

Research for a Sustainable Economy

# Annual Report 2016/2017



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## IMPRINT

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Berlin, November 2017

# Introduction

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## Dear Reader,

Digitalization is in everyone's mind and brings with it many expectations. In any case, it will reshape the economy and society. At IÖW, we are examining both the potentials and the pitfalls of digitalization and are developing framework options and governance instruments for effectively managing a sustainability-oriented digital policy agenda.

Since May 2016, the junior research group *Digitalization and Sustainability*, a cooperative effort of IÖW and TU Berlin, has been investigating the issue of whether the increasing digitalization of our world will lead to greater or lesser resource consumption and whether it can contribute to a sufficient lifestyle. The research team is looking at how energy consumption shifts, how people change their consumer behavior, and how companies develop new services and adapt their marketing strategies in the three fields of mobility, nutrition, and housing. Further research at IÖW, as a part of our new research topic *Digital Transformation*, focuses on the digital energy revolution, collaborative production, and the sharing economy.

## Transformative Economics

The transition to sustainable production and consumption patterns can be effectively supported by a conceptual-analytical framework that provides orientation for scientists and practitioners. We support the growing demand for a paradigmatic shift from economics to transformative economics. What contribution can and should economics make to the path towards a sustainable society? This question is not new, but more pressing than ever – and it is still being controversially discussed among economists. Our position is clearly expressed in our Institute's mission statement: we want to think ahead and drive change with our scientific work.

## Key Topics in Sustainability Research

In this Annual Report, we present the institute's current projects and publications, dealing with seven IÖW research topics that range from *Products and Consumption* and *Sustainable Corporate Management* to *Climate and Energy* and *Water and Land Management*.

If you would like to learn more about our work, we invite you to visit the IÖW website: [www.ioew.de/en](http://www.ioew.de/en)

## In Conclusion ...

We have continued to grow in 2017 and further incorporate significant social developments into our research. Our new staff members will extend the institute's expertise and contribute new ideas to its development. Further projects allow us to work with a wider range of sponsors and partners.

We would like to thank all those who have supported our work in recent years and beyond: our friends, supporters, and cooperation partners – research institutions and other organizations involved in sustainability strategies and issues. Together with you, we will continue to look to the future in order to find answers to today's pressing concerns.

**Thomas Korbun**  
Scientific Director



## Contact

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# The IÖW – Facts and Figures

The Institute for Ecological Economy Research is a leading scientific institute in the field of practice-oriented sustainability research.

At IÖW we devise and build strategies and approaches for achieving a viable, long-term economic activity – a sustainable economy, one that allows us to live well, but also preserves our natural resources. For more than thirty years, IÖW has been tackling the challenges of sustainable development and seeking new, often unconventional, answers to today's questions about tomorrow.



## ORGANIZATION AND STAFF (AS OF SEPTEMBER 2017)

### Management

Thomas Korbun, Scientific Director  
Marion Wiegand, Financial Director

### Board

Kathrin Ankele  
Thomas Korbun  
Dr. Jan Nill  
Johannes Rupp  
Ulrich Petschow

### Public Relations and Communications

Richard Harnisch

### Ökologisches Wirtschaften (Journal *Ecological Economy*)

Dr. Christopher Garthe

### Fields of Research

Corporate Management and Consumption  
Dr. Gerd Scholl

Ecological Economics and Environmental Policy  
Ulrich Petschow

Sustainable Energy and Climate Protection  
Prof. Dr. Bernd Hirschl

Ecological Product Policy  
Dr. Frieder Rubik

## IÖW – RETHINKING THE ECONOMIC SYSTEM

Imagine an economy that creates prosperity without endangering natural resources. Imagine a clean energy supply that provides decentralized electricity and heat without polluting the Earth's atmosphere or burdening future generations with radioactive waste. Imagine being able to use durable, high-quality products without having to own them. Imagine companies that not only want to create economic value, but also want to maximize their social and ecological value.

Imagine an economy far beyond today's industrial society – one that has been fundamentally transformed. That is the kind of economy towards which IÖW is working.

## PRACTICABLE, EVERYDAY SUSTAINABILITY

To date, IÖW has worked on more than 500 projects to tackle social challenges, using unique research designs and innovative methods and forming new alliances. We are currently working on topics such as sustainable corporate management, climate-friendly energy systems, new technologies, sustainable consumption, and environmental policy and governance. Our goal is to develop tangible ideas and approaches for a sustainable economy that are applicable both at the meta-level and to everyday life. We endeavor to work closely with the relevant stakeholders and to issue clear and unequivocal recommendations.

Topics and projects > see pages 5–35

## OUR STAFF

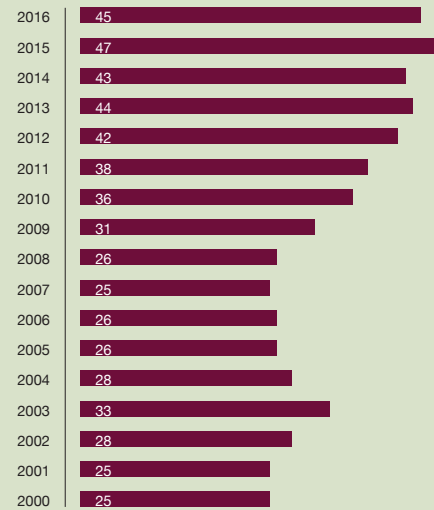
At IÖW, scientists of various disciplines work together in teams – economists together with engineers, sociologists, and political scientists. Relying on curiosity and expertise as well as conviction and independence to achieve their goals, their common task is to recognize and identify the causes of social challenges and develop possible solutions. Along with our technical competence and methodological knowledge, the IÖW team itself is growing. Many staff members have been with us for a long time – they have shaped the institute and its work over a period of many years and made IÖW what it is today.

Read more about IÖW staff > [www.ioew.de/en](http://www.ioew.de/en).

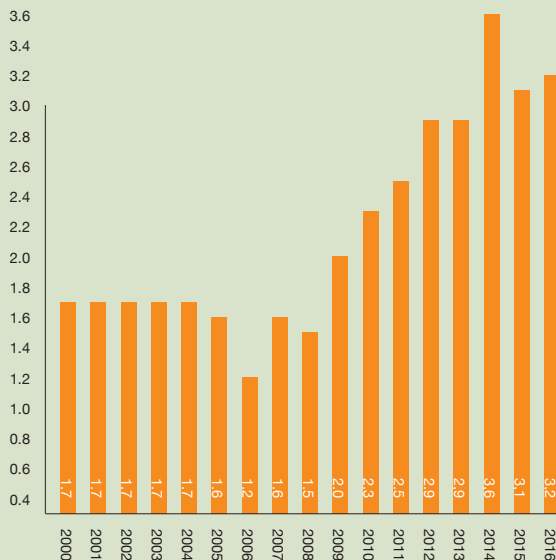
## INDEPENDENT AND NOT-FOR-PROFIT

We have been around for more than 30 years – a long time for an independent research institute, which goes to show that competence, innovative thinking, assured direction, and flexibility are also required on the “research market” and that we can safeguard our independence – our financial independence, as well – with these strengths. As an independent institute, IÖW receives no permanent basic subsidies.

## PERSONNEL DEVELOPMENT 2000–2016



## REVENUES 2000–2016 in Million Euro



## OUR CLIENTS

IÖW's clients and sponsors come from many different sectors. In recent years, we have been able to obtain a large share of our projects from the public sector, such as the German Federal Government and the federal states, but also from corporations, associations and private foundations. Cooperation with international partners and clients such as the European Union has become an enriching feature.

More on our cooperation partners > see page 36.

# Sustainability at IÖW

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IÖW is one of the pioneer institutions in interdisciplinary sustainability research in Germany. Through our scientific work, we initiate, monitor, and strengthen social change for sustainable development. At the same time, we contribute to further developing scientific knowledge and methods. We create conceptual foundations and practical solutions that help embed ecological and social aims more firmly in the behavior of society.

This target definition plays a prominent role for our employees. Sustainability is our professional concern and an important element of our personal values. In 2011, IÖW became one of the first German research institutions to publish information about its own sustainability practices.

Since then, we have continuously been working towards, systematically recording, and reporting on our progress in the fields of corporate governance and environmental impact, e.g., energy and paper consumption, business travel, and the purchasing of office equipment, but also work-life balance and job satisfaction. Overall responsibility for these issues lies with the institute's leadership, but in 2013 we institutionalized sustainability management at IÖW. A sustainability manager steers the implementation and monitoring of improvement measures and reports on these annually. An internal working group supports these activities by putting into practice employees' suggestions and contributions to our sustainability strategy.

Two years ago, we developed and eventually set up an occupational health management program. As a consequence, our working environment and daily routines have noticeably changed. The program supports a health-conscious work culture and encourages self-responsibility within our project work. Main activities include initial training for new employees about the institute's sustainability measures as well as the implementation of a human resources development concept.

In 2016, job satisfaction at IÖW remains high: 66 percent of our employees were rather satisfied or very satisfied with their position, although 55 percent perceived their workload as heavy or very heavy. Compared to the previous year, job satisfaction decreased (75 percent in 2015), but workload perception remains high (67 percent in 2015). The decline in employee satisfaction requires more study; the decline in the perceived workload is a welcome result, but we are monitoring the development closely and will continue to pursue this issue.

IÖW emits greenhouse gas equivalents mainly through heating, business travel, and electricity. In 2015 we were responsible for 71.5 tons of CO<sub>2</sub>-equivalents. This implies a decline of 5.1 tons against the previous year due to significantly less business travel by plane and rail. In 2016, our total electricity consumption was 35,310 kWh. This is a reduction of 9 percent compared to the previous year (38,840 kWh in 2015). We have managed to reduce our specific electricity use per average fulltime equivalent by 14 percent in 2016 (686 kWh) compared to 798 kWh in 2008, when starting data monitoring of the institute's electricity consumption.

Since 2014, our internal handbook The Green Meeting Guide has set binding standards for the organization of environmentally sound meetings, seminars, and conferences.

Find out more about our sustainability targets and our detailed sustainability program on our Website under *Unsere Verantwortung*:

[www.ioew.de/das-ioew/verantwortung](http://www.ioew.de/das-ioew/verantwortung) (in German).

# IÖW Topics at a Glance

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## DIGITAL TRANSFORMATION

Smart homes, the sharing economy, virtual power plants, and the Internet of things – the digital transformation is reshaping the economy and society. This development raises many expectations: Companies may become more competitive, while at the same time, industrial processes and digital services can become more energy and resource-efficient. Thus, digitalization can contribute to reconciling economic growth with ecological sustainability – so the thinking goes. Yet, pressing questions remain: Will jobs vanish in great numbers? Will digital applications increase overall demand for products and services until rebound effects eventually quash any gains in efficiency? And what kinds of hazards will arise, in critical infrastructures of our public services – as we become increasingly dependent on 24/7 reliable electricity and digital data transmission? At IÖW we are examining both the potentials and the risks of digitalization and developing framework options and governance instruments for effectively managing a sustainability-oriented digital policy agenda.



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## CLIMATE AND ENERGY

Climate change is one of the greatest challenges of our time. Climate protection and adaptation are necessary in equal measure in order to mitigate and overcome the effects of climate change and build resilience. IÖW is developing, analyzing, and evaluating technologies, concepts, political strategies, and instruments in the context of the ongoing transition to sustainable energy – the Energiewende. We pay special attention to the practical relevance of our work and an interdisciplinary approach, one that considers not only the effects of greenhouse gases but also other aspects of sustainability, such as conflicting interests and economic profits. Our areas of study include renewables, energy efficiency, the urban heat shift, climate protection concepts, and adaptation measures. We are also evaluating the potential opportunities for economic profit that climate change measures may bring. With our economic models, we are able to calculate the value-added and employment effects of renewable energy technologies and energy-efficient building renovation. Our EPROM model allows us to simulate technical performance aspects and economic effects of new energy producers (such as the prosumer) in the smart energy world.



