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Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Shaping the Future

Annual report of the Oeko-Institut for 2014

The outlook is green – shaping a sustainable future

Climate change, resource scarcity and environmental degradation make it increasingly clear that "business as usual" is not an option in many spheres of life and economic activity. At the Oeko-Institut, one of the leading independent research institutes, we have always sought to identify the challenges arising in the transition to a sustainable future. We – and others – use the term "transformation" to describe how our economy and society must change.

The Oeko-Institut's Annual Report focuses on these efforts to shape the future, this "great transformation". Since 1977, the Oeko-Institut has been charting the transition towards a more sustainable, more environmentally sound and more equitable world. We believe that this transformation is essential for our ever-changing planet. In 2014, we once again conducted numerous projects which contribute actively to shaping the future. We present an overview of this work in our Annual Report.

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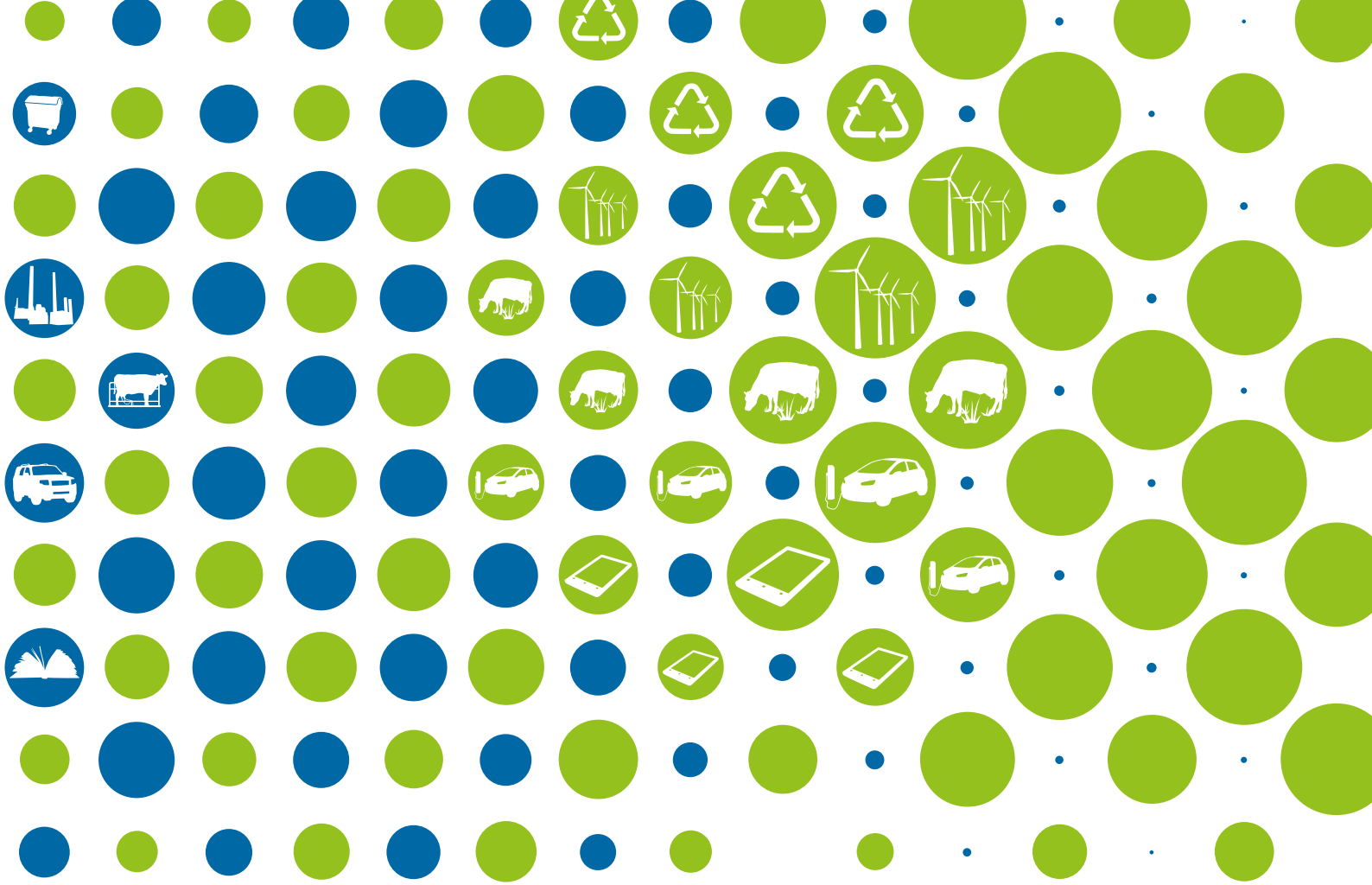

Imprint

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Institute for Applied Ecology
March 2015

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Design and layout:
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Printed by:
LokayDruck (www.lokay.de)
Printed on 100% recycled paper

Our year 2014

Dear readers,

In 2014, we marked three significant anniversaries: the start of the First World War 100 years ago, the outbreak of the Second World War 75 years ago, and as a positive event in history, the fall of the Berlin Wall 25 years ago, which we celebrated in November. The peaceful revolution, as it has come to be known, and German reunification show us that events which we regarded as impossible only a few years ago can become a reality. This idea – that visions can become reality, if only we have faith and invest our energies in making them happen – is one which we should not lose sight of as we address the key sustainability issues facing us today. Whether it is energy system transformation or nuclear phase-out – with political commitment and public support, the most important goals in the transition to a low-carbon, sustainable and resource-conserving world are within reach.

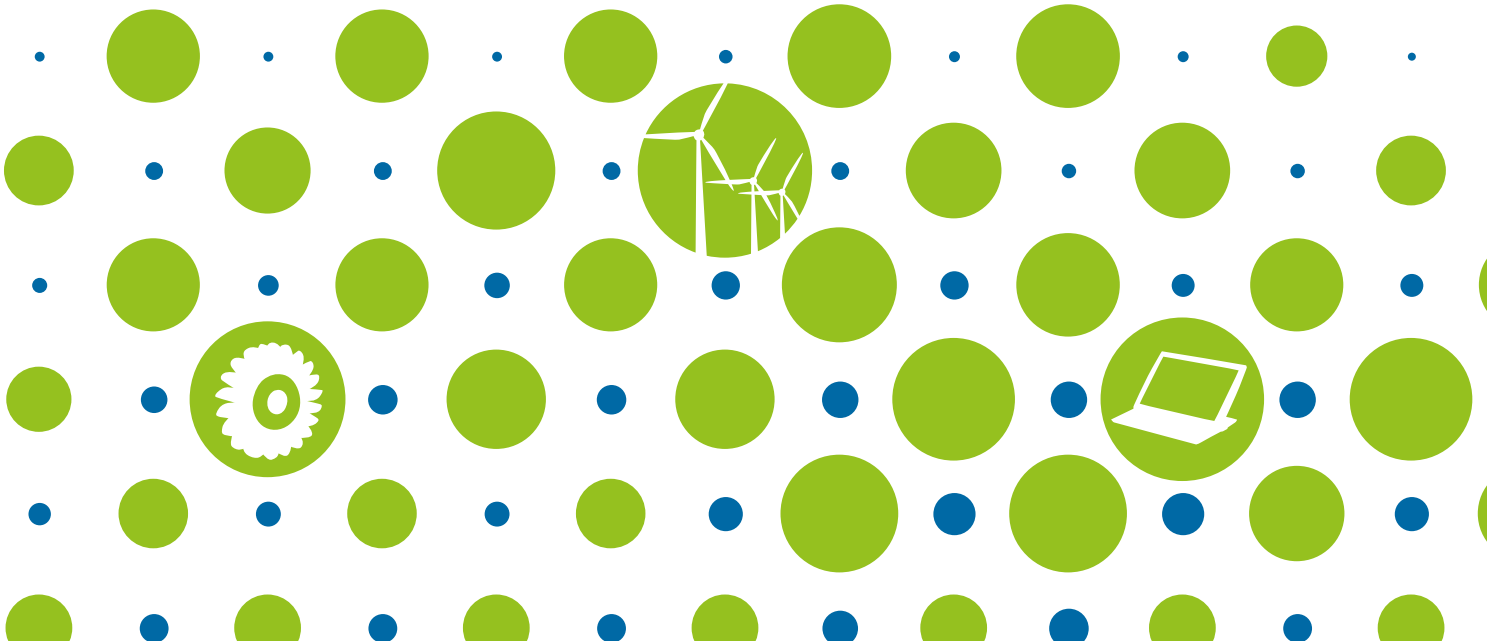
Energy system transformation?! Yes, and …

During the first six months of 2014, it was sustainable energy policy which was the main focus of our work at the Oeko-Institut. From the beginning of the year until the autumn, policy-makers, the energy industry and civil society stakeholders were engaged in ongoing discussions in Berlin on ways of promoting renewable energies in future. The expansion of renewables is a success story, and there are numerous studies showing that in future, we will be able to meet all our national electricity needs from wind, hydro and solar energy. However, the more renewable energies come onto the market, the better equipped the market must be to deal with them. There is thus a need to develop meaningful scenarios on the future management of renewables, on the one hand, and on the provision of the requisite reserve capacities, on the other. The Oeko-Institut has participated intensively in the discussions about the reform of the Renewable Energy Sources Act (EEG) and the restructuring of the energy market as a whole, and has contributed various studies and position papers to the debate, setting out its proposals.

