Fraunhofer

ISI

FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH ISI

ANNUAL REPORT 2015

CONTENTS

GOING DIGITAL

2015 was a successful year for the Fraunhofer Institute for Systems and Innovation Research ISI, full of interesting projects. It began with our participation in the German government's international German Forum on "The future needs integrated solutions" in January, and finished with important publications in December such as the latest figures on the "Innovation Indicator 2015" showing Germany's innovative capacity in an international comparison, and the roadmaps plotting the detailed research and development status of lithium-ion batteries. In-between, there were about 400 projects, and a medley of successful workshops, events and conferences. 233 highly motivated members of staff worked together to generate a turnover of 21 million euros.

Once again, we delivered scientifically sound recommendations to those responsible for making research and innovation policy decisions. On behalf of policy-makers and industry, we tackled innovation, technology, socio-economic and environmental policy issues that already affect our society today and that will decisively shape our future. These topics require a systemic approach as does the topic of digitalization. In our editorial, we address the various facets and impacts of the digital transformation.

Our annual report for 2015 visibly demonstrates that we are tackling the topic of digitalization in a very practical way. We decided to take advantage of going digital and present our clients with an electronic version of our annual report for the first time and no longer a printed one. We focus on two highlights from the Fraunhofer ISI's wide portfolio: Data and information security, and the energy transition (Energiewende). Project examples give you some insights into the research conducted in our Competence Centers (CC).

The past year also saw many changes. We adjusted our organizational structure to cater to current demands by transferring the topics handled in the former CC Industrial and Service Innovations to our other Competence Centers. This process was completed during the course of the year. We believe this puts us in a good position to continue to act as a pioneer and progressive thinker for industry, policy-makers and society.

We would like to give you some idea of what we have been working on over the past year in the following reports on exciting projects, conferences and cooperation.

We hope you enjoy reading about us.

Prof. Marion A. Weissenberger-Eibl
Director of the Institute

Dr. Harald Hiessl
Deputy Director of the Institute

DIGITALIZATION

We at Fraunhofer ISI deal systemically with socially-relevant topics; which means that we work across all our Competence Centers on the important issues relevant to our time. Here in particular our systemic approach takes its full effect. Only when considered as a whole, can an overall picture reflect complex issues. An example of such an issue is digitalization; its facets have relevant issues in the private sphere as well as in industry and in human-technology interaction.

The progressing digitalization due to new technologies and increasing online networking permeates society more and more. This development affects every single citizen and at first sight has several advantages: "Smart" technologies and services can make many areas of life simpler. Dealing with official business or shopping can be done very simply online. Changes, which meet the demands of an ageing society.

MORE AND MORE APPLIANCES ARE INTERCONNECTED DIGITALLY AND CAN COMMUNICATE WITHOUT HUMAN INTERVENTION.

Against the background of comprehensive digitalization we at Fraunhofer ISI also have the impacts on industry in mind. Examples such as "the Internet of Things" also show how far technological development has now progressed. More and more devices are digitally connected to each other and communicate without human intervention. Production machines retrieve information from the internet independently in order to adapt components to changed framework conditions or to order parts which are scarce but required for the production process. In 2015 Fraunhofer ISI prepared a "Thesis paper Industry 4.0": We describe how digitalization opens up many new areas of business and should not be reduced to the aspect of efficiency enhancement. Fraunhofer ISI also postulates that not all small and medium-sized production companies need a comprehensive, completely integrated digital network of all production processes, which is often wrongly assumed. We deal with the issue whether Industry 4.0 makes the competences of the traditional skilled worker obsolete. Enterprises as well as the German education system benefit from research results associated with digitalization and Industry 4.0. President Obama also recognized this strength; he commented positively on the Fraunhofer model and emphasized that such an institution, which better coordinates research and application on a national level, is missing in the US.

What remains to be done? Germany will have to change its innovation system in this direction while emerging industrial nations and developing countries can better adjust their technology and innovation policy to digitalization from the start. This has advantages for their innovation systems and countries such as China and India will in future become important think tanks and innovation incubators. Accordingly, global innovation centers could increasingly move to these regions.

Due to its efficient science and innovation system, Germany is well prepared for the future. As Fraunhofer ISI has been able to establish in the innovation ranking "Innovation Indicator 2015" in cooperation with the Centre for European Economic Research (ZEW), in an international comparison Germany's innovation capability is rather impressive. In fifth position we are immediately behind the top group. In view of digitalization and Industry 4.0, however, broadband expansion should be rapidly pushed ahead and a digital European internal market should be created.

Dealing with the issue Industry 4.0 and investigating the impact of digitalization on the private sphere takes us at Fraunhofer ISI inevitably to fundamental questions on the relationship of humans and technology. The individual human being is already today part of an integral system, together with many different technologies. As an example we take an already existing warehouse which is the size of several football pitches, and where a specially developed computer algorithm directs employees and issues them with "instructions". Human beings are part of the complex system in which they operate.

GERMANY IS WELL PREPARED FOR THE FUTURE DUE TO ITS STRONG SCIENCE AND INNOVATION SYSTEM

Many developments which confront us with new questions and challenges contribute to an active interactivity of technological systems. It is against this background that each individual faces the task of addressing the new human-technology relation and its demands. New competences are required; those no longer needed are almost forgotten. How many can still drive a horse-drawn carriage, and how many cars with manual transmission?

Possibilities, useful options for action but also ever new damage potentials emerge and disappear through the interdependence between humans and technology. It will be crucial how the hierarchy between humans and machines will be formed. Human beings, however, should in any case still be the measure of all things.

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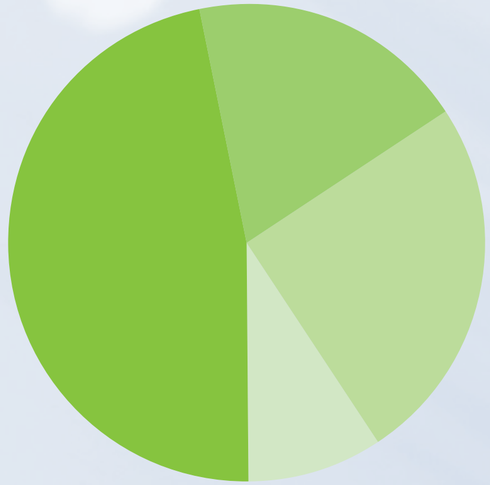
FACTS AND FIGURES

OPERATING BUDGET

20.6 million euros



5.2 million euros

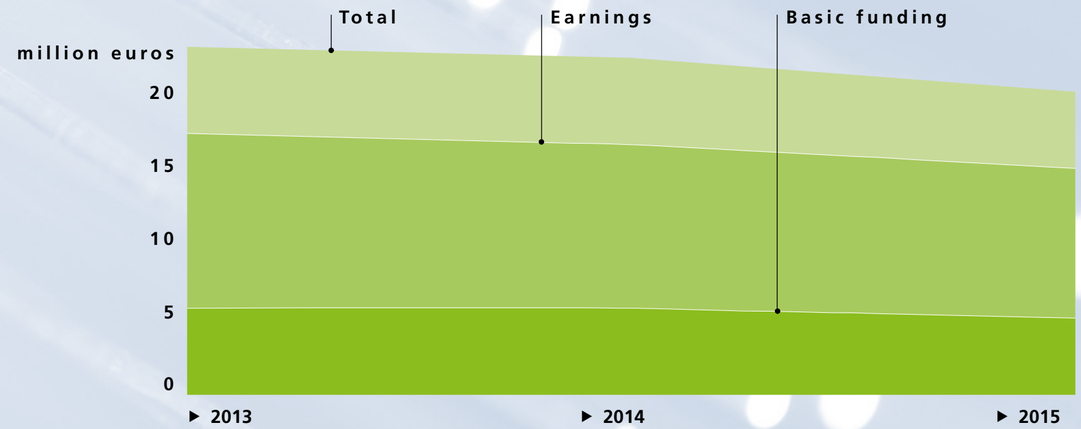
Basic funding

15.4 million euros

Earnings

▶ Public sector national	7.24
▶ Industry	3.84
▶ EU	2.92
▶ Other R&D, research promotion	1.35

DEVELOPMENT OF TURNOVER



NUMBER OF STAFF

Total 233

Scientists 166

Non-scientists 67

INFORMATION SECURITY AND DATA PROTECTION FOR THE “SMART” AGE

In the context of the research priority “information security”, Fraunhofer Institute for Systems and Innovation Research ISI addresses the security of critical IT infrastructures, investigates societal impacts of surveillance and security technologies and carries out privacy impact assessments. In 2015, studies and position papers were written which focused on the topics of privacy and data protection.

Everyday life for many people is increasingly shaped by communication devices which are connected with other devices, service providers and manufacturers in the “Internet of things”. The users are often not aware that, for example, smart TVs or smart watches collect personal data and why. In addition, the increasing complexity of the technology makes it more difficult to protect personal data from unwanted access and disclosure to third parties.

IN THE CONTEXT OF WIDESPREAD SMART TECHNOLOGIES, THE FRAUNHOFER ISI EXAMINES THE CHANGED FRAMEWORK CONDITIONS FOR PRIVACY AND DATA PROTECTION

Smart technologies confront data protection with different challenges

In the context of widespread “intelligent” technologies, Fraunhofer ISI investigates the changing framework conditions for privacy and data protection. In its White Paper “Das versteckte Internet” (The hidden Internet), the research alliance “Forum Privatheit”, funded by the Federal Ministry of Education and Research (BMBF) and coordinated by Fraunhofer ISI, deals with the risks of using smart devices. It has become apparent that many smart TVs collect user and behavior data when watching television and allow personal identification through photo, audio and video recognition. This is similar for networked cars, smart glasses or fitness bracelets. The White Paper also proposes solutions to increase data protection. It is, for instance, recommended that in future networked devices and applications should have privacy-friendly default settings (Privacy by Default) and that users are made aware of possible data transfers through labels or warnings.

