA), »Plastic waste in the world's oceans« takes first place in terms of perceived threat from environmental risks. This shows that the problem is perceived in society as a very urgent environmental problem. Solution strategies are concerned with the consumption of crude oil resources, the change to a bio-economy, systemic transformation to a closed loop economy, extended producer responsibility, ecological product design, political and regulatory measures, awareness raising, and changes in consumer behavior. Technical innovations are essential.

Since 2014, the Microplastics Working Group of Fraunhofer UMISCHT has been working on microplastics and plastic waste in the environment. In April 2016 a consortium study with eleven partners from the plastics industry, water management and science was started. A survey was conducted among laymen and experts, which showed that although plastics play an important role in our everyday life, they have no value and are perceived as very disturbing and dangerous when they enter the environment. Further research projects started in 2017 on microplastics in cosmetics, on the development of methods to map microplastics in life cycle assessments, and on the spread of tire abrasion. In 2018, research projects on filter development for washing machines and the weathering of agricultural films followed. In order to maintain an exchange with stakeholders, communicate research results, and develop joint solution strategies, Fraunhofer UMISCHT is involved in the Federal Environment Agency's Round Table on Marine Waste and takes part in various workshops and conferences.



MEASURES AND OBJECTIVES

In this sustainability report, we have restructured and supplemented our measures according to the main topics. In many cases, we have sharpened the objectives and presented the measures in more detail. Wherever possible, we have indicated milestones for the achievement of our goals.

| OBJECTIVE | MEASURE | ACHIEVEMENT OF THE OBJECTIVE, IF APPLICABLE WITH PERIOD | STATUS |
|--|--|--|----------|
| CONCRETE CONTRIBUTIONS OF FRAUNHOFER UMSICHT TO SUSTAINABILITY | | | |
| Making the contribution of our projects to sustainability visible (e.g. with regard to the raw material shift and energy transition) | Presentation in the Annual Report and in this Sustainability Report | Presentation of the contribution of the following R&D activities: Hydrogels, alternative plastics, microplastics, particle foams, optimized shovel Activity on site: Student projects Sophie-Scholl-Gymnasium (in chapter 6) Presentation of the reference of selected projects to the Sustainable Development Goals (SDGs) (in chapter 7) | |
| LONG-TERM HUMAN RESOURCES RESPONSIBILITY, PEOPLE, EDUCATION | | | |
| Extending good leadership | Carry out appropriate training courses | Since 2013, all persons with management responsibility have been obliged to undergo further training programmes (p. 13) | |
| Enabling a career with Fraunhofer; qualifying staff for different career paths | Create human resources development plans systematically for all employees | Introduction from mid 2016, training courses underway | |
| | Strengthen human resources development | Group Human Resources enlarged | |
| | Research school | Introduction from 2017, support for doctoral students (doctoral support) | |
| | Postdoc school | Introduction in 2020, promotion of postdocs (career support) | |
| Maintaining contacts with alumni, strengthening alumni work | Foundation of the Alumni Association of the Fraunhofer-Gesellschaft | Foundation 2015 | |
| | Information for alumni through UMSICHT employee magazine for:um, invitations to Christmas parties and UMSICHT events | Continuously | |
| | Exit survey | Since 2017 | |
| Support for employees with children | Parent-with-child office; holiday childcare between 6 and 12 years | Parent-with-child office since 2009; support since 2011 (p. 11) | |

Measure fully implemented

Measure partially implemented

Measure not implemented

Measure started (no assessment possible yet)

Ongoing measures



MEASURES AND OBJECTIVES

| OBJECTIVE | MEASURE | ACHIEVEMENT OF THE OBJECTIVE, IF APPLICABLE WITH PERIOD | STATUS |
|--|--|--|--------|
| Support for employees with family care needs | Offer of pme Familienservice | Continuously | |
| Improve working conditions/ employee satisfaction in the institute | Participation in pilot project "New Work" of the Fraunhofer-Gesellschaft | 2019/2020 (p. 17) | |
| Increase of internationality | Increased implementation of international projects | Continuously | |
| | UMSICHT scholarship | Resumed in 2017 (financing of stays abroad) | |
| Improving the health of employees | Health days, vaccinations/»back mobile«, eye examination | Continuously (see chapter 3) | |
| Expand diversity (including increasing the proportion of women) | Presentation of diversity based on age, gender, nationality in the sustainability report | Included in this report (p. 11) | |
| | Increase in the proportion of women on the Board of Trustees | 2016: Admission of 3 new members, increase to a total of 5 | |
| INNOVATION PROCESS AND KNOWLEDGE TRANSFER | | | |
| Increase visibility | Increase the number of publications, also in consumer magazines read by our customers | Continuously | |
| | Update web presence | Target achievement: 2017/2018 | |
| Positioning on current topics | Position papers on microplastics and recycling of bioplastics prepared | Further papers and thematic issues will follow and be published on the website under »Positions and Discourse« | |
| Increase the comprehensibility of research | Sensitization of the staff; training in scientific writing | Continuously | |
| Increase knowledge transfer into society | UMSICHT Science Award | Annually | |
| | Lecture series »Science at the pub« | Several times a year | |
| Adapt research process with the goal of sustainability | Sensitizing employees to sustainability | Develop tools (reflection frames) for staff to capture sustainability contribution | |
| EXPLOITATION AND CUSTOMER ORIENTATION | | | |
| Increase revenues, increase impact | Optimize recycling management | Continuously, training of 15 persons to become a Business Manager in the year 2018/2019 | |
| Getting to know customer needs even better | Implementation of stakeholder dialog with customers and partners; event series »UMSICHT: Zur Sache!« | Continuously | |
| Increase customer loyalty, optimize customer approach | Setup of Customer Relationship Management System (CRM) | Introduced in 2016; success of the system is continuously monitored, in 2021 transfer to an SAP system | |