At the same time, nuclear phase-out continued to feature on the political and media agenda in the context of energy system transformation. In an ever-evolving economic situation, will the major energy suppliers be able to mobilise sufficient resources for the retirement of the nuclear power plants and for nuclear waste disposal, as they are legally obliged to do? And if so, how? These issues frequently featured in the headlines, as did the founding of the Commission on the Final Storage of Nuclear Waste. Since April 2014, I myself have been one of the 32 members of this Commission, whose goal is to establish the parameters for the search for a final repository site for highly radioactive waste. The Oeko-Institut has been calling for a permanent solution to this problem for years. We therefore very much welcome this step and hope that this opportunity will be utilised effectively.

Initiating future topics today – the resource revolution …

One of our own initiatives, launched in 2014 and to which we attach particular importance, is the "Ger-



many 2049: Transition to sustainable use of raw materials" project. It aims to develop a comprehensive strategy for long-term and sustainable resource management with reference to Germany as an industrial society, for it is already clear that energy system transformation, rising consumption and new infrastructures will drive up demand for resources such as building materials, industrial inputs, ores and metals. Managing this demand will be the next major challenge for our own and future generations. Against this background, the Oeko-Institut is developing a scenario for the transition to sustainable use of raw materials, which will demonstrate how the consumption of raw materials could potentially develop to 2049 and consider which technical and policy instruments and measures are needed to bring about the transition to sustainable use for the long term.

… and the City of the Future

Another Oeko-Institut project, which ended in 2014, also looks to the future. With support from donors, the "City of the Future" project shows that sustainable mobility can improve quality of life in cities. With reference to Bremen and Stuttgart, our researchers investigated the potential that is already being harnessed by local authorities in order to develop flexible integrated transport options – local public transport, walking, cycling and car sharing. We believe that this is the only way to encourage people to choose car-free, greener transport options in future. A very attractive poster is featured on our website, portraying the results of the project and showing what a city that offers good quality of life might look like.

Looking ahead to the coming year: energy system transformation – the half-way stage?

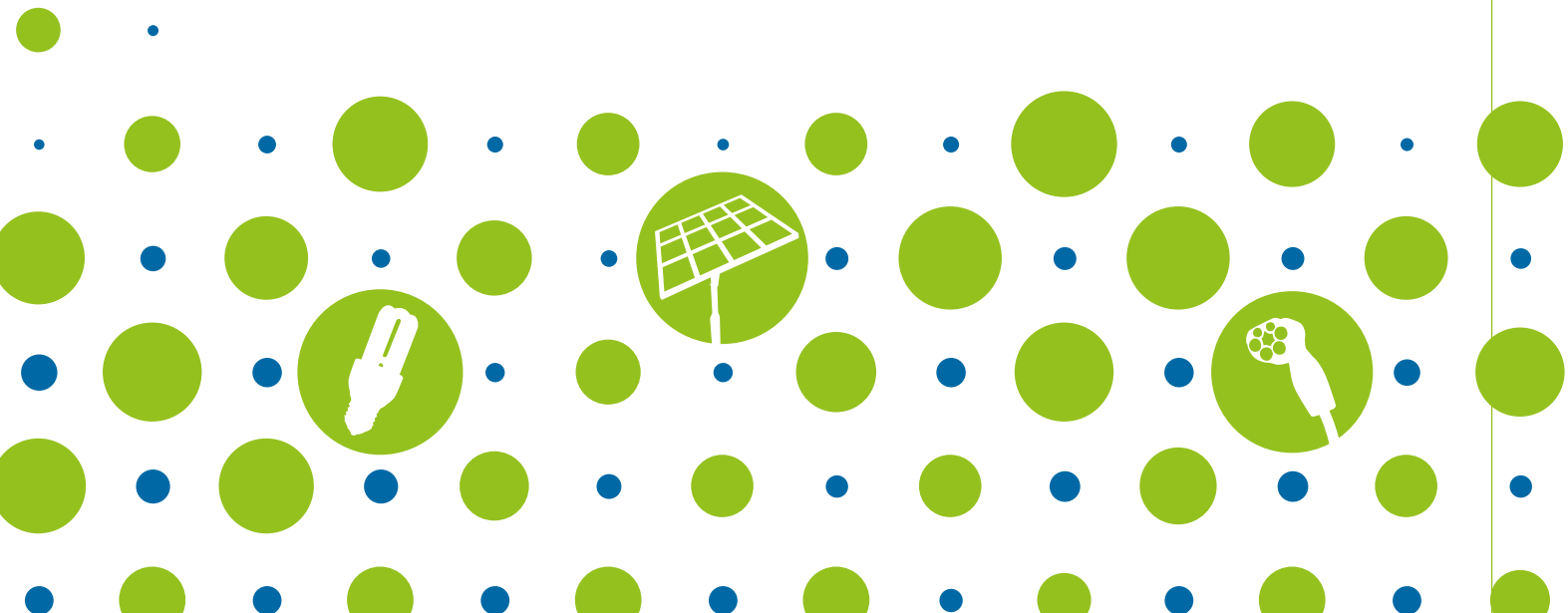
In 2015, we will continue to work on sustainable development challenges. However, one landmark in particular stands out. This year, energy system transformation will reach the half-way stage. Why? In March 1980, S. Fischer Verlag published the Oeko-Institut's book Energiewende – Wachstum und Wohlstand ohne Erdöl und Uran. That book established the term Energiewende – energy turnaround – in the public consciousness. Given that energy transformation scenarios are now being modelled to 2050, this year will mark the 35th anniversary – and the half-way stage – of the "energy transformation" concept.

In 2015, the Oeko-Institut will therefore focus on "energy system transformation – the half-way stage" and celebrate some of the initial successes achieved in the energy turnaround, casting a glance back and reviewing progress. We will also seek to identify the additional efforts needed to complete the transformation, including some of the more difficult challenges which are likely to arise in the next 35 years.

We will keep you informed about these and many more of our future-oriented projects via our website and other communication channels. Some of these projects are included in this Annual Report. I hope you find it an interesting and enjoyable read.

Yours,

Michael Sailer
Chief Executive Officer of the Oeko-Institut



Facilitating change: a practical yet visionary approach

Climate-friendly, resource-light, reusable, sharing, low-carbon, equitable, nuclear-free – this is the kind of tomorrow's world that we want. It is clear that resources are finite, the climate is under stress and alternative economic models are needed that make sparing use of our resources. But which pathway should be followed towards this goal? That is the subject of countless debates – among politicians, academics, the business community and indeed the general public; each and every one of us is involved. For some years now, the term "major transformation" has frequently been heard in this debate, denoting the transition and long-term restructuring of our entire society towards sustainable development. It is generally understood to be a quest that involves many different stakeholders – governments, business, academics, the media, the public, interest groups and civil society organisations.