The disclosure of data collection is also important as users often reject this practice as soon as they find out about it. A study “PRIvacy and Security MirrorS” (PRISMS in short), which was led by Fraunhofer ISI and conducted in cooperation with eight research partners, investigated the attitude of European citizens towards security-oriented surveillance technologies. The survey of 27,000 people showed that they are highly skeptical of the commercial use of personal data. For example, 70 percent of the respondents rejected personalized Internet advertisements which are based on their previous surfing behavior. 78 percent also said they wanted to do what they wanted on the Internet without companies monitoring online behavior – although 68 percent fear that companies already have information about their customers’ online activities.

THE FRAUNHOFER ISI‘S SURVEY OF 27,000 PEOPLE REVEALS HOW SKEPTICAL THEY ARE ABOUT THE COMMERCIAL USE OF PERSONAL DATA.

“Do-it-yourself privacy protection” cannot replace the government’s obligation to protect from surveillance

Users can protect themselves from possible dangers by encrypting data and communication or using anonymization tools when surfing the Internet. As another White Paper by the Forum Privacy coordinated by Fraunhofer ISI points out, “do-it-yourself privacy protection” cannot under any circumstances replace the government’s obligation to protect citizens, but only complement it. Therefore, the government has to increase its efforts to protect its citizens against unreasonable levels of surveillance. Informational privacy is not a question of individual preference but is essential for a liberal, democratic community.

INTEGRATED CONCEPT FOR A SUCCESSFUL ENERGY TRANSITION IN GERMANY

An integrated concept is needed to successfully manage the energy transition (Energiewende) in Germany: ecological and technological aspects have to be taken into account as much as economic and social factors. To guarantee social participation, the general public should be involved alongside the actors from government and industry. In 2015, the Fraunhofer ISI conducted a variety of studies on important components of the Energiewende.

FOLLOWING THE PHASE OF TECHNOLOGY DEVELOPMENT, THE FOCUS IS NOW ON INTEGRATING RENEWABLE ENERGY SOURCES INTO EXISTING SYSTEMS AND MARKETS.

Renewable energy sources play a crucial role in reducing greenhouse gas emissions and decarbonizing the energy system. Following the phase of technology development, the focus is now on integrating them into existing systems and markets. An effective Renewable Energy Sources Act (EEG) is critical for their successful integration. The Fraunhofer ISI and its project partners worked on proposals for how to reform the EEG in the "Think-tank Renewable Energies (Zukunftswerkstatt Erneuerbare Energien)".

The most important result was that each support instrument consists of several elements that can be freely combined, and matching and coordinating them is essential for support to be effective and efficient. These elements are: first, how support payments are made; second, how the amount of support is determined; third, the level of technology specification; fourth, how locations are differentiated; and fifth, the type or presence of quantity control or a cap on deployment.

Energy efficiency and renewable energy sources are closely connected

The efficient implementation of the Energiewende depends on dovetailing energy efficiency and renewable energy sources. The project "Mapping EU heat supply", for example, reveals an important correlation of energy efficiency and renewable energy: Half of the EU's final energy consumption is used for heating and cooling, but the share of renewable energy here is still marginal. It only covers 18 percent of primary energy consumption, while natural gas has a share of about 45 percent.

The EU Commission included this balance into the proposed heating and cooling strategy that is intended to lower the EU's dependency on natural gas: Among other things, Member States are required to consistently promote energy-efficient heating and cooling. In addition, the Commission plans to revise its directives for energy efficiency, renewable energies and buildings so that they contain more elements of renewable heating and cooling. Last, but not least, Member States should involve associations to a greater extent to better inform their citizens.

Communication and participation strategies

Informing citizens also plays a decisive role in projects concerning the acceptance of the Energiewende – especially when this is about the fair distribution of costs and burdens in infrastructure projects. In the "WISE Power" project, for example, strategies were developed to include all the stakeholder groups: It is important to analyze the specific location in detail and to construct the participation and communication strategy on this basis. Possible methods of information include written notifications, on-site meetings, debates and a hotline. Involving all the stakeholders at an early stage can resolve conflicts of interest in advance and increase planning security: This minimizes the risk of projects being delayed or cancelled.

INVOLVING ALL THE STAKEHOLDERS AT AN EARLY STAGE OF INFRASTRUCTURE PROJECTS CAN RESOLVE CONFLICTS OF INTEREST IN ADVANCE AND INCREASE PLANNING SECURITY.

This is important not only for the individual construction project, but for the overall system: Accelerated infrastructure expansion is essential for the Energiewende to succeed. Alongside expansion, this will also involve restructuring and transformation: The energy system of the future will be more integrated, more intelligent, more efficient and more flexible than the one we know today.

December

25–26 November 2015
The "Urban Futures" congress takes place in Berlin as part of the Fraunhofer Gesellschaft's "Morgenstadt - City of the Future Initiative". The Fraunhofer ISI presents results on how infrastructure systems change under changing framework conditions.

26–27 November 2015
The research association "Forum Privacy and self-determined life in the digital world" hosts the interdisciplinary conference on "The Future of Informational Self-Determination" in Berlin.

21 December 2015
The "Innovation Indicator 2015" developed by the Fraunhofer ISI together with the ZEW shows that Germany is shortening the gap to Switzerland, which is still the leader in international innovation competition, while France and China are falling behind.

22 December 2015
The Fraunhofer ISI publishes nine comprehensive roadmaps that describe the state of the research and development of lithium-ion batteries for the first time. These include estimations up to 2030 and long-term scenarios up to 2050.

November

7 November 2015
Marion Weissenberger-Eibl gives a lecture "Digitalization, sustainability and society – a triad?!" at the symposium "Digitalization – Global! Sustainable?" of the German Federal Environmental Foundation and the Council of Environmental Prizewinners in Essen.

October

14–16 October 2015
The Tenth International Conference on Regional Innovation Policies takes place in Strasbourg and Karlsruhe. This is organized by Fraunhofer ISI together with the Chair of Economic Policy at the Karlsruhe Institute of Technology and BETA Strasbourg and is geared towards researchers, practitioners and policy-makers.

July

2 July 2015
The first Foresight Film Festival is held in Halle (Saale). The Fraunhofer ISI provides the scientific monitoring and contributes its expertise in foresight research.

September

21 September 2015
At the symposium "Green change: renewable energies, policy mix and innovation", results from the GRETCHEN project show that a consistent and credible policy mix is decisive for the rapid progress made in renewable power generation technologies over the past decades.

29 September 2015
Around 200 participants share their experiences and perspectives at the annual conference of the Learning Energy Efficiency Networks in Berlin. In addition, six LEEN networks that had been set up over the previous twelve months are presented with an award.

June

17–18 June 2015
The Innovation Cluster Regional Eco Mobility 2030 (REM2030) takes a systemic perspective of mobility at the symposium "Urban mobility of the future" in Karlsruhe. It is demonstrated how future mobility can be more effective and more sustainable at the same time.

21 May and 15 June 2015
The Fraunhofer ISI, Siemens AG and the Chair of Innovation and Technology Management at the Karlsruhe Institute of Technology (KIT) host a series of lectures "Focus: Future. Our lives in 2050". On 21 May, all the topics revolve around "Future visions 2050", while on 15 June, the focus is on "Energy in the future".

May

January

19–20 January 2015
The Second International German Forum takes place at the Federal Chancellery. Together with Mikko Kosonen, Marion Weissenberger-Eibl, Head of the Fraunhofer ISI, hosts the discussions in the thematic group "The future needs integrated solutions".

March

26 March 2015
The first meeting of the Alliance Industry 4.0 Baden-Wuerttemberg takes place in Stuttgart. The Fraunhofer ISI is one of the founding members of this Alliance, which wants to make Baden-Wuerttemberg a leading location for Industry 4.0.

April

29–30 April 2015
At the 3rd Fraunhofer Energy Days taking place in Berlin under the heading "Energiewende in Germany's industry", Harald Bradke, Head of the CC Energy Technology and Energy Systems, presents key findings from research on energy efficiency in industry.

INTERDISCIPLINARY WORK FOR A SYSTEMIC PERSPECTIVE

On the following pages you will find an overview of the Competence Centers (CC) of Fraunhofer ISI. Each CC has its specific focus; however, the scientific work at Fraunhofer ISI is characterized by close interdisciplinary collaboration. Only then is it possible to look at complex issues in a systemic way and find holistic answers.

Each project presented is an example for the successful project work of the respective CC in the past year. In addition to the selected project, you have the opportunity to go through all the other projects of the CC. Detailed information can be found in the appendix and on our website.

Fraunhofer ISI comprises six Competence Centers with a total of 22 business units:

The CC Energy Policy and Energy Markets examines how the political and institutional framework of sustainable energy systems can be designed, further developed and evaluated. The work is structured into the four Business Units: Renewable Energies, Energy Policy, Climate Policy as well as Electricity Markets and Infrastructures.

The CC Energy Technology and Energy Systems analyzes innovative energy technologies and their contribution to a sustainable energy system from a strategic perspective. It includes the Business Units Energy Efficiency, Energy Economy, Demand Analyses and Projections as well as Demand Response and Smart Grids.

The CC Foresight develops methods to identify and analyze long-term developments in society, industry and technology. It is comprised of the Business Units Future Alternatives and Society, Futures Thinking and Dialogs, and Foresight for Strategy Development.

The CC Sustainability and Infrastructure Systems analyzes the pre-conditions and opportunities to reduce emissions, improve resource efficiency and the sustainability of infrastructure systems. It contains the Business Units Water Resources Management, Mobility, Systemic Risks as well as Sustainability Innovation and Policy.

The CC Emerging Technologies analyzes the potentials, effects and design conditions for new technologies and develops options for action. It comprises the Business Units Bioeconomy and Life Sciences, Innovations in the Health System as well as Information and Communication Technology.

The CC Policy – Industry – Innovation explores the functionalities and the changes in research and innovation systems. It consists of the Business Units Policy Design and Evaluation, Industrial Innovation Strategies, Regional Innovation Systems and Innovation Indicators.

Until the middle of 2015 the CC Industrial and Service Innovations was also part of the institute. In the course of reorganising the institute it was linked closer to other research areas. Fraunhofer ISI used personnel changes to incorporate the CC and its staff into the six competence centers. This achieved and ensured the topic-specific integration of the competences around the research area Industry and Service Innovations so that it remains an important element in the profile of Fraunhofer ISI.