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## PRODUCTS AND CONSUMPTION

The production and consumption patterns of Western industrial societies are not sustainable. Moreover, the economic development of newly industrialized countries, such as Brazil, India, and China, clearly shows that environmental degradation must be reduced and the negative social effects of the economy limited. Sustainability policy has taken up this challenge, but there is still a lot of work and research to be done. IÖW develops strategies for sustainable consumption and production (SCP) at the federal and European levels, e.g., for the food, housing, and mobility sectors. We analyze national and international policy concepts and instruments, such as environmental labels and green public procurement, and draw up sustainability strategies that are tailored to the respective stakeholders. Sustainable marketing and market research into greener patterns of consumption are also part of our services.



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## SUSTAINABLE CORPORATE MANAGEMENT

Society has high expectations for the business world. Companies are supposed to offer high-quality, affordable products and services. Today, we also insist that they consider – and address – the current and future impacts of their business on the environment, on employees and business partners, and on society at large. Last but not least, innovation and product development must respond to real and urgent societal challenges: simply “good” is not good enough. At IÖW, we support companies in meeting their social obligations; we research and develop strategies, methods, tools, and best practices for fostering corporate sustainability and responsibility. To enable economic actors to respond to the future challenges of a post-growth society, we are also analyzing and evaluating alternative business models and innovative forms of access-based consumption.



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## ENVIRONMENTAL POLICY AND GOVERNANCE

More than ever before, environmental policy calls for far-reaching inter- and transdisciplinary approaches. Finding solutions to formidable sustainability problems such as climate change or resource depletion requires new forms of governance and societal involvement as well as the support of stakeholders on many levels. End-of-pipe solutions, a staple of environmental policy only a few years ago, do not go far enough. Effective environmental and sustainability policy capable of achieving a large-scale transformation combines legal and economic instruments with new cooperative approaches. At IÖW, we analyze problem contexts, develop and assess environmental policy concepts, and work out innovative solutions – without losing touch with the relevant protagonists in politics, industry, and society at large.



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## WATER AND LAND MANAGEMENT

Water and land management agencies are currently under pressure to adapt to climate change and global economic developments that are influencing land use patterns and the availability of water. Land-use decisions and human interference with the water balance are having a serious impact on local and global climate, groundwater quality, inland and coastal waters, biodiversity, and on a number of other ecosystem services, thereby influencing or even impeding achievement of the UN's Sustainable Development Goals, mainly SDG 2, 6, 13, 14, and 15. IÖW conducts research and provides advisory services in the field of integrated water resource and land management. We undertake socio-economic analyses in the context of interdisciplinary projects on river basin and flood risk management, integrated coastal zone management, and the effects of agriculture on the environment and climate.



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## PARTICIPATION AND COMMUNICATION

Sustainable development is a process in which, ideally, all social groups are represented. Transparency, open communication, and involvement of the stakeholders in value-creation or decision-making processes are fundamental for sustainable development – be it in politics, business, or civil society. IÖW designs and moderates such dialogue processes – for example, in the German policy area of climate change adaptation. We also have a long tradition of evaluating corporate sustainability reporting, which in 2017 became obligatory for specific capital market-oriented companies, banks, and insurance companies within the EU. In our research projects we work closely with partners who are practitioners in various fields and we communicate the results of our research via diverse channels – from traditional print media and varied event formats, to online presentations and the social networks.



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> see [www.ioew.de/en/topics](http://www.ioew.de/en/topics)

## EVALUATION AND ASSESSMENT

Making progress on the path towards sustainability requires a good strategy – one that allows for proper assessment of the consequences for environment, economy, and society. An ex-ante, systematic evaluation of policies, instruments, and programs can help achieve objectives, increase legitimacy and acceptance, and promote a smart policy approach. IÖW works to improve the methodology behind such evaluations and carries out impact assessments and evaluations for political and business entities and stakeholders. We also draw up ecological-economic assessments – especially for dealing with natural resources – as well as life cycle assessments for products and technologies. One of our special concerns is contributing to the discourse on evidence-based policy-making by extending and improving the quality criteria and standards for these assessment tools.



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# Digital Transformation



TOPIC

## Digitalization from a Social-ecological Perspective

### Digitalization and Social-ecological Transformation: Rebound Risks and Sufficiency Opportunities of Digital Services

Period: 05/2016 – 04/2021

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: Technische Universität Berlin: Institute of Vocational Education and Work Studies – Economic Education and Sustainable Consumption, and the Center for Technology and Society, Berlin

Post-industrial society is facing an epic transformation: the ongoing digitalization of our world is already a decades-old phenomenon, one that shows no signs of diminishing in the future. Today more than ever we are digitally linked to our environment, the machines and products we use, and to one another by computer-based technologies – thus the emergence of deeply integrated “cyber-physical” systems. This is reflected not only in new forms of consumption, but also in concepts of decentralized production.

Many political and entrepreneurial stakeholders see above all opportunities in digitalization: industry in Germany will become more competitive at the international level and new jobs will be created. The new technologies can make possible greater efficiencies in the use of resources, thus better reconciling economic growth with ecological sustainability – so the thinking goes. The number of critical voices, however, is growing – especially with respect to the ecological aspects. The demand for resources and energy continues to increase as a result of our expanding information and communication technologies. The so-called rebound effect comes into play here: The more efficient an individual computing device becomes, the more extensive its use and the greater the number of people who want to use it. Thus, despite gains in efficiency, overall resource and energy consumption increase. Does digitalization then really contribute to the dematerialization of economic processes? Or does it increase undesirable environmental impacts?

In addition to environmental considerations, there are further impacts related to digitalization: networked mobility and the shared use of goods (e.g., carsharing) generate persistent data that often make it possible for third parties to draw conclusions about our private lives. What implications might this have for democracy?

### THE NEXT GENERATION: PREPARING YOUNG SCIENTISTS FOR THE CHALLENGES OF THE FUTURE

In various doctoral and postdoctoral research projects, the junior research group is exploring three questions during their five-year term:

- (1) How might digital services be able to contribute to the development of more sustainable patterns of consumption and, in particular, a more moderate way of life (greater “sufficiency”)?
- (2) Under what conditions does digitalization lead to increased demand due to rebound effects?
- (3) Are there political and entrepreneurial approaches that can also take into account the ecological, social, and democratic implications of digitalization?

### SOCIAL ALLIANCES FOR A SOCIAL-ECOLOGICAL APPROACH TO DIGITALIZATION

Working within the three fields of mobility, nutrition, and housing, the research group is investigating the shifting of energy flows, changes in both human consumption patterns and business marketing strategies, and the development of new social models. The group is also looking at how the decoupling of natural consumption from growth affects market and income concentration, and whether it alters processes of individualization and democratization.

These questions are being addressed with representatives from the worlds of business, politics, and civil society; international research cooperations are also being planned. In addition, organizations from the digitalization scene will be brought together in a transdisciplinary manner with representatives from the environmental scene – the former bringing technical and network policy know-how to the table, the latter substantial experience with environmental policy issues. In this way, it becomes possible to build new social alliances capable of pursuing a social-ecological approach to the ongoing digitalization movement.

More information can be found here:

[www.sustainable-digitalization.org](http://www.sustainable-digitalization.org)

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# Peer Production and Consumption

Around the world, our economic system is confronting a paradigm shift: proprietary forms of production and consumption are being supplemented, or in some cases, even supplanted by open and community-oriented models. Fab labs, makerspaces and sharing platforms are expressions of such an emerging collaborative economy. Digitization facilitates online collaboration and networking, leading to entirely new value-added architectures. Increasingly we are able to satisfy our needs without the necessity of owning the means of production or consumer goods. IÖW is examining the socio-ecological potential of this still largely undocumented transformation.

## Open Workshops: Niche or Transformative Movement?

### Commons-based Peer Production in Open Labs (Cowerk)

Period: 11/2014 – 10/2017

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: Fraunhofer UMSICHT, Oberhausen; Fraunhofer ISI, Karlsruhe;

University of Bremen, Bremen; Verbund Offener Werkstätten, Berlin; Multiplicities, Berlin

DYI – do it yourself! More and more creative minds, hobbyists, and unconventional thinkers are pursuing this motto, and taking it even further: “do it together”. They call themselves “makers” and experiment and work in open workshops with decentralized production technologies that range from traditional handicrafts all the way to innovative 3D printing. With more than 1,000 fab labs in operation worldwide today, “making” has become a global phenomenon, and its potential has drawn the attention of journalists, educators, and policymakers. Communication technologies and digitalization enable knowledge transfer and information sharing on a global scale.

Makerspaces, fab labs, and hackerspaces may open up new possibilities for exploring sustainable development. Being locations of civic experimentation and social innovation, places where novel practices of creativity and learning are cultivated, open labs are held up as potential breeders of more sustainable forms of production where social and ecological sustainability – especially with regard to sufficiency strategies – can be practiced and experienced in real life. By giving everybody access to the means of production, open labs further advance the democratization of innovation processes.

Can this emerging culture of communal production, which exists somewhere between hobby and commercial exploitation, revolutionize the production of goods and make living together more sustainable and social? By way of the example of these open workshops, the research group Cowerk, under the direction of IÖW, is examining possible ways in which collaborative organization models can arise in manufacturing. The aim of the project is to analyze how practitioners acquire new technological capabilities in the context of decentralized and commons-based production and to look at the opportunities this presents from a sustainable development perspective.

In the monograph *Offene Werkstätten – nachhaltig innovativ? (Open workshops – sustainably innovative?)*, Cowerk describes the various types of open workshops that exist, the stakeholders, and their motivations. A survey distributed to more than 450 open workshops in Germany shows that often the produc-



tion of an object is not the main reason for participation, but rather the community orientation that such workshops provide. The exploration of new social ways of learning, knowledge transfer, and cooperation are part and parcel of everyday practice in the typical open workshop.

At the Cowerk conference *The Transformative Power of the Makers*, held in Berlin in early 2017, it became clear that many in the maker movement anticipate a global trend, one with the potential to extensively advance decentralized and more sustainable methods of production. Others, however, see a more limited range and the tendency for new developments to be absorbed by the corporate sector, which recognizes the potential in new open innovation forms and processes. Finally, Cowerk is exploring the various options for cooperation and networking in order to derive appropriate recommendations for action in support of sustainable development.

For further information on the project:

[www.cowerk.org](http://www.cowerk.org)

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# Sharing – Saving Money and Environmental Resources

## PeerSharing – Online-based Business Models for Collaborative Consumption as Contribution to a Sustainable Economy

Period: 02/2015 – 01/2018

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: IZT – Institute for Futures Studies and Technology Assessment gGmbH, Berlin

Institute for Energy and Environmental Research GmbH (ifeu), Heidelberg

Sharing is a growing trend. The shared use, exchange, giving, lending, renting, and reselling of things is a lasting boom, not least thanks to new possibilities of digital communication.

Numerous concepts and business models have emerged in recent years enabling the shared use of goods and services, thereby promising a more efficient allocation of resources and more collaborative patterns of production and consumption. Typically, the sharing economy comprises three different forms of sharing: the prolongation of product use through giving away, swapping, and reselling; the more intense use of goods through renting and co-using; and the exchange of services. Sharing is practiced in business-to-business and business-to-consumer markets and it has also manifested itself in peer-to-peer (P2P) markets in which an intermediary organization facilitates sharing transactions among individuals as peer providers and/or peer consumers.