Although transformations cannot be micro-managed – we need only think of the many grassroots initiatives such as community exchange schemes and private car sharing – they can be shaped and influenced. This is how we see our role at the Oeko-Institut. As a research institute, we are involved in a great many projects and have been working for many years on shaping a sustainable world. In doing so, we recognise that many cogs need to move in order to initiate long-term change: in technology and products, policy instruments, in markets, research, science and education, in our values and visions, behaviour and lifestyles, and in social structures and timeframes. This means that "major transformations", such as the energy turnaround, can only be thought of as longer-term processes – but ones which, nonetheless, require short-term impetus and drivers, as well as support for niche areas of activity and pioneering thinkers. Ultimately, the transformation must be acceptable to society and inclusive.

Transformation research at the Oeko-Institut

In recent years, the Oeko-Institut has worked intensively on the issue of transformation, focusing on a wide variety of sustainability issues: energy, mobility, agriculture, resources, etc. and on sustainable industrial policy as a whole. In late 2013, for example, our researchers working on the "Sufficiency in everyday life" project described how our consumption patterns can change in order to ensure that our lifestyle remains within the Earth's ecological carrying capacity in the medium term. In essence, this Oeko-Institut project concluded that there are many facets to sufficiency, so it requires policy frameworks which facilitate interaction between business and consumers.

Two of our current projects also analyse societal transformation processes. In "Models of Change", experts pool experience and knowledge of approaches to shaping societal change and show how transformation can be initiated strategically and supported at political level. They also describe the levels at which change takes place, the individuals and institutions involved, and participation and management processes during times of transition. The project is expected to publish its findings in late 2015. In the "Trafo 3.0" project, launched very recently, the Oeko-Institut has chosen three fields – paperless publishing and reading, e-bikes and sustainable meat production and consumption – to show how transformation processes can be initiated and shaped in practice. In cooperation with practitioners, our researchers are developing goals and strategies for potential transformations.

These and other projects make it clear that today, a transition towards more sustainability is more urgently needed than ever. So that it can become a reality, scientific analyses, policy strategies and practical proposals must all interact. With its many years of experience with transformation projects, the Oeko-Institut is able to deliver scientific expertise, practical support and policy recommendations in equal measure. In the project profiles on page 8 onwards, we present some examples of our work.

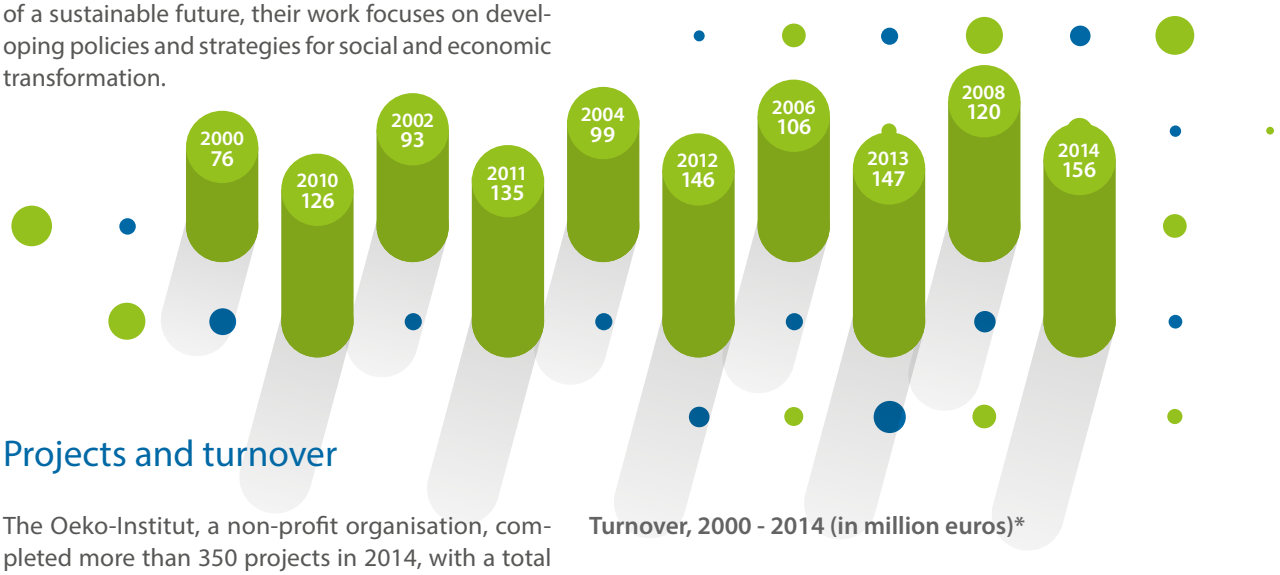
At a glance

The Oeko-Institut in 2014: facts and figures

Human resources

The Oeko-Institut employs more than 150 staff at three locations in Germany – Freiburg, Darmstadt and Berlin. In keeping with the Oeko-Institut's vision of a sustainable future, their work focuses on developing policies and strategies for social and economic transformation.

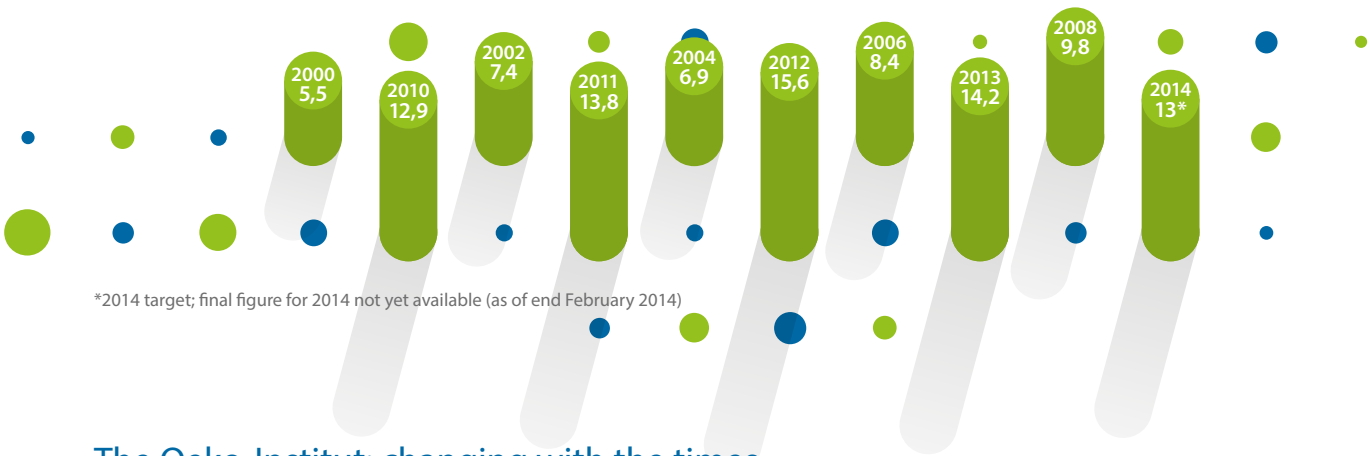
Human resources, 2000 - 2014



Projects and turnover

The Oeko-Institut, a non-profit organisation, completed more than 350 projects in 2014, with a total turnover of around 13 million euros (target figure).

Turnover, 2000 - 2014 (in million euros)*



*2014 target; final figure for 2014 not yet available (as of end February 2014)

The Oeko-Institut: changing with the times

As the staffing and turnover figures show, the Oeko-Institut has changed with the times. Since 2000, the number of staff at all locations in Germany has more than doubled. We constantly needed more space. To meet that need, we moved offices in Berlin in 2010, expanded our Darmstadt office last year, and acquired new space in the Sonnenschiff building in Freiburg this year. Our turnover has also grown in recent years, although that is not one of our main objectives.

The number of projects has increased, clearly demonstrating that we are willing and able to influence the sustainability agenda, whether we are advising companies on environmentally sound production or procurement systems, providing support for civil society groups such as NGOs through our scientific studies on relevant topics, or carrying out analyses for policy-makers at federal, state or local level. Our primary goal is to make a contribution, large or small, to shaping the global future – and that hasn't changed at all.

A smart transition
Selected projects from 2014

We need to change: we are well aware of that. Our societies and lifestyles consume too much energy, produce excessively high quantities of CO_2 emissions and consume too many finite resources. But how can and should our societies change? That's not always clear. How can we utilise the benefits of the digital world without constantly driving up electricity consumption? How can renewable energies be promoted without making too many demands on consumers? A smart transition to a more sustainable society is only possible with sound analyses and effective strategies and measures. The researchers at the Oeko-Institut made a key contribution to that process in 2014.

