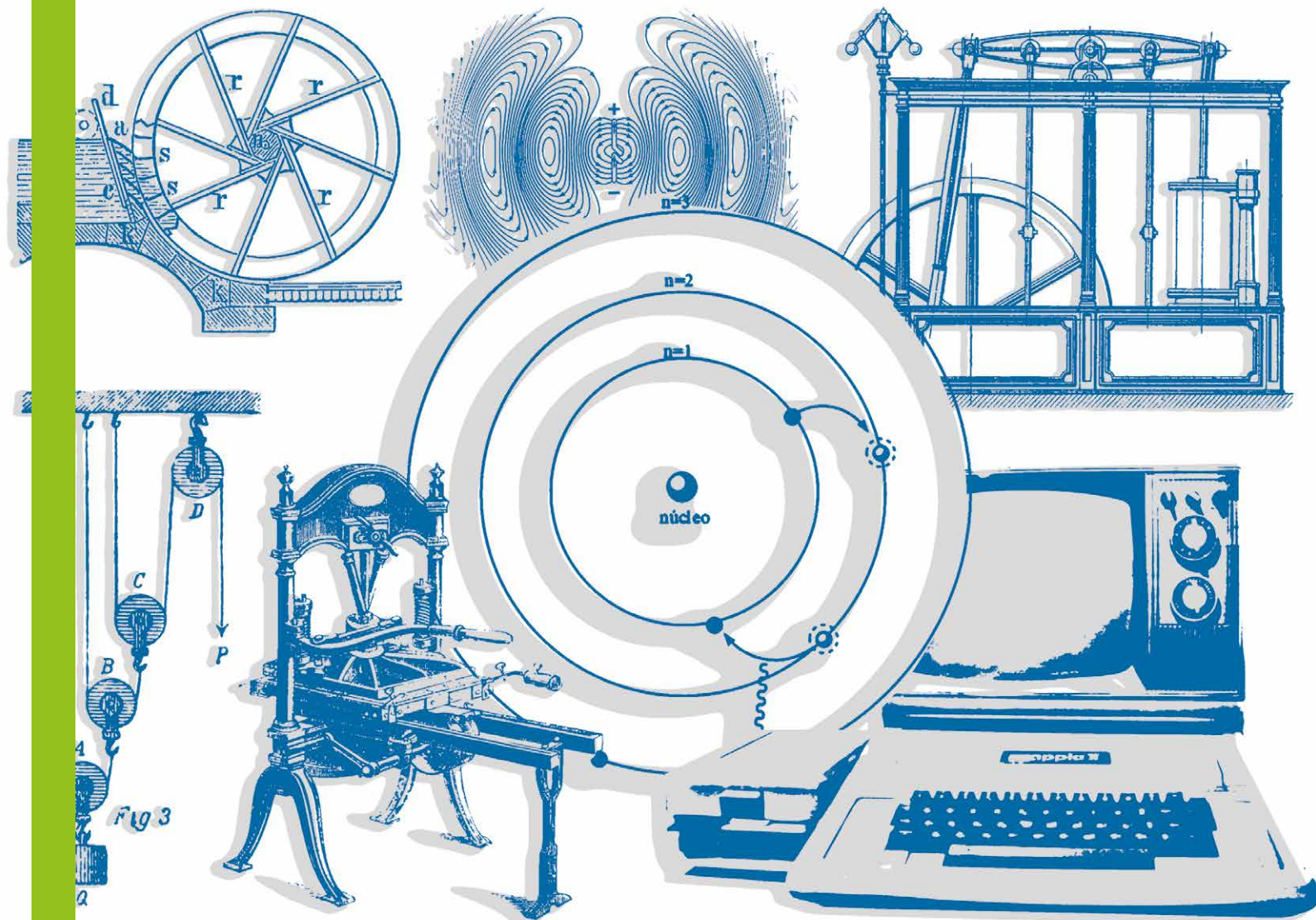


Science in transition

Annual Report of the Oeko-Institut 2018



Science drives change

Science has always propelled our society forwards. Consider the discovery and use of electricity, or the diagnosis and treatment of disease. And of course science has also advanced our understanding of the

changes that need to be made as we seek to make life on this planet more sustainable. Many committed, inspired and knowledgeable scientists have played a part in this.