But what potential do these concepts offer for a more sustainable way of doing business? The aim of the project PeerSharing is to answer this question empirically.

In contrast to the plethora of publications dealing with the emergence and characteristics of the sharing economy, little is known, in particular empirically, about its actual development or its economic, social, and environmental impacts. The work done in the project encompasses an inventory of P2P-sharing platforms in Germany, an analysis of governance and regulatory issues related to these new forms of consumption, and an environmental assessment of the impacts of peer-to-peer sharing. The inventory aims to provide an overview of P2P-sharing platforms in Germany and thereby create a more sound understanding of the markets, the competition, and the developments within the field. A database was set up to capture and categorize all online platforms offering P2P-sharing services in Germany. As of May 2016, more than 100 P2P platforms, covering various fields of consumption, had been recorded; most exist for shared mobility and the sharing of property.

In close cooperation with the four P2P-sharing industry partners Wimdu, Drivy, flinc, and Kleiderkreisel, we were able to carry out life-cycle analyses of the environmental impacts of shared use and undertake comprehensive surveys of usage patterns and potentials.

A nationwide, representative survey of 2,000 people showed that to date only one in ten was familiar with such offerings, but almost every third person could imagine sharing things via such an online service. With the aid of the online platform Utopia, users of the sharing platforms of our four industry partners were also queried. The research results show that peer-to-peer sharing is positively valued overall. The primary motive is saving money, but the respondents also recognize the environmental benefits. In order to support internet services in the area of peer-sharing, a guide to various business models has been developed.

Further information: [www.peer-sharing.de](http://www.peer-sharing.de)

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# A Smart and Resilient Energy Supply

Germany has begun a fundamental transformation of its energy supply system: in the future, energy production will be provided by renewable energy. Given that solar and wind power fluctuate according to the weather, the decisive factor for consumption will no longer be demand, but rather supply. To manage this, the use of sophisticated information and communication technology (ICT) is becoming increasingly important in the energy system. Digital services such as flexible electricity tariffs or energy management for prosumer households are one important element of turning power grids into smart grids. But such technologies also make the energy system more complex. Will these make it more susceptible to outages or manipulation? IÖW is investigating various aspects of the deployment of smart-grid technologies in Germany.

## Which Smart Grid do Users Want?

### Participatory Design of Consumer-Oriented Innovations for Smart Grids (InnoSmart)

Period: 09/2013 – 11/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: DIALOGIK, Stuttgart; University of Stuttgart, Institute for Human Engineering and Technology Management (IAT), Stuttgart, ENTEGA, Darmstadt; MVV Energie, Mannheim; EnBW, Karlsruhe

The price of electric power will no longer be fixed in the future, but instead be dependent on how much power wind turbines and solar power plants are currently producing. Intelligent electric meters will respond accordingly to regulate the deferrable demand of devices such as washing machines, dishwashers, and freezers. At the same time, more and more consumers will be storing self-generated power and marketing it.

That, at least, is the theory. But just how clever will these new technologies have to be in order to ensure that the smart grid of the future will become a functioning reality? And how do we deal with concerns about privacy, security, and social justice? In a series of user innovation workshops, the InnoSmart project has been exploring how new products and technologies could be designed to meet the needs of private customers. Participating energy suppliers have subsequently begun to rethink their existing smart grid developments and explore ideas for new business models, for example, an app for the convenient charge management of electric vehicles or the operation of community energy storage systems. The convergence between energy suppliers and end users must be considered in a regional context.

The website [www.partizipativ-innovativ.de](http://www.partizipativ-innovativ.de) offers a toolbox of creative methods and ideas designed to help companies as well as civil society and political stakeholders integrate end users into innovation processes and thus develop business models or products that better meet the requirements of customers. Information about the project and six InnoSmart work reports for download are available here: [www.innosmart-projekt.de](http://www.innosmart-projekt.de)

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## How Vulnerable is the Power Supply?

### IT and the Electrical Power Supply: Potentials and Risks of Coupling with Respect to Vulnerability and Resilience

Period: 09/2015 – 11/2017

Supported by: Federal Ministry of Education and Research (BMBF), Berlin  
Cooperation partners: University of Bremen

Nowadays, virtually all areas of living and working are highly dependent on a reliable power supply. Germany faces a fundamental transformation of its energy system – the so-called *Energiewende* – which in the future will be dominated by weather-dependent, fluctuating renewable energies, i.e., wind and solar power. Such variability will require diverse flexibility to balance supply and demand, which in turn will require the increased use of information and communication technologies (ICT) in the energy system to ensure a high degree of supply reliability. Further global driving factors for the expanded use of ICT in the power system are the global trends of smart grids and Industry 4.0 – the fourth industrial revolution, i.e. industrial digitalization. The increasing use of ICT results in supplemental vulnerabilities for the energy system regarding complexity, failures, and external manipulation. Several international examples already show the possible impact and high relevance of cyberwarfare and cyberterrorism, e.g., the power outage in Ukraine (2015). At the same time, an advancing decentralization and increased granularity of the energy system may reduce its vulnerability to large-scale, long-lasting power outages (blackouts) and could favor restoration efforts when such events arise.

The project *Strom-Resilienz* (Power Resilience) aims to capture the opportunities and risks of digitizing the power supply in its entirety. Potential external disturbances and unintended interactions are to be taken into account as well as technical realization and the speed of conversion of such systems. Explicit uncertainties such as these are being mapped out by the project team on the basis of a vulnerability and resilience assessment approach.

The project team is conducting expert surveys and workshops with stakeholders from the areas of both research and practice in the energy and IT security sectors. The focus of the analysis is on the vulnerability of the power system to specific disruptions such as IT hacker attacks, as well as structural vulnerabilities. This will allow us to determine possible options and system variants by which to minimize the vulnerability of the power supply in the future and maximize its resilience.

Further information: [www.strom-resilienz.de](http://www.strom-resilienz.de)

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## Selected Publications and Presentations

Ferdinand, Jan-Peter; Petschow, Ulrich; Dickel, Sascha (2016)

**The Decentralized and Networked Future of Value Creation – 3D Printing and its Implications for Society, Industry, and Sustainable Development**

Springer

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Gossen, Maike (2017)

Presentation **'Peer-to-Peer Sharing in Germany – Empirical Insights into Usage Patterns and Future Potential. Results of Two Quantitative Online Surveys'**

4th International Workshop on the Sharing Economy (IWSE)

15-16 June 2017, Lund, Sweden

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Hofmann, Esther (2016)

Presentation **'Energy Users and the Smart Grid'**

15th Annual STS Conference – Critical Issues in Science, Technology and Society Studies

9 May 2016, Graz, Austria

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Hofmann, Esther (2016):

Presentation **'Integrating Users in Smart Grid Innovations'**

3rd Energy and Society Conference

14 September 2016, Leipzig

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Scholl, Gerd (2016)

Presentation **'Practice and Perception of Peer-to-Peer Sharing'**

2nd International Workshop on the Sharing Economy, ESCP

28-29 January 2016, Paris, France



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# Climate and Energy

TOPIC



## Berlin and Munich: Two Major German Cities Adapt to Climate Change

### Adapting to the Impacts of Climate Change in Berlin (AFOK Berlin)

Period: 12/2014 – 02/2016

Supported by: Senate Department for Urban Development and the Environment, Berlin

Cooperation partner: Potsdam Institute for Climate Impact Research, Potsdam

### Adaptation Concept to the Impacts of Climate Change in Munich

Period: 01/2015 – 04/2016

Supported by: City of Munich

Cooperation partner: bifa Environmental Institute, Augsburg

In addition to climate change mitigation, the necessity of adapting to unavoidable climatic impacts is globally on the rise. Large cities especially are vulnerable and need to address climate adaptation strategically. The two major cities of Berlin and Munich both developed climate adaptation concepts in 2016 with the support of IÖW. In Berlin, IÖW was mainly involved in developing content for several action areas, whereas in Munich it was in charge of supporting the administrative process and drafting the final adaptation concept.

The concepts are key elements of the cities' municipal climate policies, embedded in a range of already existing plans, programs and projects, as well as resolutions and acts. At their heart are strategies and measures to minimize climate impacts resulting from the increase of average temperatures, a shift in rainfall patterns, and weather extremes such as extreme heat, heavy rains, and storm events. The development of adaptation measures supports the goals of increased public awareness and protection of the local population and urban infrastructure against critical damage.

How did Berlin and Munich proceed in planning climate change adaptation?

In order to get a better picture, it is worth taking a closer look at the drafting process and the content of the two concepts. Each city pursued its own approach. Both approaches can serve as models and impetus for other major cities, both in Germany and abroad, when they come to drafting their own concepts.

In Berlin, the adaptation plan constitutes the strategic frame for adapting and accommodating environment, economy and society to possible effects of climate change while at the same time sustaining the quality of life in the city. The concept therefore follows a broad approach covering nine action areas, including for instance human health and civil protection; buildings, urban development, green and public spaces; and education. In deriving a series of applicable measures, the project team considered various climate scenarios, with both near (2050) and distant (2100) time frames. The proposed measures target, among others, the

allocation of green space within the city to counteract increasing temperatures as well as the smart use of urban space to accommodate excess flood water and its systematic evaporation on warmer days.

The Berlin concept was drafted in a participatory way by conducting interviews and workshops with a range of city stakeholders; more than 100 participants shared their knowledge and expertise. Currently, the major challenge will be the implementation of the adaptation concept and the provision of necessary resources. This will require public discussion of the set of proposed measures.

The major aim for the City of Munich was to develop an implementation-oriented adaptation concept for facing the urban challenges of climate change. Together with the various divisions of the city administration, the project team developed a concept that included measures covering action areas such as city development and green urban spaces and buildings, precipitation and water, land use and ecosystems, and human health. Specific measures address, for instance, the further integration of climate adaptation within city planning, the expansion of climate-oriented green spaces, and an analysis of the potential for the greening of roofs, facades, and courtyards.

Additionally in Munich, in order to provide further guidance for the development of climate adaptation strategies and measures within the city, climate experts were consulted and a map covering various climate functions was established as a basis for further climate-oriented urban planning processes. Support and political legitimization of the concept's implementation was provided by a resolution of the Munich city council.

Further information on the adaptation concept of Berlin: [www.berlin.de](http://www.berlin.de)

Further information on the adaptation concept of Munich (in German): [www.muenchen.de](http://www.muenchen.de)

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# A Social-ecological Approach to the Heating Transition in Berlin

## Urban Heat Shift – Participatory Transformation of Coupled Infrastructures, Focusing on Heating Supply in Berlin

Period: 06/2016 – 05/2019

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: Senate Department for Urban Development and the Environment, Berlin;

Technische Universität Berlin, Department of Economic and Infrastructure Policy, Berlin;

Bremen University, Department for Resilient Energy Systems

Around the world, roughly three-fourths of the resources we use are consumed in our cities, accounting for almost 80% of CO<sub>2</sub> emissions. Urban living spaces thus are a key component in solving global challenges such as climate change, the transition toward sustainable energy, and resource conservation. As studies such as the Heat Roadmap show, district heating (distributed heating) has an important role in the future of the sustainable energy system. But in order to reach the goal of a sustainable heating system, radical changes are necessary: low-temperature district heating networks will have to interact with low-energy buildings as part of an integrated smart energy system. In our cities, in particular, one key to a greater share of renewable heat energy is the intelligent networking of district heating, natural gas, and electric power infrastructures. While more than 30% of electricity generation is already based on renewable energies, almost 90% of our energy for heating in Germany is still produced from fossil fuels. At the present time, various blueprints for the supply of heating in the future are being discussed. Possible strategies for the heating transition in urban areas include strengthening central network infrastructures, expanding low-temperature networks, and installing decentralized heating systems based on renewable energies. However, there is still much uncertainty among political decision-makers and stakeholders as to which strategies are the most advantageous with respect to the social-ecological aspects.