The transformation of society is a key issue for all of the Oeko-Institut's divisions, as the projects profiled on the following pages show. For example, the Energy & Climate Division analysed the potential of biomass in North Rhine-Westphalia's energy supply and produced a model for the next reform of Germany's Renewable Energy Sources Act. The Infrastructure & Enterprises Division explored the potential for emissions reductions in the transport sector and the opportunities afforded by the closed substance cycle for more climate action. With its coherence wiki project, the Environmental Law & Governance Division developed an important source of guidance for environmental policy-makers. The Sustainable Products & Material Flows Division focused on future energy consumption in the information and communication technology sector and measures to increase efficiency. And the Nuclear Engineering & Facility Safety Division pinpointed the risks posed by ageing nuclear power plants.

This report also profiles some of our analyses which focus on the present. Researchers from the Nuclear Engineering & Facility Safety Division, for example, investigated the possible consequences of an accident at a Swiss nuclear power plant on drinking water from the Aare and Rhine rivers and from lakes. And the Environmental Law & Governance Division analysed the success of class actions under Germany's Environmental Appeals Act. The Sustainable Products & Material Flows Division undertook a comprehensive relaunch of the EcoTopTen consumer advice website.

For the Oeko-Institut, the past is a guide to the future: driving sustainable development was, and will remain, our main goal – one which we have pursued intensively throughout 2014.

Transport for tomorrow

Towards effective cuts in transport emissions

Avoidance of unnecessary transport use, a modal shift and improved efficiency: good strategies can help to reduce transport emissions. There's no doubt that substantial reductions in this sector are urgently needed to achieve climate targets. Cutting transport emissions by more than 80 per cent by 2050 is possible, according to a joint paper, entitled "Climate-friendly transport in Germany", by environmental organisations WWF, BUND, Germanwatch, NABU and VCD. The Oeko-Institut provided scientific support for the project in 2014.

To identify the potential for emissions reductions, the researchers developed a climate action scenario which describes potential development in the transport sector to 2050, based on ideas and proposals from the organisations themselves. According to the scenario, passenger transport can be reduced by 15 per cent by 2050. Movement of goods will initially continue to increase, but in the long term, the trend will reverse, with a shift towards regional cycles.

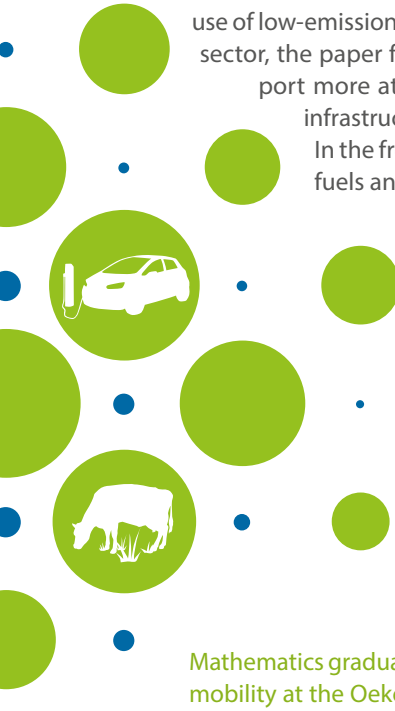
The joint paper defines a comprehensive package of strategies to reduce traffic and cut greenhouse gas emissions. Key elements, say the experts, are avoidance of unnecessary transport use, a modal shift, improved efficiency across all forms of transport, the introduction of alternative propulsion systems and the use of low-emission fuels. In the passenger transport sector, the paper focuses on making public transport more attractive, improving the cycling infrastructure, and promoting car sharing. In the freight sector, a phase-out of fossil fuels and a modal shift to rail and inland shipping are key elements.

Based on the measures outlined in the climate action scenario, the researchers conclude that there is potential to reduce the transport sector's final energy demand by around 70 per cent by 2050 compared to 2005, which would make it possible to achieve an 86 per cent cut in greenhouse gas emissions from transport compared to 1990. This would be a much-needed step towards making transport more climate-friendly.

Project profile

Project title: Climate-friendly transport in Germany – the way forward to 2050
Contact: Ruth Blanck, r.blanck@oeko.de
Institute Division: Infrastructure & Enterprises
Client: WWF Germany
Sponsors: German Federal Environment Agency (UBA), German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Timescale: 01/2013 - 06/2014
Further information: http://bit.ly/1yt7ZZn

„The prerequisite for substantial reductions in transport emissions is a policy strategy which focuses more strongly on a modal shift and avoidance of unnecessary transport use. There needs to be further discussion of how biofuels and power-to-fuel can be deployed in compliance with stringent sustainability criteria. The minimum prerequisite for the use of power-to-gas and power-to-fuel, however, is rigorous energy system transformation in the electricity sector."



Ruth Blanck

Mathematics graduate Ruth Blanck has worked on sustainable mobility at the Oeko-Institut since 2012. As a member of the Infrastructure & Enterprises Division team, her work includes developing long-term scenarios and climate strategies for the transport sector.

Serious consequences

Possible effects of a nuclear power plant accident

What would be the effects of an accident at one of the three Swiss nuclear power plant sites – Beznau, Leibstadt and Gösgen – on the drinking water supply? What would be the effects of an accidental release of radioactive materials similar to that which occurred at one of the Fukushima reactors in the Pacific in 2011? These questions were the subject of an investigation conducted by the Oeko-Institut on behalf of the Trinational Anti-Nuclear Federation (TRAS) in 2014. It found that a nuclear power plant accident would have serious consequences for the drinking water supply from the Aare and Rhine rivers and from lakes in Germany and Switzerland.

A serious accident scenario such as that modelled by the Oeko-Institut would result in high levels of radioactive contamination of drinking water from the Aare and Rhine rivers, lasting many months. Drinking water extraction from the two rivers would have to cease immediately, for if the accident resulted in the failure of the cooling systems, it may be necessary to pump cooling water from external sources into the interior of the reactors and into the storage ponds where the fuel elements are located, in order to prevent a Fukushima-type core melt. If a leak were to occur, this contaminated cooling water would then be discharged into the environment, primarily into the Aare and Rhine. Although diluted, the concentrations of radionuclides would still be very high. If an accident were to occur at Gösgen nuclear power plant, for example, each litre of water in the river Aare would contain as much as 58,000 becquerels of radioactive strontium, compared with the limit of 125 Bq/l established in Switzerland.

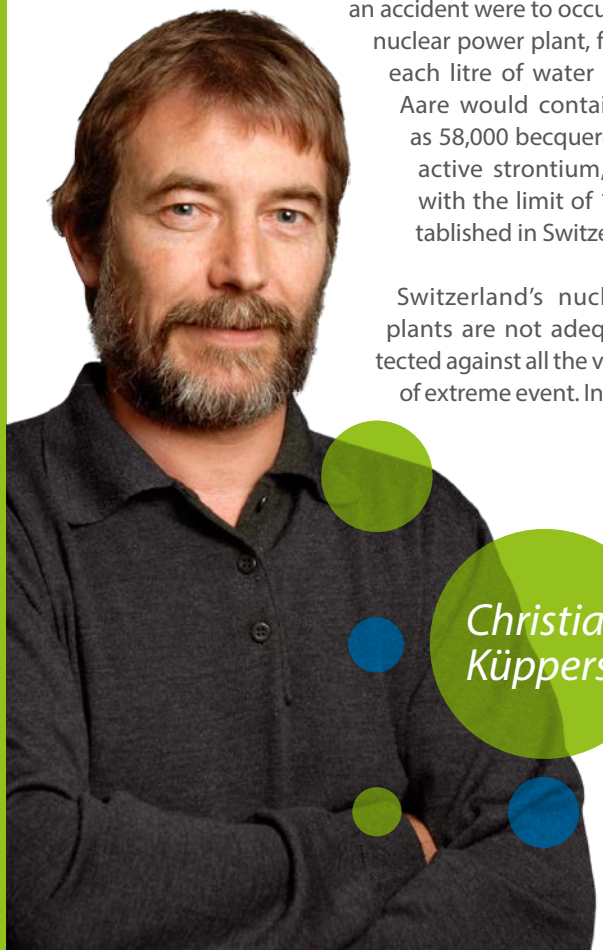
Switzerland's nuclear power plants are not adequately protected against all the various types of extreme event. In the experts' view, the reactors' advanced age and design, which no longer meet the standards of more modern plants, pose a particular risk. Currently, however, the contingency plans drawn up by the water utilities do not include measures to protect the general public in the event of the modelled scenarios occurring.