1386 HEIDELBERG UNIVERSITY

Germany's first university opened in Heidelberg in 1386.



1732 LAURA BASSI

The first female university professor in Europe, the philosopher Laura Bassi, lectures at the University of Bologna in 1732.



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1824



JEAN BAPTISTE JOSEPH FOURIER

The greenhouse effect was identified by mathematician and physicist Jean Baptiste Joseph Fourier as long ago as 1824.

WOMEN AT UNIVERSITIES

The Grand Duchy of Baden admits women to the universities of Freiburg and Heidelberg, thus becoming the first German state to grant places to women.

Grossherzoglich Badische
Universität Heidelberg.

Studien- und Sittenzeugniß.

Dem Herrn Dr. Georg Schauer
Sohn des F. Schauer, S. 1. 14. 1824
hiermit, dass er auf Grund
eines Referenzzeugnisses des Gymn. Karlsruhe
eines Abgangszeugnisses der Universität technischen
Hochschule, genügendes Zeugniß
als Student Philosophie
am 21. 12. 1824

1900

1901 NOBEL PRIZE

The first Nobel Prizes were awarded in 1901.



1969



Union of Concerned Scientists

The Union of Concerned Scientists is founded in the USA in 1969.

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Our year 2018

Dear readers,

The past year has been one of extremes. We saw this on the political front: it was only in March 2018, after dogged and protracted coalition negotiations between different political factions, that a new federal government was formed in Germany – some six months after the parliamentary elections. In sport too: never before has the German national team been knocked out of the FIFA World Cup at the first stage. And in terms of the weather it was a once-in-a-millennium summer marked by a seemingly endless succession of sunny days. But while some were enjoying the hot summer on the beach or by the lake, others were battling the drought and the knock-on effects, which included forest fires and failed harvests.

The extreme weather of the summer of 2018 also raised the question of whether it was “just” a statistical anomaly or a systematic shift as a result of climate change. This raised the profile of an important issue on the agenda. Mitigating climate change and protecting the environment have frequently been marginalised as other issues have claimed our attention. This is not surprising, given that nationalistic politicians on various continents continue to jostle for the limelight, keeping the world on tenterhooks with their declarations and actions. At the same time we find ourselves in a process of constant change

and movement. Majorities change. Parties rise and fall. New technologies replace familiar behaviours and change the ways in which we live and work. This brings many opportunities, but also challenges. And so it is not surprising that many people are feeling insecure and looking for guidance – and in the process sometimes listening to those who shout loudest or promise the nicest easy solution.

I believe that science has an important role in this situation. It explains connections. It supplies facts where others try to distort the truth. And in the case of the Oeko-Institut, it repeatedly highlights the importance of action on climate change and environmental issues. To communicate its findings, science needs clout and credibility – and credibility is something that seems ever more difficult to achieve. Transparency, participation and independence are therefore cornerstones of our work at the Oeko-Institut.

At the same time, science must be in tune with the modern world; it cannot retreat to an ivory tower but must address issues of relevance to society. And in 2018 we continued to do that. The topics on our agenda included avoidance of plastic, genome editing, corporate responsibility in global supply chains, the expansion of electricity grids and the emissions



1873
**THE INTERNATIONAL
 METEOROLOGICAL ORGANIZATION
 (IMO) WAS FOUNDED IN 1873.**

trading system, and sustainable transport and nutrition. In addition, we took a long hard look at the phasing out of coal and through Dr Felix Christian Matthes, Research Coordinator for Energy & Climate Policy, we were involved in Germany's Coal Commission. This is an important task, because in our view the phasing out of coal must at long last be tackled with a view to finding a way forward that combines ambitious action on climate change with consideration of the interests of those who are directly and indirectly affected.