## OPTIONS FOR THE HEATING SUPPLY OF THE FUTURE

Taking the city of Berlin as its example, the project Urban Heat Shift is investigating the sustainability of various options for supplying heat. Its goal is to develop recommendations regarding the various options for the transition to more efficient and sustainable heating in Berlin and thereby initiate a process of transformation. The research project thus ties in with the Berlin Energy and Climate Protection Program, in whose development IÖW played a leading role in 2015.

The project team is designing and evaluating future heating supply scenarios for three neighborhoods within the city. These “real-world labs” were selected in order to address some of the key questions, for example, how to make greener the still largely fossil fuel-based district heating supply in Berlin. The approaches under consideration range from power-to-heat systems in combination with combined heat and power (CHP) to the integration of decentralized renewable energy through the splitting off of sub-networks and reduction of operating temperatures. In network fringe areas, the question arises as to whether it is advantageous to supply buildings via district heating lines or rather by direct on-site heat generation.

In addition to climate impact, there are other aspects that must be considered in the evaluation of future options; the criteria include economic viability and regional value added, further ecological indicators, and also resilience and vulnerability of future systems. In addition, the researchers are looking at the various governance and ownership structures with respect to the supply of heating and their long-term capacity to sustainably transform urban infrastructure.





# Prosumers: The Future of the Energy System?

## **PARTICIPATORY PROCESS FOR THE PROFESSIONAL PUBLIC**

Stakeholders and interested professionals can become involved in the project by means of a citywide participatory process as well as in the three neighborhood real-world labs. The participatory formats are designed to initiate processes of transformation in the supply of heating through the exchange of ideas with local stakeholders.

When completed, the project should provide us with a much improved set of data on the energy and heating infrastructure in Berlin. In addition, it is anticipated that transferable recommendations will come out of the three real-world labs that can also support the transformation of technical infrastructures in other cities. The assessment methods and tools being (further) developed should be equally applicable to other urban centers. The project thus extends beyond the city limits of Berlin and will convey approaches to and expertise on the transformation of urban energy infrastructures more generally. Further information:

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## **Private Households as New Key Actors in the Energy System's Transformation Process**

Period: 04/2013 – 06/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: RWTH Aachen, Institute for Future Energy Consumer Needs and Behavior (FCN); GWS – Institute of Economic Structures Research, Osnabrück



Considerably more than one million photovoltaic plants are now generating solar power in Germany. Many of them are located on the roofs of private households. The result is a unique hybrid: their owners are producers as well as consumers of electrical power. In recent years, these so-called “prosumers” have become increasingly important for the social-ecological transformation of the energy system.

In international comparisons, Germany is still playing catch up, as renewable energy has long been used for the self-sufficient supply of energy in other countries, especially in southern regions and remote areas.

The goal of the Prosumer Households project was to investigate the behavior of these energy-producing households and their influence on the energy system. Additionally, macroeconomic developments and distribution effects of “prosuming” were analyzed. In order to investigate effects on grid stability, IÖW turned to its own prosumer model. Modeling calculations have shown that reliance on a number of different prosumer technologies promotes grid stability. The beneficial effects for the power grid and the energy supply can be further increased by reasonable management of private consumption behavior, for example, load-dependent tariffs or demand side management.

## **POLICY RECOMMENDATIONS**

The policy paper “Prosumer households: Recommendations for a Socially Responsible and Systematic Promotion Policy” explains how the stability of the entire energy system can profit from the further development of decentralized energy production and self-supply if feed-in tariffs and self-supply can be appropriately managed. The paper contains a number of proposals as to how public policy can efficiently promote the generation of electricity by private households for their own use. The recommendations take into account the diverse restrictions, needs, and behaviors of the private household, while also acknowledging the ecological and economic conflicts of goals between micro-economic and national interests.

Further information: [www.prosumer-haushalte.de](http://www.prosumer-haushalte.de)

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## Further Projects

### **Designetz: A Modular Concept for the Energy Transition – From Isolated Solutions to an Efficient Energy System of the Future**

Period: 01/2017 – 12/2020

Supported by: Federal Ministry for Economic Affairs and Energy (BMWi), Berlin

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### **AcceptEE – Factors for promoting acceptance of renewable energies**

Period: 12/2016 – 01/2019

Supported by: Federal Agency for Nature Conservation (BfN), Bonn

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### **Internet-Based Value-Added Calculator for Energy-Saving Building Refurbishment**

Period: 01/2016 – 12/2018

Supported by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Berlin

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### **Regional Economic Potentials of Agro-Forestry Systems – Economic Analysis of Value-Added Chains in order to Evaluate and Quantify the Economic Factor of Agro-Forestry Systems in a Model Region of the Research Project AUFWERTEN**

Period: 12/2016 – 12/2017

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **LowExTra – Low-Exergy-Grids for Storing and Distributing Heat at Different Temperature Levels**

Period: 07/2014 – 12/2017

Supported by: Federal Ministry for Economic Affairs and Energy (BMWi), Berlin

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### **Heating with Straw – An Analysis of Regional Economic and Ecological Effects of Straw Fired-Heating Plants**

Period: 07/2016 – 03/2017

Supported by: Federal Ministry of Food and Agriculture (BMEL), Berlin

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### **Resilient Design of the Energy System Exemplified by Options of Transformation in the EE-Methane-System and Regional Self-Sufficiency (RESYSTRA)**

Period: 05/2013 – 11/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **Systemic Transformation of the Energy Supply in the Existing Housing Stock**

Period: 08/2013 – 10/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **Brief study on a Re-Design for the Existing EEG Cost Apportionment**

Period: 09/2016 – 10/2016

Supported by: BNE – Association of Energy Market Innovators, Berlin

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### **Expansion of Renewable Energies – Impacts within an Integrated Socio-Economic and Ecological Overview Analysis**

Period: 05/2016 – 09/2016

Supported by: Office of Technology Assessment at the German Bundestag (TAB), Berlin

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### **Future Building: Quantification of Rebound Effects after Thermal Retrofits of Non-Residential Buildings/ Federal Properties**

Period: 04/2015 – 09/2016

Supported by: Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) within the Federal Office for Building and Regional Planning (BBR), Berlin

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# Selected Publications and Presentations

Dunkelberg, Elisa (2014)

## **A Case-Study Approach to Quantifying Indirect Land-Use Change due to Expanding Biofuels Feedstock Cultivation**

Mensch und Buch Verlag, Berlin, 235 pages, ISBN 9783863874377

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Gähns, Swantje (2016)

## **Presentation 'Modelling of Prosumer-Households for Economic Evaluations – Presentation of the Special Approach for a Prosumer-Model'**

39<sup>th</sup> IAEE International Conference 'Energy: Expectations and Uncertainty'  
22 June 2016, Bergen, Norway

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Gähns, Swantje; Mehler, Katrin; Bost, Mark; Hirschl, Bernd (2015)

## **Acceptance of Ancillary Services and Willingness to Invest in PV-storage-systems**

in: Energy Procedia, 73/2015, pp. 29-36

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Großmann, Doreen; Hirschl, Bernd (2016)

## **Influence of Rebound Effects on the Achievement of Energy Saving Targets after an Increase in Energy Efficiency on Non-Residential Buildings**

in: Bulletin of Prydniprov'ska State Academy of Civil Engineering and Architecture, 3/2016, pp. 27-33

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Heinbach, Katharina; Bost, Mark; Salecki, Steven; Weiß, Julika (2015)

## **Vattenfall's Opportunity – A Future for Lusatia without Lignite**

Report, Download: [www.greenpeace.org](http://www.greenpeace.org)

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Hirschl, Bernd; Harnisch, Richard (2016)

## **Climate-Neutral Berlin 2050 – Recommendations for a Berlin Energy and Climate Protection Programme (BEK)**

Brochure, Download: [www.berlin.de](http://www.berlin.de)

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Moshövel, Janina; Kairies, Kai-Philipp; Magnor, Dirk; Leuthold, Matthias; Bost, Mark; Gähns, Swantje; Szczechowicz, Eva; Cramer, Moritz; Sauer, Dirk Uwe (2015)

## **Analysis of the Maximal Possible Grid Relief From PV-Peak-Power Impacts by Using Storage Systems for Increased Self-Consumption**

in: Applied Energy 137, pp. 567–575

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Raupach-Sumiya, Jörg; Matsubara, Hironao; Prah, Andreas; Aretz, Astrid; Salecki, Steven (2015)

## **Regional Economic Effects of Renewable Energies. Comparing Germany and Japan**

in: Energy, Sustainability and Society, 05/2015

Rommel, Jens; Sagebiel, Julian; Müller, Jakob R. (2016)

## **Quality Uncertainty and the Market for Renewable Energy Evidence from German consumers**

in: Renewable Energy, 94, pp. 106-113

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Ruppert-Winkel, Chantal; Arlinghaus, Robert; Deppisch, Sonja; Eisenack, Klaus; Gottschlich, Daniela; Hirschl, Bernd; Matzdorf, Bettina; Mölders, Tanja; Padmanabhan, Martina; Selbmann, Kirsten; Ziegler, Rafael; Plieninger, Tobias (2015)

## **Characteristics, Emerging Needs, and Challenges of Transdisciplinary Sustainability Science – Experiences from the German Social-Ecological Research Program**

in: Ecology and Society, 20 (3), p. 13

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Weiß, Julika (2016)

## **Presentation 'Rebound Effects in Non-Residential Public Service Buildings'**

Berlin Seminar on Energy and Climate Policy  
19 April 2016, Berlin

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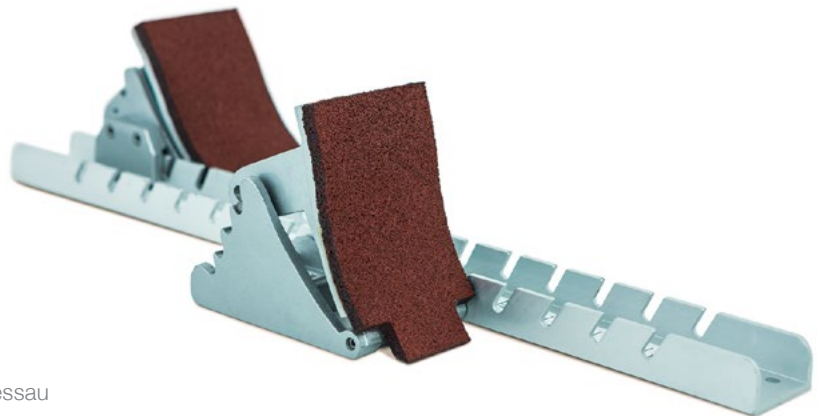
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# Products and Consumption

TOPIC

## Stimulating Eco-Innovation through Consumer Demand



### **Concentrating Market Power: Bulk Consumers as Drivers of Eco-Innovation and Sustainable Consumption**

Period: 08/2012 – 10/2014

Supported by: Federal Environment Agency (UBA), Dessau

Cooperation partners: Institute for Resource Efficiency and Energy  
Strategies (IREES), Karlsruhe;

Fraunhofer Institute for Systems and Innovation Research (ISI), Karlsruhe

### **Scientific Support of Processes for a Green Public Procurement (GPP)**

Period: 09/2013 – 02/2017

Supported by: Federal Environment Agency (UBA), Dessau

Cooperation partners: Oeko-Institut, Freiburg

### **Scientific Support of Processes for an Enforced Consideration of Environmental Criteria in Public Procurement (GPP)**

Period: 09/2015 – 11/2018

Supported by: Federal Environment Agency (UBA), Dessau

Cooperation partners: Oeko-Institut, Freiburg

Eco-innovation is viewed as the motor of a “green economy”. Innovations that contribute to reduced levels of environmental pollution, for example, are promoted and supported by innovation policy. For more than a decade now, consumer-based policy approaches, i.e. strengthening demand for eco-innovation, have increasingly attracted attention and gained in importance in many countries. The OECD and EU are also pursuing such an approach. Both public procurement and private households are capable of generating increased consumer demand for eco-innovation and are hence targeted by such approaches.