The Oeko-Institut's analysis also found that radionuclides could be released into the air, with subsequent deposition by rainfall. This in turn would cause contamination of lakes, resulting in high and prolonged contamination of drinking water. Here, the study identified a risk to Lake Constance but especially to Lake Zurich, which supplies 70 per cent of drinking water for the city of Zurich.

Project profile

Project title: Investigation of possible consequences of a nuclear power plant accident in Switzerland on the drinking water supply
Contact: Christian Küppers, c.kueppers@oeko.de
Institute Division: Nuclear Engineering & Facility Safety
Client: Trinational Anti-Nuclear Federation (TRAS)
Timescale: 08/2013 - 06/2014
Further information: http://bit.ly/15GIM1P

„At between 30 and 45 years of age, Switzerland's four nuclear power plants – Leibstadt, Gösgen and Beznau I and Beznau II – are among the oldest in operation in Europe. They are much less resilient to extreme events than newer nuclear power plants. A Fukushima-type event would have very serious consequences for the drinking water supply from the Aare and Rhine rivers and from lakes, affecting not only Switzerland but Germany too."



Christian Küppers

Physicist Christian Küppers has worked for the Oeko-Institut since 1986. As Deputy Head of the Nuclear Engineering & Facility Safety Division, his work includes preparing studies and expert opinions on radiological protection. He is a member of the German Environment Ministry's Commission on Radiological Protection (SSK).

Biomass in North Rhine-Westphalia
Potential for the energy supply

Biomass is an important contributor to the energy supply of the German state of North Rhine-Westphalia (NRW). But is there scope to expand its current share even further, while meeting the stringent requirements of nature and environmental conservation? NRW has set itself the target of meeting around 30 per cent of its electricity needs from renewable energies by 2025. On behalf of North Rhine-Westphalia's State Office for Nature, Environment and Consumer Protection (LANUV), the Oeko-Institut calculated the potential to expand biomass in NRW's future energy supply.

North Rhine-Westphalia's biomass conversion facilities currently produce 5 terawatt-hours (TWh) of electricity and 15 TWh of heat annually, according to Oeko-Institut researchers working on this joint project with the Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT. The facilities mainly run on biomass from forestry and the waste industry.

The project partners also calculated the viable potential for power and heat generation from biomass by modelling various scenarios. Sustainability criteria were defined for this purpose, which differed in each scenario. In the maximal scenario, which was based on the sustainability criteria established in current legislation, the researchers calculated that there is potential to generate 13 TWh of electricity and 28 TWh of heat from biomass. This increase of 8 and 13 TWh respectively would be achieved by making greater use of harvest residues and forest timber from non-managed private woodland. In the scenarios based on more stringent sustainability criteria, no major expansion potential for power and heat was identified; the researchers calculated that there is merely scope to generate an additional 10 TWh annually. This biomass potential derives primarily from the additional and more intensive use of residues and waste.

As one of its key findings, the analysis notes that biomass will play a less significant role than wind and solar power in NRW, as these latter two energy sources, according to two previous studies by LANUV, offer annual power generation potential of more than 70 TWh. Furthermore, land-use competition could potentially arise between energy and non-energy uses of biomass. This is a significant issue, especially in agriculture.

Project profile

Project title: Analysis of renewable energy potential in NRW, Part 3 – Biomass
Contact: Katja Hünecke, k.huenecke@oeko.de
Dr. Klaus Hennenberg, k.hennenberg@oeko.de
Institute Division: Energy & Climate
Client: North Rhine-Westphalian State Office for Nature, Environment and Consumer Protection (LANUV)
Project partner: Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT
Timescale: 08/2012 - 12/2012
Further information: www.bioenergieatlas.nrw.de

„Biomass is undoubtedly an extremely practical renewable resource. It can be used flexibly and can easily be transported and stored. And unlike solar and wind, it is not subject to short-term fluctuations in availability. Nonetheless, the other two energy sources will take precedence in NRW, due to their power generation potential and the limited availability of farmland and forests."

Katja Hünnecke

Katja Hünecke's expertise includes the social and economic aspects of biomass use. The business and energy management expert has worked in the Energy & Climate Division since 2003 and is now the Deputy Head of this Division (Darmstadt).

Conflicts and synergies

Coherence check of environmental policy goals

Environmental policy goals rarely exist in isolation. Each one is closely connected to others, with positive or negative feedback effects. For example, promoting biofuels in order to mitigate climate change can conflict with other environmental goals, such as the conservation of biological diversity. As environmental policy becomes ever more complex, there is a growing risk of conflicts arising between the various fields of action. The Oeko-Institut has therefore developed a wiki in order to assist policy-makers to identify these linkages in future.

On behalf of the German Federal Environment Agency (UBA), the Oeko-Institut, the Environmental Policy Research Centre (FFU) and the Health and Environment Alliance have prepared an overview of the various environmental policy fields, based on public goods that merit protection, such as climate, water and health, and sectors such as the energy industry and transport. A new wiki lists the main environmental problems arising in each field, e.g. climate change. The causes of the problems, such as emissions from fossil energy production, and political goals and solutions – e.g. increasing the share of renewable energies – are identified. Policy measures such as the feed-in of renewables-generated energy and the resulting need for action – the construction of solar power generation facilities being one example – are also covered. The actions include not only intended reactions from target groups but also unintended consequences.

The individual entries are interconnected, forming part of a cause-effect chain, and this is reflected in the structure of the wiki itself. Each environmental problem is presented along with the policy goals defined for its solution, which in turn are linked to appropriate measures. Crucially, in the actions, the impacts on other environmental policy fields are also covered and explained. With its software-based evaluation options, the wiki enables the interactions between environmental fields to be identified more accurately. This supports integrated policy analysis and environmental reporting. It also highlights the need for action by policy-makers to align environmental policy goals and measures.

Project profile

Project title: Coherence check of environmental policy goals and measures for the purpose of environmental reporting
Contact: Dirk Arne Heyen, d.heyen@oeko.de
Franziska Wolff, f.wolff@oeko.de (project manager)
Institute Division: Environmental Law & Governance
Client: German Federal Environment Agency (UBA)
Project partner: Environmental Policy Research Centre (FFU) at the Freie Universität Berlin, Health and Environment Alliance
Timescale: 11/2012 - 3/2015

„The more environmental policy goals and measures are formulated, the greater the risk that inconsistencies and conflicts arise, especially given that policy-making is divided among various ministries and departments which focus on specific assets or sectors. The same often applies to policy advice as well. With this wiki, which can easily be updated, we are helping to maintain an overview over the wide range of environmental policies and identify impacts beyond the individual fields of action."

Dirk Arne Heyen

Dirk Arne Heyen's research focuses on policy instruments, participation and societal change. A political scientist, he joined the Oeko-Institut's Environmental Law & Governance Division in 2011 and conducts analyses primarily in the fields of energy, infrastructure and consumption.

10 years of sustainability
Relaunch of EcoTopTen

EcoTopTen is a web-based platform which provides consumer information about leading-edge environmental products and services. Initiated by the Oeko-Institut and launched in March 2005, the project supports sustainable consumption by featuring low-impact, low-carbon products which offer best value for money. It also makes recommendations to guide consumers' purchasing decisions and describes how products can be used sustainably. The platform, which is funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the EU's Intelligent Energy Europe programme, was relaunched in 2014.

When it comes to efficiency, much has changed in the 10 years or so since EcoTopTen was first launched. The energy efficiency of appliances such as tumble dryers has greatly improved, and the range of energy-efficient goods available in some product groups has increased; fridges and freezers are a case in point. The platform itself changed in 2014 as well. As part of the relaunch, the website's design and the product categories have been revamped and now cover lighting, heating, electricity, large/small domestic appliances, TVs, computers/office equipment, mobility, food, and textiles. Consumers can also check the product recommendations, which cover products and services such as washing machines, green electricity tariffs and even cars. The platform currently offers 23 overviews of the best models, with product details, including manufacturers and dimensions.