CC ENERGY POLICY AND ENERGY MARKETS

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BUSINESS UNITS

- **Renewable energies**
- **Energy policy**
- **Climate policy**
- **Electricity markets and infrastructures**

LONG-TERM SCENARIOS AND STRATEGIES TO EXPAND RENEWABLE ENERGY

In this project, the Fraunhofer ISI and its research partners are developing the scientific basis for a long-term model of the climate and energy policy transformation process for the German Federal Ministry of Economics. The first results will be published in 2016. The objective is to supply impulses and inputs to policy initiatives and measures using detailed, model-based future scenarios and analyses.

Germany's energy system is undergoing far-reaching radical changes. The global efforts to limit climate change and the merging of European and global energy markets are two important higher-level drivers of this transformation. In this context, Germany has set itself ambitious energy and climate policy goals: lowering greenhouse gases and energy consumption, increasing energy efficiency, phasing out nuclear energy and expanding the use of renewable energy sources. The transformation process has to be economical and environmental and must ensure the security of energy supply.

Increasing renewable power generation requires a more systemic overall view of electricity markets and networks

Expanding renewable energy sources plays a key role in this transformation. Renewable sources will have to cover an ever larger share of energy demand regardless of whether this is used for electricity generation, transport or heating. Organizing this transformation efficiently is a huge challenge due to the many varied technical interactions and changing framework conditions. It is already apparent today in the electricity sector, for instance, that growing shares of renewable energy sources mean that the requirements for market and system integration will become more important, as will the interaction with conventional power stations and grids. It is necessary to take a systemic view of the potentials for balancing and flexibility beyond the sector's borders in order to ensure the integration of increasing shares of renewables (see the project text of the Competence Center Energy Technology and Energy Systems on this specific issue). For example, load shifting potentials in heat pumps or charging the batteries in electric vehicles could help to balance fluctuations in the amount of renewable power being fed into the grid.

In the project, this systemic view is taken by coupling several dynamic energy systems and grid models. There is a stronger focus on the economic aspects than is the case in the majority of long-term studies conducted so far. Several cost-efficient pathways are developed that take into account Germany's energy and climate policy goals. Each of these scenarios highlights different aspects that must be understood in order to develop robust strategies. The scenarios provide important insights into the most pressing questions of the Energiewende: How important is grid expansion for the Energiewende to succeed? What role does sector coupling play? Should wind farms be constructed close to the load centers in the South or at wind-rich locations in the North? Where does it make the most sense to use biomass? And last, but not least: How much will the Energiewende cost?

The scenarios are accompanied by an overarching economic and ecological analysis. This enables recommendations to be given for strategies and measures to restructure the energy supply system in a climate-friendly way.

OTHER PROJECTS

- DIA-CORE: Policy DIAlogue on the assessment and COnvergence of RES policy in EU Member States
  Inga Boie
- BRISKEE: Behavioural Response to Investment Risks in Energy Efficiency
  Sibylle Braungardt
- Evaluation Lateinamerika: Qualitätsinfrastruktur für Energieeffizienz und Erneuerbare Energien in Lateinamerika und der Karibik
  Sibylle Braungardt
- Klimaszenario 2050: Klimaschutzszenarios 2050
  Sibylle Braungardt
- Energiewende: Makroökonomische Wirkungen und Verteilungsfragen der Energiewende
  Barbara Breitschopf
- EnerNor: Electricity Costs of the Aluminium Industry in Norway – in comparison to industries in selected countries
  Barbara Breitschopf
- EnPriC: Analysis of energy prices and costs in the EU, its Member States and major trading partners
  Barbara Breitschopf
- Strompreiswirkung: Überprüfung der aktuellen Ausnahmeregelungen für die Industrie im Bereich des EEG im Hinblick auf Treffsicherheit und Konsistenz mit anderen Ausnahmeregelungen im Energiebereich unter besonderer Berücksichtigung der internationalen Wettbe-

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BUSINESS UNITS

- **Energy efficiency**
- **Energy economy**
- **Demand analyses and projections**
- **Demand response and smart grids**

SECTOR COUPLING OPTIONS: DECARBONIZATION AND MORE FLEXIBLE ELECTRICITY DEMAND

Together with its research partners, the Fraunhofer ISI started the project "Integration of renewable energy sources by coupling sectors" (Sub-project 1: "Efficient design of sector coupling" and Sub-project 2: "Analysis of technical sector coupling options") at the beginning of 2015 on behalf of the Federal Environment Agency.

Sector coupling or so called "power to X" measures aim to accelerate the decarbonization of the energy system or the substitution of fossil fuel by using electricity from renewable energy sources. Another goal is to increase the flexibility of electricity demand by improving the system integration of fluctuating renewable energy sources. Power to X measures include all the new sector coupling options on the power side – in other words, technologies that link the electricity sector with applications in households, the tertiary sector, industry and transport. New applications are understood to be those in which electricity was not previously used, or was hardly used (such as electric mobility for private passenger transport), or the much greater use of electricity in familiar applications that is usually accompanied by product, process or organizational innovations (such as electric steel).

Electric mobility, heat pumps and electric steel can make major contributions to reducing greenhouse gases

The project results obtained so far show that power to X measures may contribute to achieving climate policy targets by substituting renewable energy sources for fossil ones in all fields of application. Electric mobility and electric steel have particularly high potentials to reduce greenhouse gases (GHG) in the short to medium term that can be tapped primarily via the higher energy efficiency of power to X applications. Heat pumps, in contrast, have a positive effect on the carbon footprint by utilizing ambient heat. In the longer term, hybrid HGVs powered by overhead cables could play a significant role, although the data here are still relatively poor at the moment. There are also high potentials in industry in the medium and longer term (in methanol, ammoniac and refineries), but these are still far from being economically viable under current framework conditions.

To reduce greenhouse gases, it is important that exclusively or predominantly renewable electricity is used. Early market entry is necessary due to the market growth rates that can be achieved with power to X applications. Associated with this is the necessary additional deployment of renewable energy sources. For cost and acceptance reasons, power to X options with high efficiency and correspondingly high GHG abatement potentials should be integrated at the beginning of the transformation process.

Sector coupling options offer considerable flexibility to better integrate renewables

Furthermore, increasing the level of flexibility in the energy system is hugely important, especially with a view to electricity demand, although the individual options vary greatly in what they can contribute here. Electric mobility and electric boilers in heating networks have particularly high potentials. It can therefore be assumed – under optimistic conditions and across all measures – that by 2030 the flexibility potentials of sector coupling options could exceed the flexibility offered by the pumped-storage power plants currently installed in Germany. Power to X options can make a valuable contribution to integrating renewable energy in the system, especially to balancing hourly to daily fluctuations.

OTHER PROJECTS

- Doosan Heavy Industries: Evaluation of technological structure of cement plant sites and market conditions for Waste Heat Recovery technology in the cement industry
  Ali Aydemir
- UK Lastspitzen: Modellierung der Auswirkungen von Energieeffizienzinstrumenten auf die Stromnachfrage und die Entwicklung der Lastspitzen im britischen Strommarkt
  Tobias Boßmann
- LEEN100plus: Lernende Energieeffizienz-Netzwerke – Anschub auf dem Weg zu 100 und mehr Netzwerken
  Harald Bradke
- HYACINTH: HYdrogen ACceptance IN the Transition pHase
  Elisabeth Dütschke
- Strategien zum Marktausbau der Elektromobilität in Baden-Württemberg – Elektromoblität im LivingLab BW mobil
  Elisabeth Dütschke
- Nutzerperspektive in der Kaufentscheidung: Analyse von Einflussfaktoren jenseits von Wirtschaftlichkeitsbetrachtungen und ihre Wirkung auf Potentiale für Elektromobilität
  Elisabeth Dütschke
- WISE Power – Fostering social acceptance for wind power
  Elisabeth Dütschke
- Mittelfristprognose ÜNB: Mittel-

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BUSINESS UNITS

- **Future alternatives and society**
- **Futures thinking and dialogs**
- **Foresight for strategy development**

CIMULACT – VISIONS FOR DESIRABLE SUSTAINABLE FUTURES

The acronym CIMULACT stands for Citizen and multi-actor consultations on the research program "Horizon 2020" of the European Union. The project has been planned for three years and is funded by the European Commission. It started in June 2015.

In the course of the project, visions and scenarios are developed which connect societal needs and scientific progress. Specific recommendations and new topics are derived from these which will then be fed into the research program "Horizon 2020" of the European Commission. In order to achieve these objectives and to design the agenda for research and innovation in Europe responsibly and with relevance for society, CIMULACT involves citizens as well as other actors in a broad discursive process: More than 1,000 citizens in 30 European countries have formulated visions of desirable futures and, together with scientists from different research areas, have developed them further. Eventually, recommendations for research and innovation policies will be developed from the results.

The capacity for broad participation processes in research and innovation is set up by experimenting with different approaches as well as assessment and training. The broad involvement of civilians facilitates a dialog and a common understanding between politicians, citizens and stakeholders. In addition, this identifies the value added of citizens' participation in research and innovation.

Creative workshop with citizens of Karlsruhe

The project started by carrying out citizens' workshops in 30 countries. In Germany, this workshop was conducted by Fraunhofer ISI on 28 November 2015 in Karlsruhe. When selecting the 40 participants, great care was taken to have as much diversity as possible. Younger and older people as well as men and women with different levels of education were invited. Explicitly not invited were experts with specific knowledge of the European Commission's research agenda.

Six very different visions or desirable expectations of the future emerged in a creative process accompanied by a team of seven scientists from Fraunhofer ISI.

Important issues for the future: housing, working conditions, mobility, education

The visions of the German citizens' workshop describe desirable housing conditions which promote the exchange between generations. Other issues which were important to the participants were working conditions, mobility in an ideal future, a sustainable circular economy and new forms of education which also contribute to the cohesion of society. These visions were always developed jointly by six citizens and finally illustrated in a collage.

In 2016, a total of 180 visions from 30 countries will be combined in an expert workshop and processed in such a way that the societal needs of citizens can be translated into a research agenda . Formulating the research agenda is then done in discussion with the scientists and citizen representatives from the participating countries.

More information on the project CIMULACT can be found at www.cimulact.eu.