IÖW has led various projects supporting procurement efforts that contribute to a more sustainable economy. In several projects, IÖW and the Oeko-Institut in Freiburg are supporting the German Federal Environment Agency (UBA) to promote such public procurement efforts both nationally and internationally. For example, together with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the institutes developed a multi-stage action plan to gradually increase the procurement share of textiles manufactured according to ecological

and social requirements to 50 percent by 2020 at the highest level of German Federal authorities. Ancillary work includes the production of additional content for the website [www.beschaffung-info.de](http://www.beschaffung-info.de) to be completed by mid-2018, the preparation of tender recommendations, and updating of UBA public procurement training scripts.

Non-governmental large-scale consumers – commercial or uncommercial – are a further segment of market demand. To date, one that has received little attention. This includes commercial enterprises, churches, and associations. As purchasers or users they tend to comprise a significant share in their respective market segments, either singularly, by reason of size, or by acting in collaboration with similar market actors. For the Federal Environment Agency IÖW worked on a systematic overview of relevant non-governmental large-scale purchasers in Germany and identified environmental innovations of great ecological relevance that are nonetheless still struggling with market entry barriers. The project team developed environmental policy proposals designed to motivate large-scale consumers to pool their market power and demand for environmentally responsive innovation, thus helping reduce market entry barriers to eco-innovation efforts.



On the basis of an extensive literature review, an overview of large-scale consumers in Germany was compiled. Additionally the project team – consisting of the Institute for Resource Efficiency and Energy Strategies (IREES), the Fraunhofer Institute for System and Innovation Research (ISI) and IÖW – identified three eco-innovations with high environmental relevance: energy-efficient commercial clothes dryers, organic or recycled cotton fibres, and passenger car air-conditioning systems based on CO<sub>2</sub> refrigerant. In technical discussions at the Federal Environment Agency, options available to large-scale consumers in shaping the demand for these innovations were explored. In addition, theory and practice were extended through case studies and expert interviews.

Conceivable measures for engaging these large-scale consumers through (environmental) political measures include regulatory approaches, such as the use of specifications and liability regulations, and economic incentives, in the form of tax relief or an innovation fund. A prize for innovation could also be effective. Also mutual exchanges of information and joint measures can be envisaged, for example action plans for market development.

All told, the project leads to the conclusion that the engagement of large-scale consumers as buyers and users of eco-innovation to increase the market share of environmentally friendly services and technologies represents a promising strategy. However, further empirical research is necessary in order to assess the prospects for success in depth. The results of this project were published by the Federal Environment Agency in the monograph series (Texte 51/2015).

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# How to Become a Climate Citizen?

## Climate Citizens: New Civic Roles, Opportunities, and Responsibilities in the Transformation of the Energy System

Period: 04/2013 – 06/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: Saarland University (coordination), Saarbrücken;

zeppelin university bridging business, culture and politics, Friedrichshafen

The Paris Climate Agreement recognizes the need for public participation and cooperation at all political and administrative levels to mitigate greenhouse gas emissions and achieve effective climate change adaptation measures. Even though such public participation is not set forth in detail or in binding form, the parties to the agreement, including Germany, thus underscore the position of the Ethics Commission of the German Bundestag, which has characterized the transformation of our energy system – the Energiewende (energy transition) – as a “cooperative effort.”

Municipalities in Germany will only be able to achieve their climate protection goals by working together with local citizens. Public participatory processes are thus essential: Whether local citizens accept projects such as the development of renewable energy in their hometown or get involved in protecting the climate often depends on the extent and quality of participatory processes. Citizens are no longer solely energy consumers, but able to actively shape the energy system: they invest, for example, in renewable energy or energy efficiency projects; as prosumers they generate energy for personal use or to feed into the grid, and they initiate citizen projects and protests.

The project Climate Citizens looked at the roles in which citizens can engage with and influence such issues, and identified approaches by which municipalities can support and initiate greater civic participation and activism. More than 40 citizens were interviewed and four focus groups were carried out in order to analyze the motives behind civic commitment and to consider which conditions could encourage greater community involvement. Subsequently, a sampling of more than 2,200 citizens in four selected regions was conducted in order to obtain a broader look at the potential for civic engagement among the public at large.

The results show that some of these engaged individuals were initially only active in a single role – e.g., politically, or as an investor. This involvement then later expanded to further activities in other areas. Thus initial involvement in a single role influences behavior and encourages further involvement in other topics and roles.

## FIELD TESTS FOR LOCALLY INITIATED CLIMATE PROTECTION MEASURES

As a part of the project, several measures were implemented and followed in various field tests, for example, an electric energy-efficiency competition in Heidelberg/Germany among private households, or a competition among sports clubs in the district of Steinfurt/Germany to increase citizen awareness of energy consumption and the potential for savings. In cooperation with the foundation Klimaschutz+, a carbon offset payment mechanism was developed to enable air travel passengers to take responsibility for their own greenhouse gas emissions, with the payments going to support local climate projects. The field test findings and possibilities as to how citizens can participate in the development of climate protection strategies were published in the booklet “Der Weg zum Klimabürger” (Becoming a Climate Citizen). The publication addresses municipal actors, such as climate protection managers and representatives, as well as civil society initiatives and actors, and presents eight strategies for creative and effective civic engagement.

Step by step, the guide shows how municipalities can identify their potential for energy development projects and the opportunities they can use to implement them and engage their local citizens as consumers, investors, and social and political actors. The guide can be downloaded from [ioew.de](http://ioew.de) or ordered free of charge as a printed copy.

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## Selected Publications and Presentations

Martinuzzi, André; Scholl, Gerd (2016)

### **Advancing Evidence-Informed Sustainable Development Policies – Editorial**

in: Evidence & Policy, Vol. 12, No. 3, pp. 311-319

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Rommel, Jens; Sagebiel, Julian; Müller, Jakob R. (2016)

### **Quality Uncertainty and the Market for Renewable Energy Evidence from German Consumers**

In: Renewable Energy, 94, pp. 106-113

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Sagebiel, Julian (2017)

### **Preference Heterogeneity in Energy Discrete Choice Experiments – A Review on Methods for Model Selection**

In: Renewable and Sustainable Energy Reviews 69, pp. 804-811

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Scholl, Gerd (2016)

### **Presentation 'Promoting Sustainable Consumption'**

Green Talents Alumni Conference

27 October 2016, Berlin

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Scholl, Gerd (2015)

### **Step Across the Border: Knowledge Brokerage for Sustainable Consumption**

In: Reisch, Lucia A.; Thøgersen, John (Eds., 2015): Handbook of Research on Sustainable Consumption, Edward Elgar Publishing, Cheltenham, UK, pp. 359-374

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Scholl, Gerd et al. (2016)

### **CORPUS – Linking Research and Policy for Evidence-Based Policy-Making on Sustainable Consumption**

in: Martinuzzi, André; Sedlacko, Michal (Eds., 2016): Knowledge Brokerage for Sustainable Development. Innovative Tools for Increasing Research Impact and Evidence-Based Policy-Making. Saltaire: Greenleaf Publishing, pp. 153-169

## Further Projects

### **Carbon-Neutral Regions as Strategic Approach for Support of Sustainable Consumption Patterns – Analysis and Development of Political Recommendations**

Period: 09/2016 – 10/2018

Supported by: German Federal Environment Agency (UBA), Dessau

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### **ShareWay – Advancement of Shared Mobility to the 3rd generation: Study on the Current Austrian and International State of Research, Development and Implementation of Shared Mobility Solutions**

Period: 02/2015 – 02/2016

Supported by: Austrian Research Promotion Agency (FFG)

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### **Linking Innovative Forms of Living with Mobility Services in Business Models**

Period: 06/2015 – 05/2018

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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# Sustainable Corporate Management

TOPIC

## Businesses Must Be More Transparent About Their Supplier Relationships

### Ranking of Sustainability Reports 2015

Period: 10/2015 – 12/2016

Supported by: Federal Ministry of Labour and Social Affairs (BMAS), Berlin

Cooperation partner: future – verantwortung unternehmen, Münster

Business enterprises are becoming increasingly aware of the importance of transparency regarding human rights, labor, social, and environmental issues. Multinational corporations in particular have a responsibility to see that supply chain standards and terms of production in foreign countries are adhered to.

But how much do the sustainability reports published by German companies actually tell us? The independent ranking of sustainability reports, funded by the Federal Ministry of Labour and Social Affairs and published for the ninth time by IÖW and the business association future, has been an important point of reference in this regard since 1994.

Many German companies have been reporting voluntarily for some time now on social and environmental issues. Based on a comprehensive set of social, environmental, management, and communication-related criteria, the ranking evaluates the sustainability reports of major German companies as well as small and medium-sized enterprises (SMEs) and creates a ranking of the best sustainability reports. The ranking thus provides company recognition for participation in the reporting process, but at the same time offers a competitive incentive to further increase the quality of the reporting.

According to the most recent ranking, the number of companies reporting has increased. Of the 150 largest German companies, 72 are currently reporting on sustainability issues, either separately or in an integrated annual report (as of January 2016). The number of companies providing information to their stakeholders in other ways – for example, in the parent company's sustainability report, in the annual report, online, or by means of a brochure or partial report – has also increased. Nevertheless, of the 150 largest German companies, 22 still publish little or no information on social and environmental issues relevant to their operations. For

SMEs, the number of sustainability reports recorded rose to 165 (as of February 2016).

Three large companies, as well as three small and medium-sized enterprises, were honoured for their exemplary degree of transparency on the premises of the Federal Ministry of Labour. The highest-ranked sustainability reports from the group of 150 largest German companies were those published by BMW, Miele, and KfW Group. Among small and medium-sized businesses, the organic food pioneer Lebensbaum, the outdoor equipment supplier Vaude, and the concrete and natural stone manufacturer Rinn were recognized.



### SUPPLY CHAINS ARE OFTEN STILL IN THE DARK

A focal point of the 2015 rankings was the supply chain. While it is clear that more and more companies are seeking sustainability and transparency, the conditions under which raw materials are supplied, or intermediate (upstream) production takes place, are often still kept under wraps.

The analysis of the sustainability reports shows that supply chain responsibility and risks have not yet been sufficiently accounted for in any industrial sector. Less than half of the companies, for example, clearly identify their most important procurements and back them up with figures. Information on the regional point of origin of the suppliers is missing in many reports. Issues such as addressing ancillary industry employment standards, for example, or the environmental impact of product delivery and the resolution of possible conflicts, are still not sufficiently represented.

### GOOD EXAMPLES SHOW HOW SUPPLY CHAINS CAN BE MADE MORE TRANSPARENT

Good examples of informative supply chain reporting practice are reported in detail in "Das Ranking der Nachhaltigkeitsberichte 2015 – Ergebnisse, Trends und Branchenauswertungen" (Ranking



of the 2015 Sustainability Reports – Results, Trends and Sector Evaluations). The sporting goods company Adidas, for example, discloses all suppliers – direct suppliers as well as subcontractors and licensees. The mercantile concern Otto provides quantitative data on environmental impacts and social risks in the supply chain and information about social programs for suppliers in at-risk countries. The textile business Hess Natur releases the results of its supplier audits. But altogether, only 33 percent of the reports of large companies and 20 percent of the reports from SMEs provide hard numbers from supply chain audits.