The platform also provides environmental impact information, such as power consumption and CO_2 emissions from product manufacture and use, as well as costs and results of quality testing. For the purpose of comparison, the overviews include typical products that do not fulfil the EcoTopTen criteria. The platform further provides practical guidance on purchasing and use, along with comprehensive background information, which since the relaunch has been expanded to include additional product groups such as kettles and hair dryers.

EcoTopTen now contains new filters, making it quicker and easier to search for the right product. Users can search using criteria such as manufacturer or specific product properties, such as screen size or type of LED lamp. This makes it much easier for consumers to identify the products that best suit their needs.

Project profile

Project title: EcoTopTen 2.0 and Euro-Topten Max
Contact: Dr. Dietlinde Quack, d.quack@oeko.de
Institute Division: Sustainable Products & Material Flows
Sponsors: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (National Climate Initiative), European Union (Intelligent Energy Europe programme)
Project partner: Utopia
Timescale: 01/2012 - 12/2014
Further information: www.ecotopten.de

„Interviews with various stakeholders have shown that EcoTopTen is an important and relevant platform. According to our interviewees, its comprehensive product lists are a unique source of information on energy-efficient products. Since the relaunch in 2014, we have also been providing information about updates on the EcoTopTen platform via Twitter @ecotopten. We offer tips on energy saving and news about sustainable products as well."

Dr. Dietlinde Quack works in the Sustainable Products & Material Flows Division, where she investigates the diverse aspects of sustainable consumption patterns, including product policy and labelling. A biologist, she joined the Oeko-Institut in 1999 and heads the Consumption Group.

EEG 3.0
A reform for renewable energies

From 25 to 80 per cent: Germany aims to meet most of its electricity needs from renewable energies by mid-century. A remuneration scheme for renewable energies geared to this new phase of development will therefore be required. On behalf of Agora Energiewende, the Oeko-Institut developed a model for the next reform of the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz – EEG), known as EEG 3.0. It envisages the direct sale of electricity from renewable sources, along with the introduction of capacity payments.

Under the EEG, operators of renewable energy installations are paid a fixed price for each kWh of electricity generated, irrespective of demand. This means that at certain times of peak supply, renewable energies are sold at negative prices, amounting to as much as minus 65 euros per megawatt-hour (MWh). Theoretically, the operators would then have to pay for the power to be available on the energy exchange. The EEG 3.0 reform model aims to change this state of affairs. It proposes the introduction, from 2017, of a capacity payment for the plant, based on a reference capacity compatible with the future needs of the system and, for the purpose of risk minimisation, based also on low prices on the energy exchange. The researchers recommend that reduction of the output of power plants should be possible at times when prices are low or negative, without forfeiture of the capacity payment. They also propose special payments for operators in order to cover high costs of innovation in offshore wind power, for example.

The proposed model will produce additional incentives for plant design that is compatible with the needs of the future electricity system. At present, incentives are optimised to ensure maximum electricity production. A shift towards a constant rate of production as far as possible is required, e.g. through modified design of solar modules. A more constant rate of production will reduce flexibility needs and thus save costs, as there will be less need for investment in storage and load management, for example. The researchers also propose the direct sale of electricity; this would mean that operators would receive direct revenue, which would create clear incentives for plant optimisation. The Oeko-Institut also emphasises that producer diversity, which was the cornerstone of renewables expansion, must be maintained.

Project profile

Project title: EEG 3.0. A model for a structural reform of the German EEG – towards a new electricity market design
Contact: Verena Graichen, v.graichen@oeko.de
Hauke Hermann, h.hermann@oeko.de
Institute Division: Energy & Climate
Client: Agora Energiewende
Timescale: 05/2013 - 10/2014
Further information:
http://bit.ly/12aD8Ti

„The funding for the renewable energy surcharge under the EEG should be distributed more equitably and on a broader basis. Major commercial consumers were increasingly exempt from the charges in the past, and there was a disproportionately heavy burden on domestic consumers. That's why we are proposing a significant reduction in the exemptions, with a greater contribution from major commercial electricity consumers and any electricity produced by consumers themselves being offset against the surcharge."

Verena Graichen

Verena Graichen, a graduate in administrative sciences, has worked in the Oeko-Institut's Energy & Climate Division since 2005, focusing on various aspects of the energy market. Her areas of expertise include emissions trading, the power plant fleet and energy costs.

Recycling comes first

Energy turnaround without waste incineration

If the waste management industry is to make an effective contribution to the energy turnaround, two conditions must be met: waste must be utilised as comprehensively as possible, and the remaining waste must be used flexibly and efficiently as a replacement for primary raw materials in energy generation. These are the main findings of a study conducted by the Oeko-Institut on behalf of the Federation of the German Waste, Water and Raw Materials Management Industry (BDE). The analysis includes specific recommendations on more climate action in the closed substance cycle.

About 15 million tonnes of waste are currently recycled as secondary raw materials in Germany every year. According to the Oeko-Institut, this figure needs to increase in the interests of the climate and resource conservation. In particular, plastics which are not utilised but incinerated in inefficient base load plants produce climate-damaging CO_2 emissions. An increase of around 100 per cent in the share of the recovered plastics will reduce CO_2 emissions by approximately six million tonnes a year and also save primary resources.

According to the study, there is also scope within recycling management to make better use of biogas potential from waste. In the future, the use of biowaste must increase to almost 100 per cent, from around 50 to 60 per cent today. This organic waste should first ideally be converted into high-quality biogas in fermentation plants for use in power and heat generation. The remaining organic waste from the fermentation plants can then be used as compost for the fertilisation and improvement of the soil.

The researchers make specific recommendations on the separate collection of recyclables. They propose the introduction of waste disposal charges based on the "polluter pays" principle and a uniform bin for recyclables, with ambitious quotas, in order to improve the separate collection of these resources. Similar regulations should also be introduced for industrial and commercial waste.

They also call for the provisions of the German Closed Substance Cycle and Waste Management Act (Kreislaufwirtschaftsgesetz) on the separate collection of biowaste to be implemented consistently and expanded with the inclusion of technical requirements relating to treatment of biowaste. And finally, the Oeko-Institut recommends a targeted programme to reduce overcapacity in waste incineration plants in order to prevent price dumping.

Project profile

Project title: Contribution of recycling management to the energy turnaround. Making optimum use of the climate protection potential under changed conditions
Contact: Günter Dehoust, g.dehoust@oeko.de
Ralph Harthan, r.harthan@oeko.de
Institute Division: Infrastructure & Enterprises, Energy & Climate
Client: Federation of the German Waste, Water and Raw Materials Management Industry (BDE)
Timescale: 07/2013 - 01/2014
Further information:
http://bit.ly/1uRmkaL

„Non-recyclable waste should no longer be used for power generation in base load power stations in future, but should be used as flexibly as possible. To that end, it will have to be processed to ensure that it is of high quality and can be stored. Waste incineration should be used solely for the disposal of toxic waste that is unsuitable for high-quality recycling. Incineration plants must also massively reduce their CO_2 emissions."

Günter Dehoust

Günter Dehoust is the Deputy Head of the Infrastructure & Enterprises Division. His research focuses mainly on sustainable material flows, and closed-loop materials and waste management. A graduate in environmental engineering, he has worked at the Oeko-Institut since 1990.

In Nature's name

The success of environmental class actions

The entry into force of the German Environmental Appeals Act (Umwelt-Rechtsbehelfsgesetz – UmwRG) in 2006 has greatly increased the scope for environmental associations to represent the interests of the environment. Under the Act, they can now bring class actions to challenge projects which may have adverse environmental impacts. On behalf of the German Federal Environment Agency (UBA), Oeko-Institut researchers have analysed the legal challenges mounted since the Act's entry into force. They found that almost every second action is wholly or partly successful.

Together with the Society for Institutional Analysis (sofia) at the University of Applied Sciences in Darmstadt, the Oeko-Institut studied the complaints lodged by environmental associations since the Act came into effect. In all, 58 legal actions brought between 2006 and 2012 under the UmwRG were identified, with the study revealing that 48 per cent of all actions were fully or partially successful. The low number of class actions shows that the environmental associations analyse their prospects of obtaining a legal remedy very carefully. Furthermore, objections by environmental associations are often based on a high level of technical expertise and result in better environmental standards, as a survey by sofia showed. The Society spoke to 35 stakeholders involved in selected class actions, including project agencies, representatives of associations and public authorities, and legal advisors.