OTHER PROJECTS

- GIZ-Delphi: Methodische Beratung bei der Vorbereitung und Umsetzung einer Delphi-Studie zum Thema Energiezukunft Deutschlands in 2040 im globalen Kontext
Kerstin Cuhls

- Horizon Scan: Models of Horizon Scanning – How to integrate Horizon Scanning in EU Research and Innovation Policy
Kerstin Cuhls

- SCHRUMPF: Vergleichende Analyse von Maßnahmen gegen die Folgen des demografischen Wandels – schrumpfende Gesellschaften im Vergleich
Kerstin Cuhls

- Delphi Bioökonomie: Internationale Delphi-Studie zu Leuchtturmprojekten der Bioökonomie
Kerstin Cuhls

- Wissenschaftliche Begleitung eines Foresight-Prozesses der Zukunftsinitiative Rheinland-Pfalz
Kerstin Cuhls

- Foresight im Bereich Embedded Systems für eine Forschungsallianz
Ewa Dönitz

- CoWerk: Stakeholder-Dialoge zu Commons-based Peer Production in offenen Werkstätten
Lorenz Erdmann

- INNOLAB: LivingLabs in Green Economy: realweltliche Innovationsräume für Nutzerintegration und Nachhaltig-

HEAD

Dr. Christoph Zanker
until May 2015

BUSINESS UNITS

- **Industrial Innovation strategies and systems**
- **Innovative production systems and value chains**
- **Industrial services**

CONTACT

from June 2015

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“GERMAN MANUFACTURING SURVEY” – A COMPANY SURVEY ON THE GERMAN MANUFACTURING INDUSTRY

In order to research issues related to industry and production, Fraunhofer ISI again conducted the *German Manufacturing Survey* in 2015. All over Germany, companies of the manufacturing industry were asked about current issues such as Industry 4.0, resource efficiency, location and relocation or their innovation activities, production structures, and approaches to competence development for production employees. Key results of the analyses are regularly edited for industry in a bulletin on the *German Manufacturing Survey*. The first bulletin based on the new survey was dedicated to the issue Industry 4.0 and the question how companies are currently preparing for future changes. Fraunhofer ISI also produces contract studies for federal and state ministries as well as associations, which are based on the results of the survey.

Fraunhofer ISI has conducted the *German Manufacturing Survey* every three years since 1993 and focuses on the topic of industrial value added processes and innovation in production. It is the broadest record of modernization trends in the manufacturing industry. The survey addresses companies of the manufacturing industry in Germany and has covered all sectors of the manufacturing industry since 2006. On the basis of a representative random sample, the regular response rate is between 1,300 and 1,600 companies.

Industry benchmark for companies: reliable comparison with tailor-made reference groups

Fraunhofer ISI has established a benchmarking service for industry based on the *German Manufacturing Survey*. For over 10 years, companies have been able to use the online portal www.industriebenchmarking.eu to compare themselves to a customized reference group on different current issues.

Based on the data from 2015, a new benchmark module is put online. The so called Readiness-I4.0 Module gives companies of the manufacturing industry the opportunity to compare themselves on the topic of Industry 4.0 to a relevant group of companies. The results can help companies to identify untapped potentials in the course of the fourth industrial revolution, to reliably investigate their capability and readiness to actually implement digital technologies and possibly introduce improvement measures for further progress.

International network and the European version “European Manufacturing Survey EMS”

Another unique feature of the *German Manufacturing Survey* is the cooperation in the consortium of the *European Manufacturing Survey* (EMS). EMS is a network of leading universities and research institutions in Europe, which addresses the issues of innovation and industrial value added. It currently includes partners from 17 countries. The EMS network has existed since 2001 and conducts the company survey of the same name, *European Manufacturing Survey*. The data basis, which is collected at the same time in different countries, regularly includes data from more than 3,500 companies.

This unique company survey facilitates reliable country comparisons on current issues of European industry. Fraunhofer ISI coordinates this network and makes use of the *European Manufacturing Survey* EMS for international research projects and together with its research partners produces contract studies for the European Union.

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BUSINESS UNITS

- **Water resources management**
- **Sustainability innovation and policy**
- **Systemic risks**
- **Mobility**

BASIS FOR A NATIONAL STRATEGY TO REDUCE MICRO-POLLUTANTS IN WATER

Micropollutants are contaminating our water bodies. Reducing this type of pollution has been an important objective of the water industry for many years. The municipal wastewater system is the dominant emission pathway for many micropollutants that originate from applications such as household chemicals, pharmaceuticals, or biocides.

Key results concerning the effectiveness and cost efficiency of product-based and end-of-pipe measures to reduce the discharge of micropollutants to water have been available since October 2015. They can be used as the basis to construct a national strategy to tackle this problem. The Fraunhofer ISI presented the relevant results on this topic to an expert audience at a workshop held at the German Federal Press Office.

Effective and efficient emission reduction measures

At European level, the EU Water Framework Directive states that specific measures have to be implemented to combat water pollution due to individual pollutants or groups of pollutants that exceed defined environmental quality standards for 45 priority substances or substance groups. Further substance-related standards were summarized for Germany in 2011 in the Ordinance on the Protection of Surface Waters (OGewV). Concrete reduction measures have to be taken if existing or future standards are exceeded. The special focus here is on evaluating the effectiveness and (cost) efficiency of reducing pollutant emissions to waters. Methodologically, evaluating the emission reduction options is based on analyzing substance flows and modeling substance emissions. The results of the substance flow analyses and emission balances show that the micropollutant emissions that are relevant for water come from very different applications and sectors, many of them via municipal wastewater systems.

A broader, comprehensive approach is necessary when compiling combinations of relevant measures that is able to take other objectives into account, such as the polluter-pays principle and the principle of pollution prevention, and that can consider steps that have already been introduced. The different possible measures not only cover very diverse fields of policy and activity, but also different emission sources and pathways. They include both source-based and end-of-pipe approaches.

Need for a comprehensive strategy

The analyses show that the quality objectives for the large variety of micropollutants can only be achieved by combining source-based, decentralized and end-of-pipe emission reduction measures. The different application and emission patterns require adapted approaches that include substance substitution, for instance, product modifications, changes in applications and use, or accompanying information. On the other hand, advanced wastewater treatment (4th stage of purification) in relevant municipal sewage treatment plants has also proven very effective as an end-of-pipe measure for a large number of pollutants.

This highlights the need for a comprehensive overall strategy involving all the relevant actors. Other components of such a comprehensive strategy include classifying and communicating risks as well as an accompanying monitoring program that serves to illustrate the achieved improvements and to adapt the implemented measures where necessary.

Further information on the project "The effectiveness and cost efficiency of product-based and end-of-pipe measures to reduce the discharge of micropollutants to water" is available on our website.

OTHER PROJECTS

- LivingRAIL: Vision for Living Environments and Railways until 2050
  Claus Doll
- Entwicklung Güterverkehr: Anforderungen und Rahmenbedingungen für eine zukunftsorientierte Entwicklung des Güterverkehrs – eine systematische Analyse auf Grundlage eines Ländervergleichs
  Claus Doll
- TRIP-Portal: Continuation of the Transport Research and Innovation Portal (TRIP)
  Claus Doll
- UBA-Methodenkonvention 3.0: Weiterentwicklung und Erweiterung der Methodenkonvention zur Schätzung von Umweltkosten
  Claus Doll
- TEN-T-Rail: The Results and efficiency of railway infrastructure financing within the EU
  Claus Doll
- LowCarb RFC: Klimafreundlicher Güterverkehr in Europa
  Claus Doll
- RohPolRess: Entwicklung von Politikempfehlungen für die Weiterentwicklung und Ausgestaltung von strategischen Ansätzen einer nachhaltigen und effizienten Rohstoffgewinnung und -nutzung
  Carsten Gandenberger
- Umweltinnovationen: Umweltinnova-

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BUSINESS UNITS

- **Bioeconomy and life sciences**
- **Innovations in the health system**
- **Information and communication technologies**

LITHIUM-ION BATTERIES – KEY ENABLING TECHNOLOGY FOR SUSTAINABLE MOBILITY AND ENERGY

In nine roadmaps focusing on electrochemical energy storage technologies – most of which were published in 2015 - the Fraunhofer ISI shows under which conditions and time horizon the vision of fully electrified, zero-emission road transport can be realized. This is closely related to the expansion of renewable energy sources and energy, economic and environmental policy objectives. The development of an optimized lithium-ion battery is decisive for when this will take place.

Lithium-ion batteries have already been through 25 years of development in consumer electronics. At present, further development efforts are focused on large format batteries from the materials up to the overall system, as well as their integration in specific applications. Lithium-ion batteries will reach maturity in the next 15 to 25 years. This means there are high development potentials for the next two decades, especially with regard to energy density and continued large cost reductions.

Better battery technology and optimized energy consumption

The roadmaps show that cost-optimized electric vehicles will only be attractive to specific target groups and applications in the next few years. By gradually increasing the driving range using improved battery technology and optimized energy consumption, however, it should be possible to develop cost-optimized vehicle models by 2030 that achieve the ranges of conventionally-powered cars and can be recharged very quickly. From a technical viewpoint, therefore, the complete switchover to purely electrified mobility could be managed between 2030 and 2050 following a market launch by 2030 – solely on the base of optimized lithium-ion batteries.

Cost optimization and the parallel expansion of renewable energy sources mean that wider market potentials for using lithium-ion batteries will open up in new fields of stationary applications from 2030 at the latest. Their use and diffusion is already beginning to take off today at the level of local and distribution networks driven by an increasing demand for energy self-sufficiency. Decentralized, grid-connected lithium-ion batteries are already being used in private homes today as photovoltaic battery systems to optimize private energy demand and are diffusing as their economic efficiency improves.

Substitution possibilities for (cost) critical raw materials

In the long term, besides lithium-ion batteries, other potentially disruptive technologies like lithium-sulfur, solid state or metal-air batteries might achieve even better energy densities and greater ranges or cost reductions. Their large-scale production will probably only be successful after 2030, but subsequently such post-lithium-ion batteries could successively replace lithium-ion batteries. This would also open up substitution possibilities for (cost) critical raw materials like cobalt, for example, which are used in optimized lithium-ion batteries.