Beginning in 2017, large capital market-oriented companies in particular are obliged, according to an EU directive, to provide information on measures to protect the environment and climate and to ensure that their supplier companies respect human rights. It is estimated that more 500 companies in Germany will be subject to this new reporting obligation. In numerous workshops throughout Germany, IÖW and future e.V. have been working together to help large and medium-sized companies prepare for this.

The full results of the ranking and further information can be found here: [www.ranking-nachhaltigkeitsberichte.de](http://www.ranking-nachhaltigkeitsberichte.de)

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## Further Projects

### **Innovative Cooperations of NGOs and Corporations for a Sustainable Economy**

Period: 07/2016 – 06/2017

Supported by: Federal Environment Agency (UBA), Dessau

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### **Procurement Specifications Considering Biodiversity – Feasibility Study and Action Plans for German Public Procurement and the Construction Sector**

Period: 01/2016 – 06/2017

Supported by: Federal Agency for Nature Conservation (BfN), Bonn

## Event

23 September 2016

### **CSR-Reporting before the Reporting Duty**

Conference of the project 'Ranking of Sustainability Reports'  
Berlin, 140 Participants

## Selected Publications and Presentations

Bauer, Stefanie; Thobe, Ines; Wolter, Marc Ingo; Helmrich, Dr. Robert; Schandock, Manuel; Zika, Gerd; Röttger, Christof; Mohaupt, Franziska (2017)

### **Qualification, Professions and Branches for the Transition to a Green Economy – an Inventory**

Report, Dessau, Download: [www.umweltbundesamt.de](http://www.umweltbundesamt.de)

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Dietsche, Christian; Liesen, Andrea; Gebauer, Jana (2015)

### **Successful Non-Growing Companies**

in: Humanistic Management Network, Research Paper Series No. 25/15

Download: [papers.ssrn.com](http://papers.ssrn.com)

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Hoffmann, Esther; Fünning, Harriet; Dietsche, Christian (2016)

### **Ranking of Sustainability Reports by IÖW and Future**

in: Ökologisches Wirtschaften, 31/4, pp. 10-11

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Rotter, Maja; Hoffmann, Esther; Pechan, Anna; Stecker, Rebecca (2016)

### **Competing Priorities – How Actors and Institutions Influence Adaptation of the German Railway System**

in: Climatic Change (2016) 137, pp. 609–623

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Ziegler, Rafael; Partzsch, Lena; Gebauer, Jana; Henkel, Marianne; Lodemann, Justus; Mohaupt, Franziska (2014)

### **Social Entrepreneurship in the Water Sector – Getting Things Done Sustainably**

Edward Elgar, Northhampton

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# Environmental Policy

## and Governance

TOPIC

### Climate-resilient Infrastructures

**KLARIS: Needs and Opportunities for Climate-resilient and Sustainable Design of National and Cross-border Infrastructures**

Period: 10/2014 – 10/2017

Supported by: Federal Environment Agency (UBA), Dessau

Cooperation partners: German Institute of Urban Affairs (Difu), Berlin; University of Stuttgart

Infrastructures – the underlying structural frameworks of our energy, mobility, information and communication, and public utility systems – are the prerequisite for a functioning society. They define and organize our opportunities and possibilities. Each of these major sectors relies on its own sophisticated infrastructure. Climate change and new technological and social requirements impose important challenges for the future functionality of these systems.

The KLARIS research project's initial goal was to analyze and systematize existing knowledge of these infrastructures in terms of the dynamics of change, overall design principles, interdependencies, and future design possibilities and needs. The analyses were conducted against a background of the growing structural interdependencies, such as the coupling of the electric power and mobility sectors and the rapidly expanding scope of the information and communication technologies sector.

While there is still insufficient knowledge on the design principles of resilience regarding these new developments, it can be assumed that such growing interdependencies may ultimately lead to a so-called “mega-infrastructure” and new vulnerabilities.

The starting point was an extensive analysis of the

literature on climate-resilient, sustainable, and “future-proof” infrastructures, with a specific focus on development and design requirements. To understand the current capacities and interdependencies of such infrastructures, a system model of the status quo was first developed. The model reflects the performance parameters and capabilities of the specific infrastructures as well as a material flow analysis for modeling their interdependencies.

As a second step, the project shifted its focus to the future of such infrastructures. Scenarios for the future development of infrastructure capacities were compared with an analysis of the system dynamics of the specific infrastructures. A particular focus was on the possibilities of increased interdependencies among infrastructures. One perspective on the growing interdependence and relevance of ICT can be found, for example, in the electricity and transport sectors: the growing reliance on the availability of electric power for automotive mobility means that a failure of the one infrastructure would have a major impact on the other. Finally, one of the goals was to assess infrastructure climate resilience. The team did so by analyzing a wide range of extreme weather events in order to understand the impact chain of these events on infrastructure supply as well as the downstream and feedback effects on other infrastructures.

The project team organized workshops in two cities (Cologne and Dessau); these focused on the design of infrastructures in light of possible learning effects after extreme weather events. The workshops addressed questions of infrastructure as socio-economic systems, analyzing the governance processes of infrastructure design. The participants, which included representatives from various sectors, including administrators, network operators, and firefighters, among others, were thus able to step outside of their own narrow frame of reference in discussions with respect to the various technical infrastructures and their interdependencies. The major outcome of these workshops was the determination that communication and learning processes relying on a comprehensive approach and including a wide range of stakeholders are highly important in adapting infrastructures to the future. In this context, it is especially important to modify the segmented, sector-specific planning approaches of the various infrastructures.

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# Environmental Awareness in Times of Change

## Representative Survey of Environmental Awareness and Behavior in 2016 Including Socioscientific Analyses

Period: 11/2015 – 05/2017

Supported by: Federal Environment Agency (UBA), Dessau; Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Berlin

Cooperation partners: Sociodimensions, Heidelberg; Holzhauerei, Mannheim

Germany is regarded worldwide in many areas as a pioneer of environmental protection and Germans are known for their strong sense of environmental awareness. Whether this is really the case is the subject of an environmental awareness study that the Federal Government has been conducting at two-year intervals since 1996. Empirical insights into the environmental awareness and behavior of German citizens are an important prerequisite for effective environmental policy and purposeful communication of policy goals. Since 1996, data have been collected systematically every two years, providing information on our attitudes to environmental issues and how we practice environmental protection in our daily lives. In 2016, IÖW, together with its market and social research partners, carried out the “Environmental Awareness in Germany” representative survey for the second time in a row.

The study project consisted of an online representative survey of the German-speaking population, age 14 and older. Among other things, participants were asked about their views on environmental and climate protection, their mobility behavior, and the topics of health and nutrition. Before the survey, a qualitative study was carried out. In a mixed-methods approach consisting of focus groups and a moderated online community, men and women from all social milieus and age groups dealt intensively with questions of social-ecological change. The insights thus acquired were used in designing questions for the representative survey and were also considered when interpreting the data.

### FOR THE MAJORITY, “BUSINESS AS USUAL” IS NOT A SOLUTION

First of all, the survey showed that despite massive changes in our perception of current problems and issues, public awareness of environmental and climate protection remains stable. In an open question regarding the most urgent challenges facing us, environmental and climate protection rank third, named by 21 percent of the respondents – two percentage points higher than two years earlier. During the same period, other concerns have become significantly more prominent: The two foremost collective issues for roughly half of those sampled were immigration and migration (55 percent) and crime, peace, and security (47 percent); in 2014 these drew only 18 and 20 percent respectively.

The survey also showed that in the long term, the majority believe “business as usual” is not a solution: people take the long-term threat to our natural resources very seriously. More than 90 percent of the respondents perceived the risks of plastic waste in the world’s oceans or the deforestation of forests as a threat. And three-fourths of the sample population either mostly or fully agreed that our energy-, resource-, and waste-intensive economy and lifestyle are in need of a fundamental transformation; in order to implement the necessary changes,



market mechanisms alone are not enough, according to 61 percent of the respondents. Rather, the vast majority (91 percent) considers it necessary to regulate the economy and the markets in such a way that environmental pollution is minimized. Finally it becomes clear that social justice remains an important issue in environmental and climate policy. Seventeen percent of the respondents were of the opinion that progress has to first be made with respect to questions of social justice before environmental and climate protection can be addressed, and another third believe that along with environmental and climate protection, there must at least be some room for compromise when it comes to social objectives. On the other hand, 37 percent of respondents were of the opinion that environmental and climate protections are an important prerequisite for achieving greater social justice. This is higher than in previous surveys, but these contrasting viewpoints suggest that conflicting objectives are still being seen.

Download the brochure “Umweltbewusstsein in Deutschland 2016” (Environmental Awareness in Germany 2016) here: [www.bmub.bund.de](http://www.bmub.bund.de)

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# Shaping a Post-growth Society

## Approaches to Resource Conservation in the Context of Degrowth Concepts

Period: 12/2015 – 02/2019

Supported by: Federal Environment Agency (UBA), Dessau  
Cooperation partners: Wuppertal Institute for Climate, Environment and Energy; Leibniz Institute for Economic Research (RWI), Essen

The risk of exceeding planetary boundaries makes apparent the need for an economic, political, and societal transformation. The project is analyzing the various (economic) approaches to resource conservation, from green growth to post-growth and degrowth, and exploring the contributions that such approaches, based on working toward a growth-neutral society, can provide to resource conservation. As a first step, the team is identifying those societal elements considered to be drivers of economic growth within the respective discourses and analyzing the degree to which societal institutions are dependent on economic growth. Once this is understood, it may be possible to weaken the effect of such drivers and thus free these institutions from their growth dependencies. As a second step, the team is addressing the question of what these ideas may be able to contribute to reducing resource consumption. Finally, the project will prepare a conceptual plan for a resource-light post-growth society and a pathway to its realization.

A scientific advisory board that consists in part of scientific members of the German federal parliament's study commission Growth, Wealth, Quality of Life – Ways to a Sustainability and Progress in the Social Market Economy is supporting the work of the project.

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# A Good Life for Everyone

## Sustainability Strategies and Policies: Challenges and Approaches

Period: 03/2015 – 11/2017

Supported by: Federal Environment Agency (UBA), Dessau  
Cooperation partners: adelphi research, Berlin; Leuphana University of Lüneburg; Ludwig-Maximilian-Universität Munich

Modern environmental and sustainability policy aims at no less than a great transformation of established ways of life within the early-industrialized countries. However, the realization of such a transformation conflates this abstract, long-term goal with many short-term challenges: migration, empty public budgets, and ailing infrastructure. How can sustainability be more closely connected to daily political life? How can it be communicated in national debates? And how can it reach a broader public? Several research projects funded by the Federal Environment Agency are studying these questions.

The IÖW project Sustainability Strategies and Policies is examining the relationship between our ideas of a good life and sustainability policy. Many social actors pursue sustainability because a sustainable society holds greater promise of a higher quality of life for all its members. The project team is analyzing current debates on happiness, quality of life, societal well-being, and living the good life in order to learn which of these discourses and good life concepts is most compatible with sustainability policy. We are also trying to ascertain the inherent risks, but also opportunities, for sustainability policy that a focus on one these respective concepts might entail. The ultimate goal is to develop effective policies on sustainable development that to the greatest extent possible do, in fact, improve the quality of life for all members of society.