The Oeko-Institut is often on hand at the very start of an important debate, putting its finger on a problem while also identifying ways of dealing with it. Or as Prof. Rainer Griesshammer, who retired from the board of the Oeko-Institut in the summer of 2018 on the grounds of age, put it in an interview with our magazine *eco@work*: "Better still, we can anticipate key debates, gather the data, analyse the various positions and alternatives and thus prepare the ground for decision-making by society."

With regard to the constant and rapid changes in our society, even in the face of extreme events and attitudes, I remain firmly convinced that reason will retain the upper hand. Or, as Chancellor Merkel has said: that we shall manage it. That we can successfully

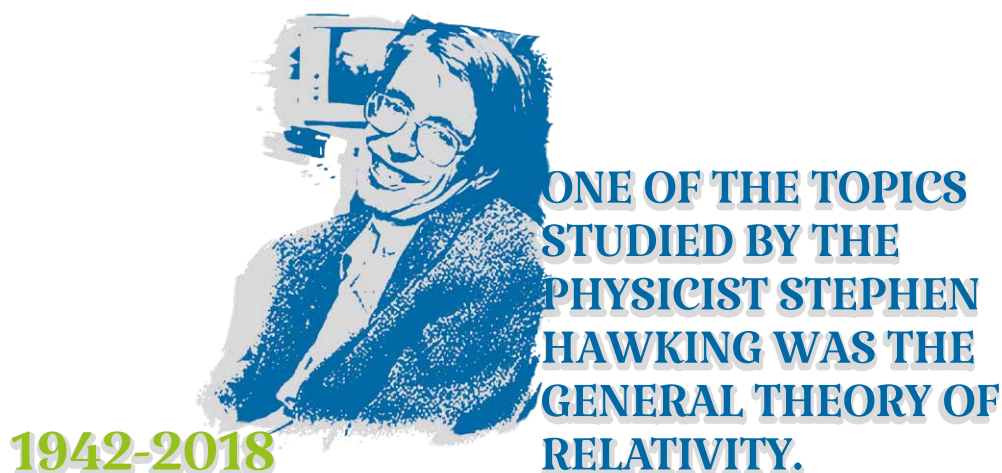
work together towards a socially just world that will at some point keep within its ecological boundaries. Furthermore, last year saw the death of one of the most impressive scientists of recent times, the physicist Stephen Hawking. He was a man who set a great example not only in his specific field but also in his attitude to life. He showed us what can be achieved if one refuses to give up – even in the most difficult circumstances.

My wish for the coming year is that we should not give up, that despite all extremes and changes we should not lose courage, and that we should continue to campaign for a good and sustainable future. For action on climate change. Against degradation of the environment. For society. Against isolation.

Yours



Michael Sailer
Chief Executive Officer of the Oeko-Institut



Science drives change

Looking to the future

Scientific work is always in flux. Over the centuries it has repeatedly undergone radical change. Sometimes the changes have been organisational, as when the universities were opened to women. Sometimes they are the result of the constant flow of new issues and challenges – in medicine or physics, in sociology or meteorology, or in the light of social change, the use of electricity, genetic engineering or digitalisation.

Even if we look back over just a few decades we can see how science not only constantly undergoes changes but also initiates it. This is also true of the Oeko-Institut: when it was founded it was regarded as a scientific rebel. The institute is still an institution that repeatedly questions longstanding conventions and structures. It also collates transparent knowledge for sustainable and future-oriented development and makes it available to society. This work is based on clear principles of scientific study – for example, with regard to the accuracy and verification of results, the objectivity of its approach to different issues, the selection of appropriate methods and the transparent documentation of findings. In addition, it takes place across disciplinary boundaries and incorporates transdisciplinary approaches. And while pursuing new theoretical knowledge, our researchers never lose sight of the need to consider the everyday practical implications.