Guest in passage: short-eared owl, photo: Ekkehard Psotta

| OBJECTIVE | MEASURE | ACHIEVEMENT OF THE OBJECTIVE, IF APPLICABLE WITH PERIOD | STATUS |
|---|--|---|--------|
| Making greater use of the location factor | Determine economic effects on the city/region; intensify cooperation in the Ruhr Science Forum Strengthen cooperation with the Ruhr University Bochum | Achieve closer cooperation with the City of Oberhausen and with surrounding communities, for example in the project »Resource-efficient industrial estates ReGe«. | |
| TECHNICAL-SCIENTIFIC EXCELLENCE | | | |
| Increase benefits for customers | Designing offers to fit more precisely (tailor-made; thinking in terms of value chains, taking into account the entire expertise of Fraunhofer UMSICHT) | Continuously | |
| Increase success rate in public funding applications | Increase the quality of applications through clear responsibilities of the managers and the implementation of application workshops | Training on the job by managers | |
| Ensure the highest quality in the preparation of applications, proposals and reporting | Set up editing for quality assurance | Since 2017 | |
| Helping to shape new research approaches | Involvement in major structure-building projects Acquire one major structure-building project per year | Continuously Example 2016: Carbon2Chem® 2016: Dynaflex® 2018: Fraunhofer Cluster of Excellence Circular Plastics Economy CCPE | |
| Increase number of publications | Introduction of premium system Monitoring via Fraunhofer science indicator | Raise number of peer-reviewed publications per scientific assistant from every 7 years to a peer-reviewed publication every 3 years (p. 26) Continuously | |
| Increase number of promotions | Increased work with doctoral students Monitoring via Fraunhofer science indicator | Institute-wide completion of about 10 dissertations per year (p. 26) Continuously | |
| Increase in the number of theses supervised | More Master theses advertised Monitoring via Fraunhofer science indicator | About 90 supervised Master theses per year Continuously | |
| Increase the perception of scientific excellence | Increased application for research awards | Submit at least 1 application per year | |
| ECONOMIC STABILITY AND MANAGEMENT | | | |
| Even more precise medium-term forecast of the departmental results and the institute's annual results | Further improve controlling Additional more detailed analysis of financial data Expansion of medium-term personnel and cost management | Continuously From 2021: Further evaluation options after conversion to SAP | |
| Focus of the institute profile | Introduction of Business Developers | Introduced in 2014 Success is checked by controlling | |

Measure fully implemented

Measure partially implemented

Measure not implemented

Measure started (no assessment possible yet)

Ongoing measures



MEASURES AND OBJECTIVES

| OBJECTIVE | MEASURE | ACHIEVEMENT OF THE OBJECTIVE, IF APPLICABLE WITH PERIOD | STATUS |
|--|--|--|--------|
| Concentrate on well-financed funding programs | Decision-making aids are made available, list of EU funding programs is available | Continuously | |
| Reduction in the use of own resources for co-financing research projects | Apply for appropriate funding programs, expand co-financing opportunities with industry | Since 2016 | |
| SOCIAL RESPONSIBILITY AND RESPONSIBLE RESEARCH | | | |
| Strengthen thought leadership; clients show which issues are becoming relevant for sustainable development | Raising awareness of staff through information events; holding debates on current issues, last debate on New Work | Continuously | |
| Optimize research processes | Questioning how we do research, for example in the Sustainability Working Group | Continuously | |
| Create a communication aid for scientists and scholars | Development of an internal policy for communicating R&D results | 2018 | |
| Strengthening inter- and transdisciplinary research | Provide a platform for opinion formation; try out new opinion-forming formats »Dezentrale« as a transdisciplinary offer Use of the »Innovative Citizen« format | Continuously | |
| UMSICHT-INTERNAL FOOTPRINT | | | |
| Efficient use of resources | Changeover to LED | Gradually switching to LED (p. 18) | |
| | Extend leasing periods of monitors, PCs and thin clients from 3 to 5 years | Leasing periods extended | |
| | Sensitization of staff | 2015: Poster with tips on sustainable behavior created, also published on the Internet | |
| Reduction of the carbon footprint | Switch to green electricity | Switch to green electricity in 2014 (p. 18) | |
| | Green travel by rail | Rail travel is CO ₂ -neutral according to Deutsche Bahn (p. 20) | |
| | More rail travel instead of air travel even at higher costs | Is allowed despite additional costs (p. 20) | |
| Improving knowledge about energy flows | Evaluation of energy audit (p. 18) from 2015 and implementation of measures | Continuously | |
| Reduce paper consumption | Offer more and more forms digitally (travel, vacation, time recording, »asset sign« program for device transfer) | Continuously, pay slips digital since 2019 | |

Measure fully implemented

Measure partially implemented

Measure not implemented

Measure started (no assessment possible yet)

Ongoing measures

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Polecat, photo: Ekkehard Psotta

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