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## Further Projects

### **Value of Green Urban Spaces – Evaluation, Management and Communication as a Key for Climate Resilient and Near-Natural Green Spaces**

Period: 11/2016 – 10/2019

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **Analysis of Approaches to Alternative Economy: Effects of Sustainability and Need for Action for the State Politics of North Rhine-Westphalia – An Explorative Analysis**

Period: 12/2015 – 02/2017

Supported by: The Ministry for Climate Protection, Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia (MKULNV), Düsseldorf

## Selected Publications and Presentations

Lange, Steffen (2016)

### **Presentation ‘From Capitalism Towards Degrowth: Changes in capitalist institutions for a degrowth economy’**

5th International Conference on Degrowth for Ecological Sustainability and Social Equity

1 September 2016, Budapest, Hungary

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Lange, Steffen (2016)

### **Presentation ‘Macroeconomics Without Growth in Neoclassical, Keynesian and Marxian Theories’**

Towards Pluralism in Macroeconomics? 20 Years-Anniversary Conference of the fmm Research Network of the Macroeconomic Policy Institute (IMK)

22 October 2016, Berlin

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Pissarskoi, Eugen (2016)

### **Presentation ‘Justification of a Climate Policy Goal under Uncertainty: the Controllability Precautionary Principle’**

Conference ‘Climate Justice, Economics and Philosophy’

Cornell University, 24 May 2016, Ithaca, USA

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Pissarskoi, Eugen (2016)

### **Presentation ‘Drivers of Economic Growth’**

5th International Conference on Degrowth for Ecological Sustainability and Social Equity

31 August 2016, Budapest, Hungary

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# Water and Land Management

TOPIC

## Sustaining Seeds and Varieties as Commons

### Right Seeds? Commons-based Rights on Seed and Seed Varieties for a Social-ecological Transformation of Crop Production

Period: 10/2016 – 09/2021

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

Cooperation partners: Carl von Ossietzky University of Oldenburg; Georg-August-Universität, Göttingen



For thousands of years farmers have been breeding varieties and shared and saved seeds. Seeds and varieties were thus originally a common good that was communally cultivated and further developed by farmers. This traditional practice, however, has seen drastic curtailments in recent decades: Transnational agribusiness are increasingly gaining market power and exploit private ownership rights. They predominantly breed hybrid varieties, which cannot be reproduced and can only be used to a limited degree by others due to patent and variety protection laws. This trend threatens agrobiodiversity, ecological sustainability, farmer independence, and the climate resilience of agricultural production worldwide.

In order to counteract these developments and to achieve the international sustainability goals of agrobiodiversity and food sovereignty, a change in seed production and use is necessary. Bringing seed production

and use in line with the Sustainable Development Goals of the United Nations is therefore the starting point of the junior research group Right Seeds.

Commons-based breeding is frequently practiced in the southern hemisphere, but in recent years, German initiatives are also dedicated to this promising approach. In the course of several of doctoral projects, the research team's goal is to explore the potential of commons-based approaches to seed breeding for social-ecological transformation of crop cultivation. The question of how such seed systems could look like is being explored from economic, ecological, political, and ethical perspectives.

IÖW investigates how seed initiatives and socially aware companies already today successfully incorporate commons-principles into their work and organizational structures. A focus lies on exploring possible options for long-term financing of commons-based seed cultivation. Since sources of income such as replication royalties or repurchase requirements are not applicable to commons-based breeding, and since open-pollinated (true-to-seed) breeding is time-consuming and costly, alternative financing strategies have to be developed and tested.

Commons-based business models for seed production and varieties are to be (further) developed through expert interviews, focus groups, and design thinking workshops with seed initiatives, the seed industry, and crop breeders. In order to assess market potential, the project team also explores consumer's willingness-to-pay for commons-based seeds and vegetables and the associated ecosystem services.

The project has several practical partners, including pioneering organizations that are already actively promoting commons-based seed cultivation and production: Kultursaat, Saat:gut, Agrecol, Arche Noah, Bingenheimer Saatgut, and Masipag, in the Philippines. As practical partners in the organic food sector, the Bundesverband Naturkost Naturwaren (Association of Organic Processors, Wholesalers and Retailers) and Tegut are also involved in the project. Collaboration with these partners is by means of regular workshops, as well as through participation in and documentation of north-south exchange processes.

[www.rightseeds.de](http://www.rightseeds.de)

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# Rural Bio-Economy: Multiple Ways to Use Renewable Raw Resources

## Future Potentials of a Rural Bio-Economy – Analysis and Assessment of Value Chains of a Multiple and Cascade-based Usage of Renewable Raw Resources (Phase I)

Period: 04/2016 – 09/2018

Supported by: Federal Ministry of Food and Agriculture (BMEL), Berlin

Cooperation partners: Institute for Applied Material Flow Management (IfaS), Birkenfeld

Bioenergy is a multi-talent – it can be stored as a liquid, gaseous, or solid energy; transported; and used for heat and electricity or as an automotive fuel. This flexibility makes it an important pillar in a renewables-based energy system. Unlike the import of fossil fuels, however, bioenergy contributes to the local economy: the harvesting and processing of raw materials as well as trade and distribution create added value and jobs.

With its Nationale Politikstrategie Bioökonomie (National Bioeconomy Policy Strategy) the federal government is pursuing the goal of creating a resource-efficient economy based on renewable raw resources and a reduction or elimination of fossil raw materials. Presently, Germany is one of the few countries worldwide with a dedicated bioeconomy strategy. Other countries have bioenergy-related or bioenergy-dedicated strategies under development. With regard to the primacy of a secure food supply, renewable raw materials in Germany are also expected to increasingly provide the basis for industry and the production of energy in the future – that is the basic idea. At the same time, rural regions of the country have the potential to be far more than just a raw material supplier: decentralized bioeconomic approaches, which account for a large part of the value added steps within a region, can foster the domestic economy.

What are the possible options then for a rural bioeconomy? And how can these be evaluated economically and ecologically? Together with its project partner, the Institute for Applied Material Flow Management (IfaS), IÖW is investigating the potential of the rural bioeconomy and thus is laying the groundwork for regional bioeconomy concepts and innovative business models in rural regions. To begin with, the project team ascertained the potential for raw materials and land, analyzed the market for selected products and product groups, and reviewed the political and legal framework. Thus the team identifies possible approaches to a regional utilization of biomass – as a raw material resource as well as for energy use. The project team is analyzing the technologies, necessary infrastructures, and material flows for selected utilization paths and looking, in particular, at the products for which there is a regional demand or regional processing capacity, such as the production of insulation materials from fiber plants, or paper and cardboard production from grass. The researchers are also interested in how secondary and residual materials can be utilized. The fermentation residues from biogas production, for example, have so far been only minimally utilized in a higher quality.

The possible value-added and employment effects of a rural bioeconomy in certain areas are evaluated using IÖW's WEBEE model, which has been created for a range of renewable energy value chains. In addition, the potential environmental impacts of the selected value chains, such as greenhouse gas emissions, eutrophication, and acidification will be analyzed. These regional economic and ecological impacts of individual bioeconomic approaches will be calculated on the basis of ideal-typical sample regions and projects. Such a scenario-based projection offers an overview of the impacts for Germany as a whole. Through surveys and workshops further input is being given from experts in the field as well as academia.

One major result of the project is to the drafting of recommendations for the further development of “pioneering practices,” as well as recommendations for shaping the political and legal framework to best promote regional bioeconomy concepts. This could also be of interest for other countries in Europe and beyond.

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# So that Summer Guests won't be Left Sitting High and Dry

## Regional Usage of Groundwater in Climate Change (RegWaKlim)

Period: 01/2016 – 12/2018

Supported by: Federal Ministry for the Environment, Nature Conservation, Building, and Nuclear Safety (BMUB), Berlin

Cooperation partners: Regional Planning Association Vorpommern (RPV VP), Greifswald; UmweltPlan, Stralsund; Ingenieurplanung – Ost (IPO), Greifswald



Is there a risk of water shortages in the holiday regions of the Baltic Sea? Studies show that the drinking water supply in the German coastal region of Vorpommern could be affected by climate change in the future. In regions of growing tourism and increasing agricultural irrigation requirements, in particular, this could lead to water shortages.

The aim of the research project RegWaKlim is to find ways to accommodate regional water requirements in a future marked by changing patterns of precipitation, temperatures, and water usage. To this end, we must take a much broader view and look at the entire planning region of Vorpommern (7,000 km<sup>2</sup>) as a whole, rather than singularly considering the respective constituent water and irrigation districts. Together with the Regional Planning Association Vorpommern, a network comprising regional water players has already been successfully established in the form of a regular regional water forum. In order to best manage the anticipated impacts on water availability, various scenarios for possible measures are being developed in conjunction with the relevant players, including representatives of the water management, agriculture and forestry, tourism, and nature conservation agencies.

Building on the work of the project partners and feedback from the regional water forum, the project team is developing an integrated strategy for the sustainable management of water resources and consumption for the entire region. This will be used to frame the development of specific measures to improve and further develop the Regional Spatial Development Program for the Vorpommern planning region.

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# Valuing Ecosystem Services Holistically

## **Interdependencies between Land Use and Climate Change:**

### **Strategies for a Sustainable Land Use Management in Germany (CC-LandStraD)**

Period: 11/2010 – 04/2016

Supported by: Federal Ministry of Education and Research (BMBF), Bonn

Several cooperation partners

On the global scale, land is a scarce resource and traditional land uses are increasingly under pressure. The project CC-LandStraD developed strategies for sustainable land-use changes and management in Germany focusing on the reduction of greenhouse gas emissions, biomass production, and nature conservation. Within this joint project IÖW created an extended framework for cost-benefit analyses based on the ecosystem services approach. Provisioning ecosystem services, such as food and biomass, were valued using market-based methods. Regulating services, such as carbon sequestration and nutrient retention, were valued on the basis of abatement costs. The values of cultural ecosystem services, such as landscape amenities, were elicited through a representative choice experiment with a representative sample of nearly 10,000 respondents in Germany.

The results show that the highest net benefits could be achieved with a strategy that combines the climate change mitigation goal with an extensification of agricultural production and an enhancement of nature protection. Another strategy, one that focuses on an increase in biomass production for renewable energy uses, is less effective, mainly due to societal costs of nutrient emissions, a deterioration of landscape scenery, and negative effects on biodiversity. The results are presented in both monetary and non-monetary terms, thus leaving the choice open to decision makers as to whether to follow the economic valuation approach applied by IÖW or to weight the effects on the ecosystem by themselves, following a multicriteria approach. These results are highly instructive for other countries that face similar land management problems – as most countries of the world do.

For more information and publications for download: [www.cc-landstrad.de/en](http://www.cc-landstrad.de/en)

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## Further Projects

### **Innovative System Solutions for a Transdisciplinary and Regional Ecological Flood Risk Management and River Basin Management/Water(course) Development Close to Nature**

Period: 04/2015 – 03/2018

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **PADO – Processes and Implications of Dune Breaching at the German Baltic Sea Coast**

Period: 10/2016 – 09/2019

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **Determination of the Value-Added and Employment Effects in Three Selected Bioenergy Regions**

Period: 11/2013 – 09/2016

Supported by: Federal Ministry of Food, Agriculture and Consumer Protection (BMEL), Berlin

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### **Research on Coastal Waters: Joint Research Project SECOS: The Service of Sediments in German Coastal Seas – Project: Monetary Evaluation**

Period: 04/2013 – 03/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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## Berlin DCE Colloquium

Discrete choice experiments (DCE) are a technique for measuring preferences and can be used, for example, to derive our willingness to pay for non-market and public goods. The method is especially well established in the environmental and sustainability sciences and finds application in areas such as sustainable consumption, sustainable land use, water management, and renewable energies.