The Oeko-Institut's research work is conducted by its five divisions: Energy & Climate, Resources & Transport, Environmental Law & Governance, Sustainable Products & Material Flows, and Nuclear Engineering & Facility Safety. In exploring the transformation towards sustainability, our researchers use a wide variety of methods. They organise participatory processes and stakeholder consultations, produce life cycle assessments and calculate their cost, evaluate technologies and their impacts, undertake quantitative and qualitative surveys and model issues such as the development of the electricity market or the transport sector.

But it is not only in terms of its research topics that the Oeko-Institut's work is in constant motion. There have been staff changes too: our longstanding executive director Prof. Rainer Griesshammer has handed over his role to Anke Herold, who was previously Research Coordinator for International Climate Policy in the Energy & Climate Division. She joined the Executive Board in April 2018 with special responsibility for science and research.



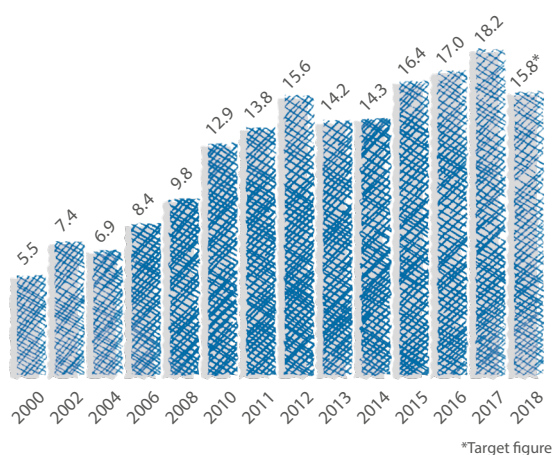
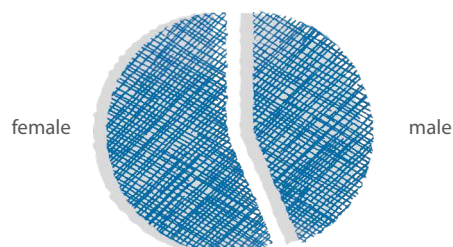
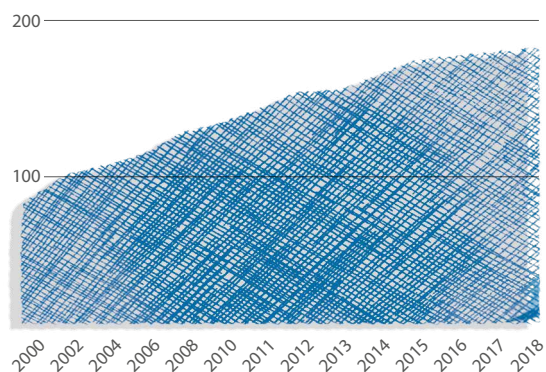
4th century B.C.
IN THE 4TH CENTURY B.C. ARISTOTLE
WAS ALREADY DIVIDING SCIENCE INTO
DIFFERENT AREAS OF STUDY.

Facts and figures for 2018

Human resources

In 2018 we had 174 members of staff working on more sustainable ways of organising our society. The workforce comprised 113 researchers and 61 members of staff in Central Services. They were employed at the institute's offices in Freiburg, Darmstadt and Berlin.

In terms of gender distribution, more posts at the Oeko-Institut were held by women (98) than by men (76). However, the overall ratio is balanced because more women work part-time.



Projects and turnover

Last year the institute's researchers worked on more than 370 projects, the majority of them commissioned by policy-makers, the private sector and civil society. In addition, our researchers initiated six projects that were funded by the institute itself. These projects enable issues to be addressed independently of the order situation. In 2018 the Oeko-Institut planned to work to a budget of more than 15 million euros. The actual amount is likely to be higher.

Stability and change

People at the Oeko-Institut

The Oeko-Institut is organised as a non-profit association managed by the Committee. The Committee includes seven external members who are elected by the General Assembly in a secret ballot; they each serve for two years. Also on the Committee are five representatives of the institute, comprising a representative of the extended management of the institute, the Chief Executive Officer as an ex officio member, and one representative elected by the staff of

each of the offices in Freiburg, Darmstadt and Berlin. The Committee appoints the CEO, the members of the Executive Board and the divisional heads.