The Oeko-Institut also makes recommendations on improving the environmental appeals under the Act. For example, the associations should have better access to information about forthcoming industrial licensing procedures or infrastructure projects. An important improvement has already been achieved, namely the requirement for information and application forms to be published on the Internet. In addition, the experts propose an extension of the deadline for the lodging of objections from six to at least eight weeks. This would give environmental associations more opportunity to prepare a solid case. The Oeko-Institut further conducted a comparative legal analysis of the Austrian, Polish and Dutch law of administrative procedure. As a result, the researchers propose the appointment of an additional independent environmental advocate (Umweltanwalt), as in Austria, and the establishment of scientific and technical advisory bodies such as those already existing for administrative jurisdiction in the Netherlands.

Project profile

Project title: Evaluation of the use and effects of the scope for class actions under the German Environmental Appeals Act (Umwelt-Rechtsbehelfsgesetz – UmwRG)
Contact: Falk Schulze, f.schulze@oeko.de
Institute Division: Environmental Law & Governance
Client: German Federal Environment Agency (UBA)
Project partner: Society for Institutional Analysis, University of Applied Sciences in Darmstadt (sofia)
Timescale: 10/2011 - 07/2013
Further information: http://bit.ly/1pvtXYI

„A great deal can often be achieved with environmental complaints, such as more mainstreaming of nature and species conservation, or a reduction in the quantity of pollutants entering the environment. The low number of environmental complaints brought between 2006 and 2012 shows that the environmental associations have a responsible attitude towards these new opportunities. Compared with more than 700 environmental impact assessments annually, the number of complaints lodged is extremely modest – just a dozen or so."

Falk Schulze

National and European environmental law is the main focus of Falk Schulze's work, which includes legal analysis and policy advice. A qualified lawyer, he has worked for the Oeko-Institut since 2004 and was appointed to his current position as Acting Deputy Head of the Environmental Law & Governance Division in 2009.

Safety levels are falling
Ageing nuclear power plants in Europe

The average age of Europe's nuclear power plants has risen to 30 years. Originally designed to last 30 to 40 years, their lifetimes are now to be extended to up to 60 years. At the same time, some reactors have to produce more thermal energy than originally planned. The result is a progressive decrease in safety levels. An Oeko-Institut report for Greenpeace identifies the weaknesses in the ageing reactors.

There are around 150 nuclear power plants in the EU, Switzerland and Ukraine. The physical ageing of components, systems and building structures in many of these plants means that additional monitoring is required. Degradation of material properties can be observed, with cracks, corrosion and embrittlement commonly occurring. According to the Oeko-Institut's findings, not every country has so far implemented the comprehensive ageing management programmes that are required. The report reveals that major components in nuclear power plants are a particular area of weakness, as replacing these components in ageing plants is complicated and may not be economically viable. The outdated conceptual and technological design of the plants also impacts on safety, with older reactors increasingly failing to meet current standards. What's more, old nuclear reactors are frequently less well protected against external impacts, both climatic and human-induced, such as floods, earthquakes and air crashes than is required according to current standards.

The – sometimes massive – power uprating can also reduce safety levels, the Oeko-Institut has found, if additional stress is imposed on ageing components. Higher levels of stress on these components can increase the risk of failures and make incidents more difficult to manage. However, general acceptance criteria for the maximum permitted extent of ageing effects are not defined; instead, it is a matter for each regulator in Europe to determine whether a power plant may be permitted to continue to operate despite ageing effects. In the Oeko-Institut's view, Germany should therefore lobby more intensively for plant retirement criteria at the EU level.

Project profile

Project title: Lifetime extension of ageing nuclear power plants: Entering a new era of risk
Contact: Simone Mohr, s.mohr@oeko.de
Institute Division: Nuclear Engineering & Facility Safety
Client: Greenpeace
Timescale: 10/2013 - 03/2014
Further information: http://out-of-age.eu

„Europe's nuclear power plants are located in densely populated regions. If there was an accident, for example at Switzerland's Beznau or Mühleberg reactors, involving a core melt and the release of radioactive material, as in Fukushima, millions of people would be affected. Given the age of the reactors – Beznau I is 45 years old, making it the oldest reactor operating in the world – and the decreasing safety levels, serious consequences cannot be ruled out."

Simone Mohr

Simone Mohr holds a degree in mechanical engineering from RWTH Aachen University. After several years in industry, she joined the Nuclear Engineering & Facility Safety Division at the Oeko-Institut in 1995. Her work mainly involves producing technical safety analyses for nuclear power plants and other nuclear facilities.

Rising consumption

More climate action needed in the ICT sector

Electricity consumption and greenhouse gas emissions from the information and communication technologies (ICT) sector are expected to rise sharply in the coming years, with a substantial increase forecast for telecommunication networks and data centres in particular, an Oeko-Institut analysis for the European Commission has found. The researchers make recommendations on environmental policy measures to improve efficiency in this sector in future.

In 2011, ICT-related electricity consumption (excluding manufacturing) in the EU-27 amounted to 214 terawatt-hours (TWh). According to the study by the Oeko-Institut and TU Berlin, this is expected to increase to 259 TWh in 2020. This figure included electricity consumption for the usage of ICT products (home and office) in the EU-27 in 2011, amounting to 142 TWh/a. Here, however, a slight decrease of electricity consumption to 139 TWh/a in 2020 can be expected; this is attributed to the broader use of mobile products and to energy efficiency improvements.

By contrast, the study predicts a substantial increase in the collective share of data centres and telecommunication networks in electricity consumption. The electricity consumption of data centres is expected to increase by almost 35 per cent from 52 TWh in the EU-27 in 2011 to 70 TWh in 2020, based on increased internet and cloud services usage. And for telecommunication networks, the increase is even greater: here, a 150 per cent increase in electricity consumption, from 20 TWh in 2011 to 50 TWh in 2020, is forecast, which the study attributes to growth in mobile data traffic.

Despite this trend, no mandatory environmental policy measures are currently being implemented to improve the efficiency of telecommunication networks and data centres. The researchers therefore make a number of recommendations on the appropriate steps. They initially recommend improving the data basis: for example, information should be gathered on the share of different data centre types and their energy consumption. Key performance indicators are also required on sustainability in telecommunication networks. In addition, the study recommends the introduction of mandatory monitoring and reporting of GHG emissions and energy consumption by data centres and telecommunication networks operators as the first step towards reducing energy consumption and emissions.

Project profile

Project title: Study on the practical application of the new framework methodology for measuring the environmental impact of ICT – cost/benefit analysis (SMART 2012/0064)
Contact: Siddharth Prakash, s.prakash@oeko.de
Institute Division: Sustainable Products & Material Flows
Client: European Commission, DG Communications Networks, Content and Technology
Project partner: TU Berlin
Timescale: 12/2012 - 01/2014
Further information: http://bit.ly/1slH22W

„Environmental aspects play more of a subordinate role in the German Government's Digital Agenda. Although reducing ICT-related energy and resource consumption is mentioned, practical strategies are lacking, especially for data centres and telecommunication networks. However, we expect the collective share of data centres and telecommunication networks in total ICT-related electricity consumption in the EU-27 to increase to around 46 per cent in 2020, compared with just 33 per cent in 2011."

Siddharth Prakash

Sustainable consumption is a key area of research for Siddharth Prakash, who works in the Sustainable Products & Material Flows Division. He joined the Oeko-Institut in 2008 and specialises in sustainability analyses for information and communication technologies.