The Berlin DCE Colloquium is organized by IÖW and Technische Universität Berlin; its goals are to promote exchange between scientists concerned with this method and to establish a regional network.

The colloquium takes place every two months and is held in the English language.

[www.ioew.de/berlin-dce-colloquium](http://www.ioew.de/berlin-dce-colloquium)

## Selected Publications and Presentations

Dunkelberg, Elisa; Finkbeiner, Matthias; Hirschl, Bernd (2014)

### **Sugarcane Ethanol Production in Malawi: Measures to Optimize the Carbon Footprint and to Avoid Indirect Emissions**

in: Biomass and Bioenergy, 71, pp. 37-45

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Hirschfeld, Jesko (2016)

### **Presentation 'Extended Cost-Benefit Analysis of Climate Change Adaptation Options and the Role of Scale Levels'**

IRI THESys Seminar of the Berlin Workshop in Institutional Analysis of Social-ecological Systems  
21 January 2016, Berlin

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Hirschfeld, Jesko (2016)

### **Presentation 'Measuring the Costs and Benefits of Land Use Changes – An Ecosystem Services Approach'**

International Conference 'Sustainable Land Management – Challenges and Opportunities  
7-9 March 2016, Berlin

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Hirschfeld, Jesko (2016)

### **Presentation 'Measuring the Costs and Benefits of Land Use Changes: An Holistic Ecosystem Services Valuation Approach'**

ISEE2016 – Transforming the Economy: Sustaining Food, Water, Energy and Justice  
26-29 June 2016, Washington, DC, USA

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Hirschfeld, Jesko; Sagebiel Julian (2016)

### **Presentation 'Economic Valuation of Marine Ecosystem's Sedimentation Services'**

International Workshop on Coastal Ecosystem Services and Land-Sea Interface, Kiel University  
22-25 March 2016, Kiel

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Kimmich, Christian; Sagebiel, Julian (2016)

### **Empowering Irrigation – A game-theoretic approach to electricity utilization in Indian agriculture**

In: Utilities Policy, 43, pp. 174-185

Magliocca, Nicholas R.; van Vliet, Jasper; Brown, Calum; Evans, Tom P.; Houet, Thomas; Messerli, Peter; Messina, Joseph P.; Nicholas, Kimberly A.; Ornetsmüller, Christine; Sagebiel, Julian; Schweizer, Vanessa; Verburg, Peter H.; Yu, Qiangyi (2015)

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Session Chair **'Willingness to pay in space: New insights into the spatial dimension of stated preferences'**

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Technology (ETH)  
22-25 June 2016, Zürich, Switzerland

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Presentation **'A simple method to account for spatially-different preferences in discrete choice experiments'**

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CREDA  
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# Participation and Communication

TOPIC

## Let's Talk About Climate Change: Consequences and Adaptation Strategies

### Cooperation and Participation Process for the Further Development of the German Strategy for Adaptation to Climate Change

Period: 02/2015 – 05/2018

Supported by: Federal Environment Agency (UBA), Dessau

Cooperation partners: IKU GmbH, Dortmund; ecole – Agentur für Ökologie und Kommunikation, Bremen; Dr. Torsten Grothmann, Berlin/Oldenburg

In light of the continuing climate change, the importance of adaptation strategies for dealing with the inevitable consequences continues to increase. In addition to the European Adaptation Strategy, almost all European countries have now developed their own climate adaptation strategies. Germany adopted the German Strategy for Adaptation to Climate Change (DAS) in 2008 and the Adaptation Action Plan (APA) in 2011. At the end of 2015, the German government published a progress report on the adaptation strategy, which also includes an update to the action plan. The adaptation strategy provides for the involvement of relevant stakeholders in its further development and implementation through specific participation processes.

Together with its partners, IÖW has been in charge for the participation process for the further development of the German adaptation strategy since 2009; discussions have been held with various stakeholders in different fields of action; including the discussion of proposals for adaptation measures and strategic approaches.

The project intends to contribute to a stabilization of the national adaptation process through increased stakeholder awareness and action and the networking of related activities. Its focus in 2016 was on preparatory tasks for KlimAdapt, a new federal information service on climate change adaptation services. The new platform will provide bundled data, information, and advisory services as well as climate change adaptation tools to stakeholders within administration, business, civil society, and research.

One part of this work was conducting expert interviews via an online survey on the usage of existing and demands for newly developed adaptation services. In total nearly 500 (potential) users participated in this online survey, supplemented by additional 24 expert interviews. In this manner it was possible to learn what information is needed and how it should be presented. At the same time, the project team documented existing climate adaptation services. 43 services were identified by public authorities, which were part of an additional survey, and roughly 150 others by means of further research. The analysis showed that the bulk of what is already available is still little known or used. In addition, the

various users have difficulty choosing the most appropriate services from such diverse offerings. Practical work aids, knowledge portals, and consulting services are particularly in demand, but the offerings are limited. Based on these results, the project team developed a draft for a communication concept for KlimAdapt, as well as a concept for a national Web-based service to be launched in 2018.

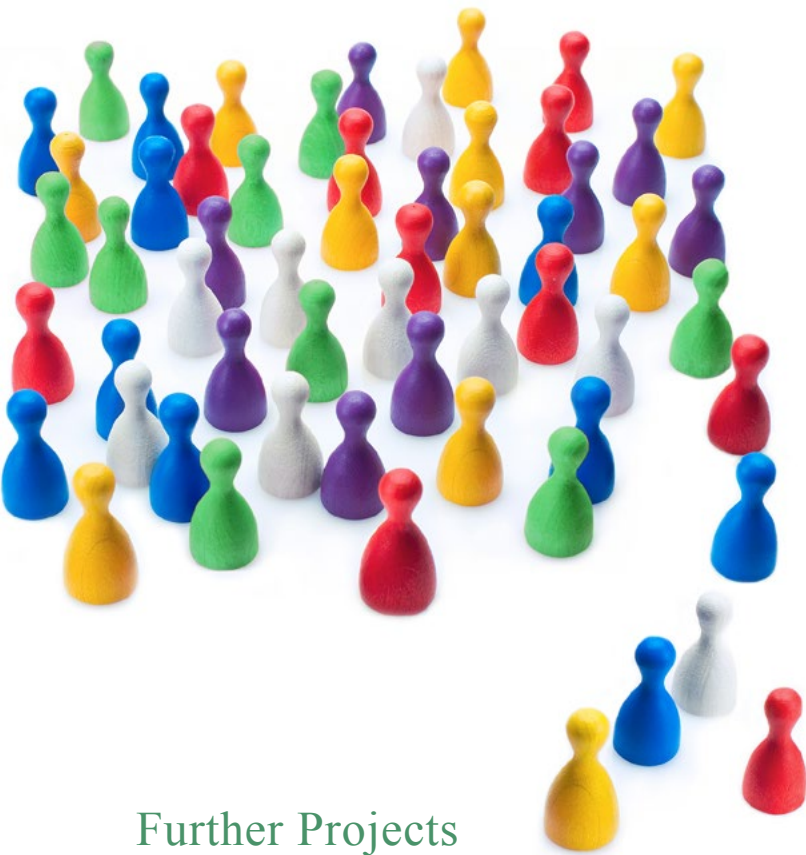
In addition, further challenges related to climate change were addressed in two stakeholder dialogues: What effect will climate change have on forestry? What will be the health consequences in the workplace? These topics were discussed with different stakeholders from the areas of business, politics, and trade unions.

Additionally, researchers conducted two workshops with representatives from the federal states in Germany. These addressed methodological recommendations on how climate impact and vulnerability analyses can best be carried out. These recommendations are summarized in the document Guidelines for Impact and Vulnerability Assessments. Beyond, a regular newsletter also provides information on climate change and adaptation strategies; edited by IÖW.

Download Guidelines for Impact and Vulnerability Assessments: [www.umweltbundesamt.de](http://www.umweltbundesamt.de)

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## Selected Publications and Presentations

Rubik, Frieder (2015)

### **Life Cycle Management: Labelling, Declarations and Certifications at the Product Level**

In: Sonnemann, Guido; Margni, Manuele (Eds., 2015):  
Life Cycle Management, Springer, pp. 65-77

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### **The Development and Marketing of Sustainability Labels – Status Quo and Future Perspectives**

In: Strandbakken, Pål; Gronow, Jukka (Eds., 2015):  
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pp. 291-309

## Further Projects

### **Waterflows in Germany II:**

#### **Education for Sustainability, Information Transfer to Experts in Water Management and International Networking**

Period: 05/2015 – 09/2016

Supported by: Federal Ministry of Education and Research (BMBF), Berlin

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### **Environmental Education in Vocational Training – an Analysis of Measures and Requirements**

Period: 10/2014 – 05/2016

Supported by: Federal Environment Agency (UBA), Dessau

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### **Assessment of the Implementation of the Waste Prevention Program and Development of Communication Strategies and Recommendations**

Period: 12/2015 – 07/2016

Supported by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Berlin; Federal Environment Agency (UBA), Dessau

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### **Future topics? Asking Youth! An Environmental and Urban Agenda for the Future**

Period: 10/2016 – 03/2018

Supported by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Berlin

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# International Cooperation

## Partners and References

### SELECTION OF INTERNATIONAL COOPERATION PARTNERS

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Copenhagen Resource Institute (CRI), Copenhagen, Denmark  
Energy Research Centre of the Netherlands (ECN), Petten,  
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Management, Vienna, Austria  
Finnish Ministry of the Environment, Helsinki, Finland  
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Institute for European Studies (IES), Vrije Universiteit Brussels, Belgium  
Institute of Environmental Sciences, Leiden University, The Netherlands  
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Economic Development (ENEA), Bologna, Italy  
National Institute for Consumer Research (SIFO), Oslo, Norway  
Netherlands Environmental Assessment Agency (PBL), The Hague  
and Bilthoven, The Netherlands  
Netherlands Organisation for Applied Scientific Research (TNO),  
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Österreichisches Ökologie Institut, Vienna/Bregenz, Austria  
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Regional Environmental Centre for Central and Eastern Europe (REC),  
Szentendre, Hungary  
Research Institute for Managing Sustainability (RIMAS), Vienna, Austria  
Strategic Design Scenarios (SDS), Brussels, Belgium  
Sustainable Europe Research Institute (SERI), Vienna, Austria  
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### SELECTION OF INTERNATIONAL CLIENTS AND SPONSORS

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European Commission, Directorate-General for Health and Consumer  
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European Commission, Directorate-General for Research (RTD),  
Brussels, Belgium  
United Nations Environment Programme (UNEP), Paris, France

# The Scientific Journal

## *Ökologisches Wirtschaften*

In 1986 IÖW began publication of its own journal, in cooperation with the Association for Ecological Economic Research (VÖW). Since 1996, our professional publication has appeared quarterly under the title *Ökologisches Wirtschaften* (Ecological Economy) and is published by oekom Verlag in Munich. Its goal is to strengthen scientific debate and disseminate research results to a specialist readership.

*Ökologisches Wirtschaften* presents the scientific foundations that link ecology and economy, describes the political and social framework conditions for sustainable management, and discusses the resulting practical challenges for companies. The concept of the journal is unique: it confronts recent scientific findings with real-world experiences from politics and industry – an exciting and, at the same time, important and productive encounter for all stakeholders.

At [www.oekologisches-wirtschaften.de](http://www.oekologisches-wirtschaften.de), the journal's open access portal offers downloads of more than 1,000 scientific articles from 1986 to the present day. The journal is published in German, but it regularly includes English-language articles as well.

### LATEST ISSUES

No. 2/2017: Transformative Economics?

No. 1/2017: Money and Sustainability

No. 4/2016: Environmental Awareness

No. 3/2016: Collaborative Economy



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