There were also changes on the Executive Board, which has three members: in the spring of 2018 Anke Herold replaced Prof. Rainer Griesshammer, who is leaving the institute on the grounds of age but nevertheless remains associated with it in an advisory capacity.

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 Prof. Dr Lucia Reisch
 Dr Hartmut Richter
 Prof. Dr Dr h.c. Udo E. Simonis

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 Ulrike Schell
 Second Chair of the Committee
 Dr Regina Betz
 Prof. Dr Gerald Kirchner
 Thomas Rahner
 Kathleen Spilok
 Prof. Dr Volrad Wollny

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Working for change

Selected projects from 2018

Conserving nature and the environment long-term, securing livelihoods for all – these are the goals that the Oeko-Institut wants to contribute to. Knowledge and science underpin the transition to a sustainable society. And so the institute's researchers establish the basic principles of sustainable development and devise appropriate strategies. They are quick to identify the environmental impacts of society's actions and they present alternative future scenarios that take account of the global context. They also help society and stakeholders to adapt to necessary change, and they ensure that their research findings reach as wide an audience as possible. We continued to do all this in 2018.

The following pages provide a glimpse of the work of the institute's five research divisions: ten projects illustrate the Oeko-Institut's contribution to the sustainable transformation of our society.

For example, the Energy & Climate Division investigated the expansion and conversion of Germany's electricity grids and ways in which the process could be improved; it also considered the costs that the

country would incur if insufficient action is taken to mitigate climate change. The Resources & Transport Division explored how Europe could be supplied with raw materials on a sustainable, environmentally sound and socially equitable basis; it also looked at the issue of climate-friendly freight transport.

Researchers in the Nuclear Engineering & Facility Safety Division studied the modification of the Munich II research reactor and sociotechnical aspects of the disposal of radioactive waste. The work of the Sustainable Products & Material Flows Division is illustrated by projects on sustainable aquaculture and the organisation of social transformation processes. The Environmental Law & Governance Division worked on guidelines for sustainable action in small- and medium-sized enterprises and investigated how the sustainability targets of the Partnership for Sustainable Textiles could be achieved on an ambitious scale.

The ten projects illustrate the vision and mission of the Oeko-Institut. They show how science can make a substantial contribution to socially and environmentally sustainable development at various levels.



1977

THE OEKO-INSTITUT HAS BEEN WORKING FOR THE SUSTAINABLE TRANSFORMATION OF SOCIETY SINCE 1977.

Technology, society and final storage

The SOTEC-radio project

In the search for a final storage site for high-level radioactive waste (HLW), there are numerous technical issues to be considered, focusing particularly on the construction and operation of the repository itself and the transport and interim storage of waste. However, sociological issues also come into play in relation to the siting of the final repository. A constructive approach to social dynamics is therefore essential in the site selection process, and the social context and expectations must also be considered. But how do technology and society interact in decision-making processes? How do political, legal and social conditions influence the technologies and concepts chosen for final repositories?

Researchers at the Oeko-Institut are addressing these questions in order to gain a better understanding of the socio-technical linkages and challenges arising in relation to the disposal of radioactive wastes. Scientific concepts for the analysis of these challenges are developed, discussed and systematised. The team focuses particularly on opportunities for stakeholder participation in technical debates and decision-making and also develops options for action to deal with socio-technical challenges in governance and management structures.

Furthermore, in partnership with the Environmental Policy Research Centre (FFU) at FU Berlin and the Institute for Technology Assessment and Systems Analysis (ITAS) at Karlsruhe Institute of Technology (KIT), the Oeko-Institut is investigating how to build skills in this area and provide better support to young researchers, e.g. through workshops, training programmes and dialogue formats. The Oeko-Institut experts also foster and deepen European and international cooperation on radioactive waste disposal issues and formulate policy recommendations.