The publication of the roadmaps completes the road mapping process begun in 2010 within the Innovation Alliance LIB 2015 that is funded by the German Federal Ministry of Education and Research. Numerous national experts from science and industry worked together in this process, researching the development potentials of lithium-ion batteries both as competing technologies and as energy storage systems for electric mobility and stationary applications. More information is available on our website.

OTHER PROJECTS

- EuDEco: Modelling the European Data Economy
  Daniel Bachlechner
- Big Data in der Cloud (TA-Vorstudie)
  Daniel Bachlechner
- Securing Intelligent Transportation Systems in Smart Cities
  Daniel Bachlechner
- IT-Sicherheit für die Industrie 4.0
  Daniel Bachlechner
- FET Traces: Evaluation of the impacts of the research programme FET Open
  Bernd Beckert
- EU-Software_2: The economic and social impact of software and services on competitiveness and innovation
  Bernd Beckert
- WISKOS: Wirtschaftsspionage und Konkurrenzausspähung in Deutschland und Europa
  Esther Bollhöfer
- SecurePLUGandWORK: Intelligente Inbetriebnahme von verketteten Maschinen und Anlagen
  Esther Bollhöfer
- RockEU: Robotics Coordination Action for Europe
  Annette Braun
- WB-NAPSE: Wissenschaftliche Begleitforschung des nationalen Aktionsplans für Menschen mit seltenen

HEAD

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BUSINESS UNITS

- Policy design and evaluation
- Industrial innovation
- Regional innovation systems
- Innovation indicators

RESEARCH CAMPUS – DEVELOPING COOPERATIONS BETWEEN SCIENCE AND INDUSTRY

An important project of the year 2015 was the accompanying research on the "research campus". The German research and innovation system is characterized by a multitude of organizations which are engaged in research and development and therefore are a major influence on the German innovation performance. Another of Germany's strengths is the close interaction between industry and science. Recently, this has also referred to strategically-oriented basic research with a time frame of five or more years. Many forms of cooperation between science and industry which were created in this context are organized as public-private partnerships.

Research campus as a new element in the German innovation system

The funding initiative "Research campus – partnership for innovation", launched by the Federal Ministry of Education and Research in 2011, begins with these developments. The objective is to support the cooperation between partners from science and industry by combining resources in order to develop new research areas with a medium to long-term perspective in the form of public-private partnerships. These are based on the campus of a university or research institute.

Together with the choice of ten (now nine) research campuses, the joint application by Fraunhofer ISI and VDI/VDE-IT GmbH for four years of accompanying research "Research campus – pro active" was chosen by a high ranking jury in the summer of 2012. Different thematic aspects of the cooperation between science and industry are scientifically analyzed and made available to the research campuses through workshops and publications. More information can be found on the website of the VDI/VDE-IT GmbH.

International benchmarking as a focus of accompanying research

One priority of the accompanying research in 2015 was the analysis of international models and programs of research cooperations between science and industry on a longer term basis. The focus here was on the US-American Industry/University Cooperative Research Centers, the Swedish VINN Excellence Centers, the Austrian COMET Centers and the Australian Cooperative Research Centres. This demonstrated that the programs start at the interfaces between science and industry. The programs' organization is country-specific and therefore they can only be compared to each other to a certain extent. However, it also became apparent that there are similarities, i.e. contractual arrangements, the joint definition of the research program as well as scientific education and qualifications. There are differences regarding the campus principle. While the COMET program in Austria and the program of the VINN Excellence Centers in Sweden as well as the German research campus put the focus of the cooperation on the geographical proximity of the partners, the Australian Cooperative Research Centres, not least due to the size of the country, are often organized as a country-wide or even national network. More information can be found in the working paper.

The trust the partners put into the well-developed culture of collaboration due to previous experiences of cooperation turned out to be a strength of the "research campus" even during the start-up phase. The regulations regarding confidentiality and the exploitation of results are also an important basis for maintaining the character of open innovation in the "research campus", even as research is becoming increasingly more substantiated.

OTHER PROJECTS

- ERP-Policy: Research and innovation policy analysis: provision of policy briefs and preparation of workshops
  Susanne Bührer
- MFT_Druckbericht: Erstellung eines Druckberichtes auf Basis der Daten der aktualisierten Fassung der Landkarte Hochschulmedizin (2009–2012)
  Susanne Bührer
- Evalu_Diskursprojekte: Evaluation des Förderinstruments Diskursprojekte zu ethischen, rechtlichen und sozialen Fragen in den modernen Lebenswissenschaften
  Susanne Bührer
- MoRRI: Monitoring the evolution and benefits of Responsible Research and Innovation
  Susanne Bührer
- SILQUA-FH: Evaluation der Förderlinie – Soziale Innovationen für Lebensqualität im Alter – SILQUA-FH des Programms Forschung an Fachhochschulen des Bundesministeriums für Bildung und Forschung (BMBF)
  Susanne Bührer
- VERA: Forward Visions on the European Research Area
  Stephanie Daimer
- Res-AGorA-RTD – CC P: Governance frameworks for Responsible Research and Innovation (RRI)
  Stephanie Daimer
- EnArgus2.0 – Zentrales Informations-

SOCIO-TECHNICAL AND SOCIO-ECONOMIC RESEARCH COMPLEMENTS THE FRAUNHOFER GESELLSCHAFT'S GROUPS AND ALLIANCES

THE WIDESPREAD DIFFUSION OF INNOVATIONS PRESUPPOSES THEIR ACCEPTANCE BY USERS AND SOCIETY.

Whether technical innovations are successful or not is increasingly dependent on how they are embedded in non-technical innovations. These include new corporate processes and business models, for example, as well as organizational, regulatory and institutional innovations. In addition, for innovations to diffuse and be widely applied presupposes their acceptance by users and society, so that this aspect needs to be considered at a very early stage of their development.

As a scientific research institute with an interdisciplinary structure and a transdisciplinary manner of working, the Fraunhofer ISI takes a systems-oriented view of technology developments and society's needs and supports its clients in finding integrated solutions. It has a well-developed awareness of socio-technical and socio-economic problems and challenges. Because it considers the related framework conditions in its research, it ideally complements the more technical and natural science-oriented institutes of the Fraunhofer Gesellschaft and enjoys close ties to the expertise they offer by networking in various groups and alliances.

The Fraunhofer ISI is a member of two Fraunhofer groups:

- Materials and Components Group
- Group for Defense and Security (Guest)

We are also a member of six Fraunhofer Alliances:

- Batteries
- Big Data
- Energy
- Nanotechnology
- Water Systems Alliance (SysWasser)
- Transport

The close networks and cooperation with multiple Fraunhofer institutes give our clients from industry and policy-making access to unique innovation and technology development services that also take into account how these are embedded in society, the economy and politics.

In this context, the Fraunhofer ISI's outstanding characteristics are that its researchers consistently take a systems perspective, anchor technical results scientifically and help to turn them into practical applications. Its empirically-based understanding of the innovation system and multi-dimensional evaluation methods enable it to make integrated analyses of complex facts using economic, societal and ecological criteria.

The Fraunhofer ISI uses a broad range of technical and socio-economic research methods to prepare, accompany and diffuse technical and non-technical innovations: The researchers analyze technological, sectoral, regional and national innovation systems, provide the knowledge needed for orientation and decision-making, accompany systemic transformation processes and strategy processes, and develop organizational and service-oriented innovations and new business models. Other main areas of research include acceptance research, designing, organizing and chairing stakeholder processes, future dialogs and participatory methods, social-science research accompanying the development of new technologies and socio-technical foresight, technology forecasting, technology impact assessment and potential analyses.

The knowledge acquired from applying these methods enables the Fraunhofer ISI to offer political and industrial stakeholders strategic advice on the topic of innovation and to support the development and application of innovative technical and non-technical solutions. In this way, it contributes to meeting societal, ecological and economic challenges and to ensuring the future viability of the economy and society.

THE FRAUNHOFER ISI USES A WIDE RANGE OF SOCIO-TECHNICAL AND SOCIO-ECONOMIC RESEARCH TO PREPARE, ACCOMPANY AND DIFFUSE TECHNICAL AND NON-TECHNICAL INNOVATIONS.

ADVICE FROM SCIENCE, INDUSTRY, POLITICS AND ADMINISTRATION

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- Dieter Schweer (Member of the central management of the Federation of German Industries e.V., Berlin)
- Dr. Toni S. Seethaler (Head of Innovation Networks and Public Funding of R&D of Freudenberg & Co.KG, Weinheim)
- Dr. Manfred Wittenstein (Chairman of the board of Wittenstein AG and former president of the Association of German Machinery and Plant Manufacturers e. V., Igersheim)

Members from politics and administration

- Engelbert Beyer (Head of Department 11 "Innovation strategies" in the Federal Ministry of Education and Research, Berlin)
- Professor Beat Hotz-Hart (Member of the team science on ETH Board, Zurich)
- Michael Kleiner (Head of Department III "Research, Technology transfer, E-Science, International" at the Ministry of Science, Research and the Arts Baden-Wuerttemberg, Stuttgart)
- Dr. Peter Mendler (Head of Department 71 "Questions of Principle of Industrial and Technology Politics" and Deputy Head of Department 7 "Industry, Innovation and Technology Transfer" at the Ministry of Finance and Economy Baden-Wuerttemberg, Stuttgart)
- Krista Sager (former member of the German parliament, Berlin, board member until the end of 2015)

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ACADEMIC TEACHING

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University of Kassel

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Energiewirtschaftliche Aspekte der Energietechnik II
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Energy Efficiency – Demand side
HECTOR School of Engineering & Management
Karlsruhe Institute of Technology

DISSERTATIONS

David Biere
Modellgestützte Szenario-Analyse der langfristigen Erdgasnachfrageentwicklung der deutschen Industrie
Prof. Martin Wietschel
Karlsruhe Institute of Technology

Tobias Boßmann
The contribution of electricity consumers to peak shaving and the integration of renewable energy sources by means of demand response. A model-based long-term scenario analysis in consideration of structural changes in electricity demand
Prof. Martin Wietschel
Karlsruhe Institute of Technology