Partners for the future

Selected clients of the Oeko-Institut in 2014

Politics and government

- Alliance 90/The Greens in NRW State Parliament
- Baden-Württemberg Ministry of the Environment, Climate Protection and the Energy Sector
- Berlin Senate Department for Urban Development and Environment
- Brandenburg Ministry of Rural Development, Environment and Agriculture
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- European Commission: Directorates-General for Energy, Research and Innovation, Climate Action, Communication, Environment, Industry and Entrepreneurship; EEA, Eurostat, EACI, Joint Research Centre, Resource Management Seville, Research Executive Agency
- European Parliament
- Federal Ministry for Economic Affairs and Energy
- Federal Ministry of Education and Research
- Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
- Federal Ministry of Transport and Digital Infrastructure
- German Federal Environment Agency (UBA)
- German Federal Environmental Foundation (DBU)
- German Federal Office for Economic Affairs and Export Control
- Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH
- Hamburg Department of Urban Development and Environment
- Hessen Agentur GmbH
- Hessian Ministry of the Environment, Climate Protection, Agriculture and Consumer Protection
- Lord Mayor's Office, Department of Urban Planning and Environment, Braunschweig
- Lower Saxony Ministry of the Environment, Energy and Climate Protection
- North Rhine-Westphalian Ministry for Climate Protection, Environment, Agriculture
- North Rhine-Westphalian Ministry of Economics, Energy, Building, Housing and Transport
- North Rhine-Westphalian State Office for Nature, the Environment and Consumer Protection
- Rhineland-Palatinate Ministry of Economics, Climate, Energy and Regional Planning
- State Agency for Environment, Measurements and Nature Conservation Baden-Württemberg (LUBW)
- Swiss Federal Nuclear Safety Inspectorate
- Swiss Federal Office of Energy
- UNIDO E-Waste Ethiopia
- Waste Management Kassel

Industry

- apple Distribution International
- BP Europa SE
- BSH Bosch und Siemens Hausgeräte GmbH
- Daimler AG
- EP: Electronic Partner
- KeTAG Baden-Württemberg
- MAN Truck & Bus AG
- Media-Saturn-Holding GmbH
- MEIKO Maschinenbau GmbH & Co.KG
- Shell Deutschland Oil GmbH
- Stadtwerke München GmbH und Stadtwerke Ulm/Neu-Ulm GmbH
- Telekom AG
- TÜV Süd
- Vaillant GmbH

Civil society

- Agora Energiewende
- Bremen Consumer Advice Centre
- BUND/Friends of the Earth Germany, NRW branch
- Federation of the German Waste, Water and Raw Materials Management Industry (BDE)
- Fraunhofer Institute for Systems and Innovation Research (ISI)
- German Association for Electrical, Electronic and Information Technologies (VDE)
- German Football Association
- German Olympic Sports Confederation
- German Society for the Promotion of Research on Standardization
- Germanwatch e.V.
- Greenpeace Nordic
- ifeu GmbH
- Legacy for the Future Foundation
- Leibniz Institute of Ecological Urban and Regional Development
- Mercator Foundation/Stiftung Mercator
- Nature and Biodiversity Conservation Union (NABU) Germany
- Rhine-Main Aircraft Noise Control Association
- Rottenburg University of Applied Forest Sciences
- RWTH Aachen University
- Save Malaysia! Stop Lynas! (NGO)
- Trinational Anti-Nuclear Federation (TRAS)
- Utopia GmbH
- VDI Centre for Resource Efficiency
- WWF Germany and Switzerland

A full list of references is available (in German) at www.oeko.de/referenzen2014

Shaping tomorrow – today
The management of the Oeko-Institut

The Oeko-Institut has been constituted as a non-profit association since it was established. Its active members elect the Committee, which runs the association. The Committee transfers responsibility for day-to-day operations to the Executive Board. The Executive Board performs its tasks in cooperation with the Oeko-Institut's scientific divisions and central services. In addition, more than 2400 members support the Oeko-Institut's work with donations and subscriptions (see also page 23).

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Sharing knowledge

The Oeko-Institut welcomed 130 representatives from politics, science and business at its annual meeting in Berlin on 12 November 2014. The theme of the meeting was "Priority climate protection – strategies for future transport". The Public Relations & Communication Department provided organisational and communications support for the event. The live streams of all the discussions proved very popular, with more than 1000 clicks, and there was an enthusiastic response to the graphic recordings – a fresh approach to conference reporting!

Graphic recording during the annual meeting. Other recordings can be accessed on our Flickr photo stream www.flickr.com/oekoinstitut

An Internet presence, media discussions and press releases are core elements of the Oeko-Institut's communications strategy. It now also uses social media (Twitter, Youtube, Flickr, Slideshare) as high-speed, high-impact communication channels which encourage questions, feedback and discussion. The Public Relations and Communication Department publishes eco@work for members and assists the Institute's Divisions with the production of flyers, brochures and project websites. Around 80 infographics provide a visual record of study findings.

The tangible results of the Public Relations and Communication Department's media relations work can be found in the press, on the radio and TV and online every day. Here are some highlights from 2014:

Carbon footprint of online versus real-world shopping

"The Oeko-Institut in Freiburg does the maths: sending a parcel by post produces an average of 500 g CO_2. Driving to the shops produces very much more. Advantage online shopping, then – click ... were it not for the poor practice. It's not only the returns that mess up online shopping's carbon footprint. Another problem is that parcels are often not delivered at the first attempt …" (Die Zeit, 3.4.2014)

EEG reform

"The Oeko-Institut in Freiburg calculated in a study last year that around two cents per kilowatt hour of the surcharge levied under the Renewable Energy Sources Act are attributable to 'redistributive effects and privileges for business and industry'." (Handelsblatt, 4.4.2014)

Carbon footprint: bus versus rail

"Where climate gases are concerned, buses can more than keep pace with rail, as the Oeko-Institut in Freiburg has shown in a study for the German Federal Environment Agency." (dpa, 29.9.2014)

Sale of uranium company Urenco

"'Up for sale is the simplest path to the atom bomb,' says Michael Sailer from the Oeko-Institut in Darmstadt, who sits on the Commission on the Final Storage of Nuclear Waste and the Reactor Safety Commission and advises the German government on nuclear matters. […] 'In my view, it's irresponsible to leave a technology with such destructive power up to market forces.'" (Süddeutsche Zeitung, 31.10.2014)

Carbon footprint of electric cars

"Despite the nuclear phase-out, electricity generation in Germany is very carbon-intensive, as Florian Hacker from the Oeko-Institut explains. In other words, the carbon savings made by driving an electric car are cancelled out by the upstream production of the power that they consume. 'If we compare an electric car with a conventional one today, the carbon footprint isn't much better,' says Florian Hacker." (Frankfurter Allgemeine Zeitung, 21.11.2014)

Many hands shape the future

2.400 members, including 27 local authorities …

… are what distinguishes the Oeko-Institut from other research institutes. Our members brought the association into being in 1977 and still form its solid financial and conceptual basis. Membership subscriptions and additional donations – amounting to more than 225,000 euros in 2014 – enable us to contribute our own topics to the political and social debate.

For example, with our 2012 donation-funded project, which ended in early 2014, we showed that organic foods are no more expensive than conventional foods if all the external costs are factored in. The findings of the study and the "political cookbook" which resulted from the project attracted considerable media interest and proved very popular with consumers.

The findings and information about the cookbook can be accessed online at:
www.oeko.de/spendenprojekt2012

In our "City of the Future" project which recently ended and also benefited from donors' support, we showed – with reference to Bremen and Stuttgart – how visionary transport strategies might work in practice and how they can ease the burden on the environment and improve quality of life.

All the findings published in December 2014, along with a poster for download, are available on our website: www.oeko.de/spendenprojekt2013

Our independent position is reflected in our day-to-day work for our clients from politics, business and non-profit organisations. We are very proud of our independence, and maintaining it is one of our priorities.

To enable us to pursue projects and develop solutions outside our contract research – in fields which we believe are extremely important to the environment – we need your support. Please consider becoming a member!

Donation-funded project 2014

LeadWorkShop: Hazardous, manual work in Africa.
For our 2014 donation-funded project, we are turning our attention to West Africa. Here, lead from old car batteries is often removed by hand in leadworks, exposing workers and local communities to unacceptably high levels of contamination. This can cause serious damage to health and even death.

This issue will be addressed in close cooperation with environmental groups and scientists from several African countries. The aim is to create synergies between the local partners, who have many years of experience, and the Oeko-Institut, which can offer technical expertise. The donations will provide the local partners with the financial resources they need for essential research, analyses and public relations activities. In addition, the Oeko-Institut will prepare technical information in English and French. The issue of inappropriate battery recycling in developing and emerging countries will also be highlighted here in Germany and at the international level.

The Oeko-Institut is delighted that Francis Norman, a musician with West African roots, has kindly agreed to become project patron.

Further information on the 2014 project is available here: www.oeko.de/spendenprojekt2014

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