"There are interactions between technical and social factors, as the research shows. In radioactive waste disposal and the search for a final repository site in Germany, it is essential, therefore, to work across established disciplinary boundaries in order to address socio-technical challenges."

The project is funded by the German Federal Ministry for Economic Affairs and Energy (BMWi).



1927-1998

Project profile

Project title: Methods and measures to deal with socio-technical challenges in radioactive waste management (SOTEC-radio)

Contact: Dr Bettina Brohmann, b.brohmann@oeko.de

Institute Division: Nuclear Engineering & Facility Safety

Funding: German Federal Ministry for Economic Affairs and Energy (BMWi)

Project partners: Institute for Technology Assessment and Systems Analysis (ITAS) at Karlsruhe Institute of Technology (KIT), Environmental Policy Research Centre (FFU) at FU Berlin

Timescale: April 2017 – April 2020

Further information:

www.oeko.de/projektflyer-sotec-radio

Dr Bettina Brohmann

As the Oeko-Institut's Research Coordinator for Transdisciplinary Studies, Dr Bettina Brohmann's work has a cross-divisional dimension. A sociologist who has worked for the Oeko-Institut for more than 30 years, she has a particular interest in transformation research.



1747



Climate-friendly freight transport

Switching to alternative propulsion systems

About a quarter of all transport greenhouse gas emissions in Germany – around 40 million tonnes of CO₂ per year – arise from the transport of goods by road. And the trend is continuing upwards, because road transport is expected to increase further.

Even if there is a widespread switch to rail, freight transport cannot play its necessary part in mitigating climate change unless trucks switch to alternative propulsion systems and fuels. The Oeko-Institut has explored the requirements and advantages of such a switch in two projects and has drawn up policy recommendations.

Electrification of road freight transport by means of catenary trucks (which draw electricity from overhead wires) is beneficial both environmentally and in terms of cost. This was demonstrated by Oeko-Institut researchers in a comparative study of different propulsion technologies funded by the Federal Environment Ministry. By 2025 total emissions from catenary trucks could be 25 percent less than those of diesel vehicles. By 2030 the figure could rise to 32 percent as a result of the increased generation of electricity from renewables. Furthermore, electric vehicle types are significantly more energy efficient than trucks with a combustion engine. Catenary trucks are also worthwhile from

the point of view of cost: over the typical five-year operating life of a long-distance truck, the total operating costs of a catenary truck in 2025 are lower than those of a diesel vehicle. These lower operating costs more than offset the higher procurement costs.

In a further analysis the Oeko-Institut and its two project partners emphasise not only the advantages of catenary and bat-

tery-electric trucks but also the urgent need for quick and reliable action by the government. Key requirements, according to the project team, are rigorous efficiency standards for trucks, a system of taxes and levies based on CO₂ emissions, and development of the necessary infrastructure. It is estimated that investment of between 2.5 and five billion euros is needed to provide a basic supply grid for around 40,000 trucks.

Project profile

Project title: Catenary trucks in the context of other propulsion and energy supply options for long-haul road freight transport (StratON project)

Alternative drive trains and fuels in road freight transport - Recommendations for action in Germany

Contact: Florian Hacker, f.hacker@oeko.de

Institute Division: Resources & Transport

Funding: German Federal Environment Ministry (catenary trucks)

Project partners: Heilbronn University of Applied Sciences, Fraunhofer Institute for Industrial Engineering (Fraunhofer IAO), Intraplan GmbH (catenary trucks) Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI), ifeu – Institut für Energie- und Umweltforschung Heidelberg (alternative propulsion systems)

Timescale: July 2016 – December 2019 (catenary trucks)

October 2018 (alternative propulsion systems)

Further information:

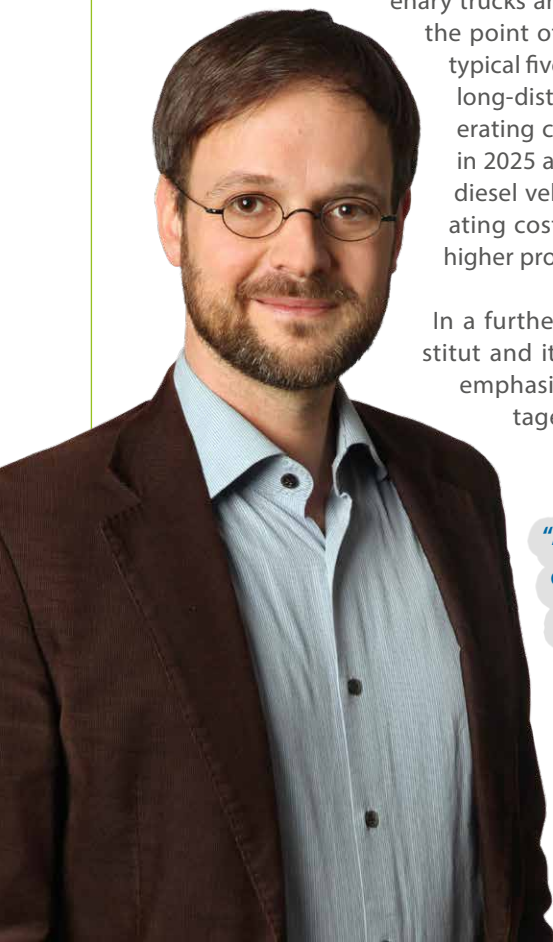
www.oeko.de/oberleitungs-lkw-vergleich

www.oeko.de/studie-alternative-antriebe-2018

Florian Hacker

Sustainable mobility is the focus of Florian Hacker's research. The Deputy Head of the Resources & Transport Division has been with the Oeko-Institut since 2007. He works on alternative propulsion technologies and fuels and on strategies for reducing carbon emissions in the transport sector.

"Alternative propulsion systems such as the catenary truck must be trialled quickly – that is vital, because we need market-ready alternatives to the diesel truck if we are to achieve the urgently required reduction in road freight transport emissions. Large-scale demonstration projects not only teach us valuable practical lessons but can also take account of the requirements of market stakeholders and society."



Not without you

How SMEs can operate more sustainably

Small- and medium-sized enterprises (SMEs) often lack the human and financial resources for extensive measures to improve their environmental and social sustainability – measures such as enhanced energy efficiency, more sustainable procurement, a good working environment and opportunities for more flexible working hours. But without SMEs a radical transformation towards more environmentally sound and socially equitable patterns of production and consumption is not possible. After all, SMEs in Germany account for more than 30 percent of turnover and employ more than 60 percent of the working population. Guidelines produced by the Oeko-Institut now help them to improve their sustainability performance.

Working with the Albert Ludwig University of Freiburg and the district authority of Steinfurt, the Oeko-Institut has published the booklet “Nachhaltiges Handeln in Unternehmen und Regionen” [“Sustainable action in businesses and regions”]. It was produced as part of the RegioTransKMU project, which advised SMEs in the Steinfurt district on how they could enhance their sustainability activities. The project, which was funded by the German Federal Ministry of Education and Research, focused on regional value creation and on ways of making a rural region a more attractive place to live and work.

The guidelines contain a comprehensive list of opportunities for improving corporate sustainability. They show, with particular reference to SMEs, how areas in which there is a particular need for action can be readily identified and how businesses can exert influence in these areas through their own actions. For example, there is a description of how sustainability targets can be formulated, implemented and communicated. The

guidelines on sustainable action also show how regional stakeholders can support the sustainability activities of SMEs.

Project profile

Project title: “Nachhaltiges Handeln in Unternehmen und Regionen” guidelines from the project “RegioTransKMU – Regional transformation through the social and environmental activities of businesses”

Contact: Cara-Sophie Scherf, c.scherf@oeko.de

Institute Division: Environmental Law & Governance

Funding: German Federal Ministry of Education and Research

Project partners: Albert Ludwig University of Freiburg, district authority of Steinfurt

Timescale: January 2015 – December 2017

Further information:

www.oeko.de/wegweiser-nachhaltiges-handeln

Cara-Sophie Scherf

Cara-Sophie Scherf gained her Master’s degree in international relations at the Paris Institute of Political Studies. In 2016 she joined the Oeko-Institut’s Environmental Law & Governance Division, where she focuses on sustainable governance.