Rainer Elsland
Long-term energy demand in the German residential sector – Development of an integrated modelling concept to capture technological myopia
Prof. Martin Wietschel
Karlsruhe Institute of Technology

Till Gnann
Market diffusion of plug-in electric vehicles and their charging infrastructure
Prof. Martin Wietschel
Karlsruhe Institute of Technology

Stephan Grandt
Entwicklung eines Referenzvorgehensmodells zur multikriteriellen Bewertung innovativer Sicherheitstechniken
Prof. Frank Fiedrich
University of Wuppertal

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EXAMPLES

Daniel Bachlechner
Data reuse as a model for Europe
‣ Bled eConference, Bled, Slovenia

Towards self-sustaining data reuse in Europe
‣ BDVA Summit, Madrid, Spain

Towards a competitive and self-sustaining European data economy
‣ ICT 2015, Lisbon, Portugal

Bernd Beckert
Leitmotive für die Zukunft der urbanen Mobilität
‣ Workshop 24h Automobil, Innovationswerkstatt von Mercedes-Benz R&D, Böblingen

Hendrik Berghäuser
Vorstellung der Begleitenden Evaluierung der Fördermaßnahme "Validierung des Innovationspotenzials wissenschaftlicher Forschung – VIP"
‣ DEGEVAL-Sitzung, Speyer

Tobias Boßmann
Auswirkungen von Lastmanagement auf Kraftwerkseinsatz und -investitionen in Deutschland bis zum Jahr 2050
‣ 11. VDI-Fachtagung Optimierung in der Energiewirtschaft, Düsseldorf

Electric vehicles – Potentials for increasing system flexibility
‣ Forum on Flexibility Options in the Electricity and Heat Markets, Berlin

Unravelling load patterns of residential end-uses from smart meter data
‣ eceee Summer Study, Hyères, France

Harald Bradke
Effiziente Wege zur Reduktion des Energieverbrauchs
‣ Energiewende: Konsequenzen für den Industriestandort Deutschland? Gemeinsames Symposium SRU / ifo Institut, Berlin

Gesellschaftliche Megatrends und deren Bedeutung für die Energiewirtschaft
‣ BDEW-Strategie- / Innovationsworkshop für die Energiewirtschaft, Berlin

Zukünftige Rolle der Kohle: Technische und strategische Optionen
‣ Aktuelle Herausforderungen der Europäischen Energie- und Klimapolitik, Expertenworkshop der Hanns-Seidel-Stiftung, Wildbad Kreuth

Sibylle Braungardt
The macroeconomic benefits of ambitious energy efficiency policy – a case study for Germany
‣ eceee Summer study 2015 Presqu'île de Giens, France

Assessing the impact of the EU Ecodesign Directive on a member state level
‣ eceee Summer study 2015 Presqu'île de Giens, France

Towards Green growth – the Influence of European product policy on innovation
‣ Multdisciplinary Symposium on Energy, Efficiency and Sustainability EES 2015, Berlin

Barbara Breitschopf
Maximising socio-economic value creation through policies
‣ World Future Energy Summit 2015, Workshop on the socio-economic impacts of renewable energy, Abu Dhabi, United Arab Emirates

Kerstin Cuhls
The Potential and Limits of Foresight / Futures
‣ Research Conference Tackling Wicked Problems, Turku, Finland

Der Zukunft auf der Spur: Wie Megatrends die Produktion beeinflussen
‣ VDMA-Mitgliederversammlung, Stuttgart

(Technology) Foresight in Japan
‣ International Workshop Science and Technology Studies Japan, Freie Universität Berlin

Stephanie Daimer
Forward Visions on the European Research Area
‣ Plenary Meeting of the European Research Area Committee (ERAC), Brussels, Belgium

Evaluation and Impact Assessment of new complex policies
‣ OECD-Workshop Assessing the Impacts of Public Research Systems, Lisbon, Portugal

(with Ralf Lindner)
Addressing orientation failure: Directionality and the Systems of Innovation Heuristic
‣ Conference of the European Forum for the Study of Politics for Research and Innovation, Helsinki, Finland

Claus Doll
LivingRAIL – Verlagerungspotentiale in Hinblick auf das 2 Grad-Ziel
‣ 19. DB-Workshop Fahrgast, Umwelt und Verkehr, Nuremberg

The role of the Autonomous Car in a Multi-Modal Environment – Opportunities and Threats
‣ RTWH Summer School, Aachen

Bahn 2050 – Visionen, Chancen und Risiken
‣ TU Berlin: 20 Jahre Infrastrukturreform, Berlin

Ewa Dönitz
Foresight zur Strategieentwicklung – Nutzen von Roadmaps und Szenarien
‣ IHK TechnologyMountains Tech-Talk-Reihe Future 2015, Karlsruhe

Mega trends and micro trends with implications for products and services
‣ Roadmapping-Workshop Household freezer and wine coolers, Qindao, China

Vicki Duscha
The influence of technological assumptions on climate cooperation
‣ ICTSD side event at COP 21: Technology in the 2015 Paris Agreement and Beyond, Paris, France

Wettbewerbsfähigkeit der deutschen Papierindustrie im internationalen Vergleich
‣ Stakeholder-Workshop Politisch induzierte Strompreise und internationale Wettbewerbsfähigkeit, Bundesministerium für Wirtschaft und Energie, Berlin

Macroeconomic impacts of renewables deployment in Europe up to 2030
‣ 9. Internationale Energiewirtschaftstagung an der TU Wien (IEWT) 2015, Vienna, Austria

Elisabeth Dütschke
Purchase of electric vehicles – early adopters in the German showcase region Baden-Württemberg
‣ Biennial Conference for Environmental Psychology, Groningen, Netherlands

Akzeptanz von Windenergie: Erfahrungen und Empfehlungen
‣ Akteursforum Windenergie, Hanover

Wolfgang Eichhammer
Energy efficiency potentials in the EU in 2030: Results and underlying data
‣ 5th Plenary Meeting Concerted Action for the Energy Efficiency Directive, Riga, Latvia

Learning Networks for Energy Efficiency in Industry as Open Innovations
‣ 1st Society of Open Innovation: Technology, Market, and Complexity (SOItmC) & 8th Knowledge Cities World Summit 2015, Daegu, South Korea

What are the efficient financial and non-financial tools to promote energy efficiency?
‣ ATEE side event at COP 21: Energy Efficiency – a key strategy for climate goals, Le Bourget, Paris, France

Lorenz Erdmann
The German Living Lab Landscape – Contours and prospects
‣ European Network of Open Living Labs (ENOLL) – Open Living Lab Days 2015, Brussels, Belgium

Substitution Roadmap – Permanent Magnet Based Applications
‣ Substitution of Critical Raw Materials – CRM_InnoNet Final Conference 2015, Istanbul, Turkey

Das Projekt Commons-based Peer Production in Offenen Werkstätten (COWERK)
‣ Verbund Offener Werkstätten (VOW) – Festival Offener Werkstätten 2015, Dresden

Tobias Fleiter
Wirkung und Wirtschaftlichkeit des KMU-Förderprogramms "Energieberatung Mittelstand"
‣ 9. Internationale Energiewirtschaftstagung IEWT, Vienna, Austria

Michael Friedewald
Surveillance, Privacy and Security: Factors Determining Acceptability and Acceptance of Security Technologies
‣ UCSIA International Workshop Socially Responsible Innovation in Security, Antwerp, Belgium

Mirroring privacy and security – where the two meet and fall apart
‣ 10th International Summer School organised jointly by the IFIP Working Group 9.2, 9.6 / 11.7, 11.4, 11.6, Edinburgh, Great Britain

Context-Dependence of Citizens' Attitudes and Preferences Regarding Privacy and Security
‣ 2nd European Conference on Technology Assessment (PACITA), Berlin

Nele Friedrichsen
Distribution network tariffs – the effect of de-centralized generation and auto-consumption
‣ 12th International Conference on the European Energy Market (EEM), Lisbon, Portugal

Hemmnisse für Interkonnektoren aus ökonomischer Sicht und Ansätze zu deren Überwindung
‣ Abschlussworkshop zum Forschungsvorhaben Effektiver Rechtsrahmen für ein europäisches Super Grid, Würzburg

Effizienzrichtlinie, Spitzenausgleich und BesAr – Mit Blick auf Energieeffizienz und Energiemanagement
‣ EUM-Fachtagung, Flensburg

Rainer Frietsch
Computer-implemented Inventions – Empirical Evidence
‣ Conference Innovation in a European Digital Market – The Role of Patents, Brussels, Belgium

A method to identify computer-implemented inventions at the EPO
‣ MIOIR data science and tech mining forum, Manchester, Great Britain

Computer-implemented Inventions in Europe – Methodological and Empirical Findings with a Special Focus on Chinese and German Companies
‣ Sino-German Workshop on Innovation and High-tech Entrepreneurship Hangzhou, China

Till Gnann
How to address the chicken-egg-problem of electric vehicles? Introducing an interaction market diffusion model for EVs and charging infrastructure
‣ eceee Summer Study, Hyères, France

How to foster EV market penetration? A model based assessment of policy measures and external factors
‣ eceee Summer Study, Hyères, France

Matthias Gotsch
How digitalization can accelerate the transformation from manufacturer to service provider
‣ Spring Servitization Conference, Birmingham, Great Britain

Sharing Economy – Trends, Potenziale, Risiken und Beispiele
‣ Industrieausschuss IHK Karlsruhe, Bühl

Bruno Gransche
Zukünfte der Trinkkultur zwischen Natur und Technik
‣ Parlamentarischer Abend des Deutschen Weinbauverbandes 2015, Berlin

Die zunehmende Mensch-Technik-Verwebung: Wer steuert wen?
‣ Netzwerk-Tag in Schloss Gracht 2015: Das Internet der Dinge – die Zukunft hat begonnen, Erfstadt (Cologne)

Michael Haendel
Short and medium term potential of power-to-x-options in Germany
‣ 15th IERE General Meeting and German Forum, Berlin

Nils Heyen
Quantified Self als neue Daten- und Wissensquelle für das Gesundheitssystem: Potenziale und Risiken
‣ DGSMP-Kongress Daten gewinnen, Wissen nutzen – für die Prävention und Versorgung, Regensburg

Chancen und Risiken der digitalen Selbstvermessung
‣ Experten-Workshop Die Digitalisierung der Gesundheit, Sachverständigenrat für Verbraucherfragen beim BMJV, Berlin

Citizen Health Science as Responsibilization
‣ STS-Austria-Konferenz Living in Technoscientific Worlds, Vienna, Austria

Harald Hiessl
TWIST++: Transitionswege Wasserinfrastruktursysteme: Anpassung an neue Herausforderungen im städtischen und ländlichen Raum
‣ INIS-Statuskonferenz des BMBF, Hamburg, Germany

Strategic Innovation Policy in Germany
‣ BRCSS International Technology Innovation System Conference, Beijing, China

Thomas Hillenbrand
BMBF-INIS: Transitionswege Wasserinfrastruktursysteme: Anpassung an neue Herausforderungen im städtischen und ländlichen Raum (TWIST++)
‣ Innovationsforum Wasserwirtschaft – Aus der Forschung in die Praxis (DBU, BMBF, DWA), Osnabrück

Das neue DWA-A 272 "Grundsätze bei der Planung und Implementierung Neuartiger Sanitärsysteme (NASS)"
‣ Abwasserwirtschaft im ländlichen Raum (ÖWAV), Vienna, Austria

Hemmnisse bei der Umsetzung innovativer Niederschlagswasserkonzepte
‣ Seminar Mut zu neuen Wegen – Umgang mit Starkregen als Bestandteil des Generationenvertrages?, Technische Akademie Hannover, Lünen

Simon Hirzel
Perspektiven industrieller Abwärmenutzung
‣ BMUB-Fachtagung Klimaschutz durch Abwärmenutzung – Potenziale, Hemmnisse, Strategien, Berlin

Evaluierung der Energieberatung Mittelstand: Beitrag des Förderprogramms zur Verbesserung der Energieeffizienz
‣ dena-Expertenworkshops Energieaudit und Energiemanagement – Herausforderungen und Chancen für Unternehmen, Berlin

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Torsten Hummen
Poster: Overall raw materials savings potential in German gross electricity production
‣ Life Cycle Management Conference 2015, Bordeaux, France

Overall raw materials savings potential in German gross electricity production
‣ Ökobilanzwerkstatt 2015, Pforzheim

Security of Supply, Criticality and LCA
‣ Workshop Mineral Resources in LCIA, London, Great Britain

Eberhard Jochem
New energy efficiency policies – Supporting profits and competitiveness of European industries
‣ EXPO High Level Workshop on Energy Efficiency and Sustainability, Milano, Italy

Doubling the progress of energy efficiency in industry by learning energy efficiency networks
‣ Climate Protection Policy, Carbon Markets and Sustainability – 20th REFORM Group Meeting, Salzburg, Austria

Energieeffizienz-Netzwerke – Ein erprobtes Geschäftsmodell für größere Kunden in der Wirtschaft
‣ BDEW-Jahrestagung Treffpunkt Vertrieb 2015, Frankfurt

Petra Jung Erceg
Integration of Key Enabling Technologies in European Manufacturing – Challenges for the Danube Region
‣ Workshop Potential for Future German and Romanian Cooperation in Research and Innovation, Organisatoren: Deutsches Zentrum für Luft- und Raumfahrt (DLR) und Deutsch-Rumänische AHK, Bucharest, Romania

Jan Kersting
The impact of shale gas on the costs of climate policy
‣ Europe is not for shale!: A Greens/EFA Conference, Brussels, Belgium

Cooperation on climate change under economic linkages
‣ 21st Annual Conference of the European Association of Environmental and Resource Economists, Helsinki, Finland

Cooperation on climate change under economic linkages
‣ Our Common Future Under Climate Change, Paris, France

Simone Kimpeler
Was bringt die Zukunft? – Wie beeinflussen gesellschaftliche Trends unsere Wirtschaft?
‣ Gemeinwohl, Gewinn, Globalisierung – Was braucht es für eine gute Wirtschaftspolitik? Diskussionsveranstaltung in der Reihe "Fortschritt neu denken" der Friedrich-Ebert-Stiftung, Ettlingen

Unsere Welt in 2050 – Foresight für Innovation
‣ Fokus: Zukunft. Unser Leben 2050, Siemens AG/Karlsruhe Institute of Technology

Aktuelle Ergebnisse und Trends des Monitorings Kultur- und Kreativwirtschaft
‣ Innovationsverhalten der deutschen Kultur- und Kreativwirtschaft – Erfolgreich in die Zukunft, Bundesministerium für Wirtschaft und Energie, Berlin

Anna-Lena Klingler
Are current regionalisation approaches sufficient to decompose electricity demand? – A German case study
‣ Enerday, Dresden

Assessing the optimal use of electric heating systems for integrating renewable energy sources
‣ SEB – Conference on Sustainability in Energy and Buildings, Lisbon, Portugal

Marian Klobasa
Recent and future developments of demand side flexibility in industry
‣ International Association of Energy Economics, 38th International Conference, Antalya, Turkey

Welche Rolle spielt IKT im zukünftigen Energiesystem für die Energieeffizienz?
‣ 3. Energie & Informatik Kongress, Karlsruhe

Recent developments of Demand side Management in Germany and Europe
‣ Study Tour on Demand Side Management and Demand Response in Germany, Munich

Jonathan Köhler
Transitions to low carbon ship propulsion technologies including wind, simulated with an agent-based model using evolutionary approaches
‣ SCC2015 Shipping in Changing Climates 2015, Strathclyde University, Glasgow, Great Britain

Modelling Long Run Transition Pathways in Mobility with the MATISSE-KK model: low carbon cars or alternative lifestyles?
‣ IST2015 Transitions conference, SPRU, Brighton, Great Britain

Knut Koschatzky
Possible starting points for the internationalization of science-industry linkages in Germany
‣ Workshop Internationalization of Science, Technology and Innovation, CAS-IPM, Beijing, China

Kooperationen zwischen Wirtschaft und Wissenschaft – Grundlagen, Erfolgsfaktoren und Förderansätze
‣ Hightech-Fachforum Herausforderungen und Erfolgsfaktoren für Kooperation und Transfer, Dortmund

The changing role of universities in the German research and innovation system – Political expectations, activities and possible impacts
‣ CRUE/CPU/EUA-Workshop Universities promoting regional innovation across Europe, Madrid, Spain

Michael Krail
Cost of Non-Completion of TEN-T
‣ Abschlusskonferenz des Projekts No-TEN_T, Brussels, Belgium

Beschäftigungseffekte der Energiewende
‣ Workshop Indikatoren für die gesamtwirtschaftlichen Effekte der Energiewende – geeignete Daten und Methoden als Grundlage für ein zuverlässiges Monitoring, Berlin

Henning Kroll
Technological Platforms of Science-Industry Collaboration
‣ BJAST-BJSS International Technological Innovation Systems Conference, Beijing, China

Cooperative Platforms for Science-Industry Collaboration
‣ CAS-IPM/Fraunhofer ISI Joint Discussion, Beijing, China

Regional Aspects of Patenting in China
‣ Sino-German Cooperation Group – Beijing Conference 2015, Beijing, China

André Kühn
Effects of Regional Structures in Automotive Supply Chains on Supply Chain Risks
‣ International Conference on Production, Logistics and Traffic (ICPLT), Dortmund

Marianne Kulicke
Zwischenevaluation der Programmphase EXIST IV im Rahmen der wissenschaftlichen Begleitforschung durch das Fraunhofer ISI
‣ Frühjahrstagung des AK Forschungs-, Technologie- und Innovationspolitik der DeGEval e.V.: Begleitende Evaluation und Begleitforschung bei heterogenen, komplexen Fördermaßnahmen, Berlin

(with Thomas Stahlecker and Hendrik Berghäuser)
Neue Ansätze der Förderung von Wissensproduktion und -verwertung und ihre Implikationen für Evaluationsdesigns und -methoden
‣ 18. Jahrestagung der DeGEval: Evaluation und Wissensgesellschaft, Speyer

Sabine Langkau
Nachhaltigkeitsmanagement – Aktuelle Richtlinien und Best-Practice-Beispiele
‣ 1. Umweltgipfel 2015 – Neue Vorgaben und Perspektiven für den betrieblichen Umweltschutz, Frankfurt a.M.

Ralf Lindner
Addressing orientation failure: Directionality and the Systems of Innovation Heuristic
‣ Conference of the Eu-SPRI Forum, Helsinki, Finland

Responsible Research and Innovation – Governance and Policies
‣ PACITA Conference: The Next Horizon of Technology Assessment, Berlin

Comments on GRACE from a RRI Perspective
‣ GRACE – Final Conference, Potsdam

Frank Marscheider-Weidemann
Rohstoffe: Versorgungssicherheit im Kontext des Technischen Wandels
‣ BGR-Statusseminar Forschungsaufträge im Bereich der Rohstoff- und Lagerstättenforschung, Hannover

Werkstoffe 4.0: Potentiale ressourcenschonender Werkstoffe
‣ i-WING 2015 – Vom Material zur Innovation, Dresden

Critical raw materials for the EU – Methodology and Results
‣ EU Critical Raw Materials: Essential for your business and your industry now and in the future, DLR, Stuttgart

Simon Marwitz
Comparison of control strategies for electric vehicles on a low voltage level electrical distribution grid
‣ International Symposium on Energy System Optimization, Heidelberg

Ursula Mielicke
Energieeffizienz: Gemeinsam geht es schneller und die Nachfrage nach energieeffizienten Lösungen steigt!
‣ Sitzung der Arbeitsgemeinschaft Marktentwicklung der DENEFF, Darmstadt

Lernende Energieeffizienz-Netzwerke: Gemeinsam geht es schneller, schlauer, motivierender
‣ Deutscher Kongress für Energieeffizienz, Cologne

Cornelius Moll
Elektromobilität weltweit
‣ Gesamtteam-Sitzung des Clusters Elektromobilität Süd-West, Essligen

Björn Moller
Früherkennung von Technologietrends
‣ Veranstaltungsreihe Future/Foresight 2015, IHK Schwarzwald-Baar-Heuberg, Villingen-Schwenningen

Emmanuel Muller
Knowledge angels … and how they may contribute to the evolution of human resources in creating new forms of economic and social values
‣ Tokyo University, Tokyo, Japan

Smart specialisation strategies and cross-border integration of regional innovation systems: Policy dynamics and challenges for the Upper Rhine
‣ 10th International Regional Innovation Policies Conference, Karlsruhe

Peter Neuhäusler
Ownership transfer of patents at the State Intellectual Property Office of China
‣ GTM2015: 5th Global Techmining Conference, Atlanta, USA

Input- or output-side changes? The impact of the financial crisis on the patenting activity of firms
‣ 6th Biennial Atlanta Conference on Science and Innovation Policy, Atlanta, USA

Input- or output-side changes? The impact of the financial crisis on the patenting activity of firms
‣ DRUID Conference 2015, Rom, Italy

Jutta Niederste-Hollenberg
Zwischen Langlebigkeit und Flexibilität – wie anpassungsfähig sind zukünftige Ver- und Entsorgungssysteme?
‣ Rehau Akademie, Dessau

Anja Peters
Bitte Wenden – Aber wie?
‣ Tagung der Evangelischen Akademie Bad Boll "Wenn möglich, bitte wenden! Zukunft der Mobilität", Bad Boll

Patrick Plötz
Trick or treat? – Real world vs. test-cycle fuel economy and CO_2 emissions of plug-in hybrid electric vehicles
‣ Department Seminar, Gothenburg, Sweden

Trends und Perspektiven der Elektromobilität
‣ Bundestagsfraktion, Berlin

Martin Pudlik
Energy Perspectives – The 4th ASEAN Energy Outlook
‣ 5th International Conference on Power and Energy, Lisbon, Portugal

The implementation of RE into the electricity system with a perspective energy storage
‣ EUROSUNMED – International School, Scharm el Scheik, Egypt

Energy demand projections and international experiences
‣ Capacity Building Workshop for the 4th ASEAN Energy Outlook, Jakarta, Indonesia

Mario Ragwitz
Renewable energy policy – challenges of mainstreaming of RES deployment
‣ Climate Annual Conference 2015 – Florence School of Regulation, Florence, Italy

Framework for RE deployment
‣ Berlin Energy Transition Dialogue, Berlin

The challenges on the way to a new market design for renewables
‣ Directors General for Energy meeting on the electricity market reform, Brussels, Belgium

Thomas Reiß
Governance approaches to gene editing based on responsible research and innovation
‣ International Summit on Human Gene Editing, Washington, D.C., USA

Karoline Rogge
Progress and challenges in evaluating climate policy mixes: the case of renewable power generation technologies in Germany
‣ 4th European Environmental Evaluators Network (EEEN), Florence, Italy

Green niche meets interconnected regimes: How smart meters interact with supply, network and demand regimes in the German electricity system
‣ 6. International Conference for Sustainability Transitions (IST), Brighton, Great Britain

Do policy mix characteristics matter for (eco-)innovation? A survey-based exploration for manufacturers of renewable power generation technologies in Germany
‣ 5th Annual Conference of the Eu-SPRI Forum, Helsinki, Finland

Clemens Rohde
Energy efficiency policies for industry in Germany – sticks, carrots and the tambourine
‣ Delegationsreise der Exportinitiative Energieeffizienz, Calgary, Canada

Energieeffizienz – die zweite Säule der Energiewende, Chancen und Herausforderungen in der Industrie
‣ Interne Weiterbildung der Daimler AG, Gaggenau

Steam Boilers and the European Ecodesign process
‣ ACEEE industrial summer study, Buffalo, USA

Joachim Schleich
Effects of Energy Audits on the Adoption of Energy Efficiency Measures
‣ European Association of Environmental and Resource Economists (EAERE), Helsinki, Finland

Unravelling load patterns of residential end-uses from smart meter data
‣ eceee summer study 2015, Presqu'île de Giens, France

Barbara Schlomann
Was macht die Nachfrage? Effizienzindikatoren weiter gedacht
‣ Berliner Energietage, Berlin

The potential of energy saving measures in the industry
‣ University of Ottawa, Carleton University, Concordia University, École de Technologie Supérieure, Ottawa / Montreal, Canada

Energieverbrauch des Sektors Gewerbe, Handel, Dienstleistungen (GHD) in Deutschland
‣ 17. Treffen der Netzwerkpartner des Effizienznetzes Rheinland-Pfalz (EffNet), Bad Kreuznach

Esther Schnabl
(with Thomas Stahlecker)
Cluster policies in the context of smart specialisation – impressions from Germany
‣ 10th International Regional Innovation Policies Conference, Karlsruhe

Torben Schubert
Multinationality, R&D and productivity. Evidence from the top R&D investors worldwide
‣ DRUID Conference 2015, Rome, Italiy

Impact of Recent Higher Education Reforms on the Optimal Size of Operations in German Universities
‣ Atlanta Science and Public Policy Conference, Atlanta, USA

Philip Schütz
Datenschutzbehörden im internationalen Vergleich
‣ DVPW-Kongress 2015, Duisburg

The Emergence of Privacy Companies: Privacy as a Competitive Advantage?
‣ CPDP-Konferenz 2015, Brussels, Belgium

Thomas Stahlecker
Lessons learned from the Innovation Performance Review: Framework conditions, innovation policies and instruments
‣ International Conference Better Policies for more Innovation, conducted by the UNECE, Minsk, Belarus

Innovation Performance Review of Tajikistan: Framework conditions, innovation policies and instruments
‣ International Conference Practical steps towards a knowledge-based economy, United Nations, Dushanbe, Tajikistan

The chances of regional innovation policy – The case of energy efficiency
‣ EST Conference 2015: Intensifying energy efficiency activities at a regional level – a multi-level policy issue, Karlsruhe

Jan Steinbach
Wärme- und Kältestrategie für Deutschland
‣ Fachgespräch Wärmestrategie, Bundestag, SPD-Fraktion, Berlin

Sanierung des deutschen Gebäudebestandes auf unterschiedliche Effizienzstandards
‣ Internationale Energiewirtschaftstagung (IEWT), Vienna, Austria

Luis Tercero Espinoza
Panel: Expert debate on "What is materials criticality and how can it be assessed"
‣ World Resources Forum, Davos, Switzerland

Felix Tettenborn
Deriving measures to reduce micropollutant emissions into the aquatic environment – potential of SFA
‣ Micropol & Ecohazard Conference 2015, 9th IWA Specialist Conference on Assessment and Control of Micropollutants and Hazardous Substances in Water, Singapore

Mikroschadstoffe aus dem urbanen Bereich: quellenorientierte und nachgeschaltete Emissionsminderungsmaßnahmen
‣ 27. Hamburger Kolloquium zur Abwasserwirtschaft, Hamburg

Emissionsmuster ausgewählter Schadstoffgruppen und Ansätze für Emissionsminderungsmaßnahmen
‣ Abschlussworkshop Maßnahmen zur Verminderung des Eintrages von Mikroschadstoffen in die Gewässer, Berlin

Axel Thielmann
German roadmap for battery technologies for ESS R&D trends and market development
‣ Advanced Automotive Batteries (AABC Europe) 2015, Mainz

Potential and acceptance of nanotechnology
‣ 1st Joint Symposium on Nanotechnology at the Federal Institute for Risk Assessment (BfR), Berlin

Battery Technology Roadmap for Stationary Energy Storage Applications
‣ Intersolar Europe 2015, Munich

Jakob Wachsmuth
The Impact of Energy Efficiency on the Costs of Decarbonisation
‣ Side-event at COP 21: Energy Efficiency: A cheaper path to a two-degree future, Paris, France

Rainer Walz
Development Trends and Innovations in the Infrastructure Sector
‣ Knowledge Exchange Week of BMZ and GIZ with the IDB on "Laying Down the Tracks for the Future: Germany's Road to Sustainable Infrastructure", Berlin

Towards modelling the development of sustainable and inclusive energy innovation systems: an integrated TIS-MLP approach for wind turbines
‣ 13th GLOBELICS Annual Conference 2015, Havanna, Cuba

Integrating TIS and MLP heuristics towards a more dynamic analysis of innovation processes: case study on wind energy
‣ Annual Meeting of Sino-German Research Group on Internationalization of Science, Research and Innovation, Beijing, China

Marion A. Weissenberger-Eibl
How do our societies generate innovations that improve wellbeing in a time of complex challenges and digital opportunities?
‣ 2. Internationales Deutschlandforum, Bundeskanzleramt, Berlin

Digitalisierung, Nachhaltigkeit und Gesellschaft – ein Dreiklang ?!
‣ Symposium des Rates der Umweltpreisträger und der Deutschen Bundesstiftung Umwelt (DBU), Essen

Martin Wietschel
Energiespeicher – Wo steht Deutschland im internationalen Vergleich?
‣ Kongress Forum ElektroMobilität, Berlin

Elektromobilität: Quo vadis?
‣ 3. Forum Elektromobilität Schleswig-Holstein, Kiel

Markthochlauf Elektromobilität – Welche Maßnahmen fehlen noch?
‣ Kamingespräch, Ministerium für Verkehr und Infrastruktur, Stuttgart

Andrea Zenker
(with Jean-Alain Héraud and Emmanuel Muller)
Smart specialization strategies and cross-border integration of regional innovation systems: policy dynamics and challenges for the Upper Rhine
‣ 10th International Regional Innovation Policies Conference, Karlsruhe

(with Philine Warnke, Knut Koschatzky, Thomas Stahlecker, Oliver Som, Ewa Dönitz, Kerstin Cuhls, Sandra Güth, Lisa Nabitz and Sybille Braungardt)
Opening up the innovation system framework towards new actors and institutions
‣ 10th International Regional Innovation Policies Conference, Karlsruhe

Peter Zoche
Koproduktion als Element Öffentlicher Wissenschaft
‣ Jahrestagung Öffentliche Wissenschaft, Großer Konvent der Schader-Stiftung, Darmstadt

Eröffnungsansprache zum Graduierten-Netzwerk zivile Sicherheit
‣ Konferenz Grenzenlose Sicherheit?, Berlin

Einführung und Moderation des Fachworkshops zu zivil-militärischer Zusammenarbeit im Katastrophenfall
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