“SMEs are an important part of our economic system. They need support to become more involved in sustainability activities – because of policy goals, the expectations of society and more stringent statutory requirements. Environmental awareness and concern for employees’ welfare are often practised, but a structured approach is lacking.”



1713





Shaping transformation

The optimised pathway to sustainability

Our society must change. It produces and consumes too much meat, generates too many greenhouse gases, uses too many resources. Social change to increase sustainability is beginning to get under way. E-bikes are booming. Less meat is being eaten. Digital solutions promise us dematerialisation. But

there is still a great deal to be done to bring our excessive consumption of natural resources back within bounds. How can the necessary change and transformation be organised from social and environmental points of view? The Oeko-Institut's researchers have explored this issue with four project partners and around twenty practical stakeholders with whom they investigated three areas of application.

With funding from the German Federal Ministry of Education and Research via the funding programme for social and ecological research, the project team looked at the areas of paperless publishing and reading, sustainable production and consumption

of meat, and e-bikes in urban and regional transport. In each area the initial setting was characterised and the drivers of transformation and obstacles to it were analysed. The Oeko-Institut also supported practical initiatives, such a project that enabled new citizens in Munich to try out electric bicycles.

The analysis shows that transformation processes are not easy to plan and manage, but there are opportunities to exert influence. A prerequisite is a systemic understanding of the transformation field. Possible opportunities for action then include identifying and responding to social trends, promoting social innovations and experiments, putting stakeholders in touch with each other and "exnovation", which involves phasing out non-sustainable structures. For example, in connection with the use of e-bikes in urban and regional transport the experts profile the creation of a strategic platform for two-wheeled electric transport and the phasing out of petrol-powered two-wheelers as possible tools for driving the transformation.

Project profile

Project title: Trafo 3.0: Developing a model for socio-ecological transformation processes in practice: Development and trial in three fields of application

Contact: Carl-Otto Gensch, c.gensch@oeko.de

Institute Division: Sustainable Products & Material Flows

Funding: German Federal Ministry of Education and Research

Project partners: Four project partners and twenty practical stakeholders

Timescale: April 2015 – September 2018

Further information:

www.trafo-3-0.de

Carl-Otto Gensch

Carl-Otto Gensch is Head of the Sustainable Products & Material Flows Division at the Oeko-Institut, where he has worked since 1988. He specialises in research into the sustainability assessment of technologies and corporate strategies.

"Social transformation cannot be planned. But when it happens, we need to be well prepared for it in order to facilitate it and – as far as possible – channel it in a sustainable direction. That involves undertaking a good initial analysis of areas in which sustainability leaves a lot to be desired and preparing ways of shaping the process."



Sharing mitigation efforts

Inadequate climate action and what it costs

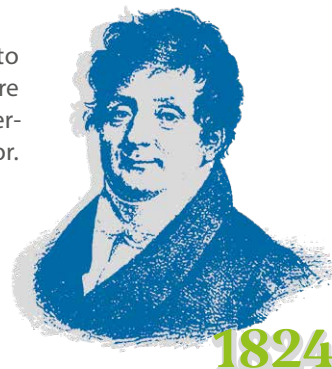
Those who don't do enough to protect the climate must pay: under the EU's effort-sharing regulation, all member states are allocated a budget for emissions not covered by the emissions trading system. The sectors affected by this distribution of mitigation effort include transport, buildings and agriculture. If a country exceeds its emissions budget, it must purchase additional emission rights from other member states to offset the higher greenhouse gas emissions. A brief study by the Oeko-Institut shows that unless Germany puts ambitious measures in place, the national budget will incur considerable costs.

Under the EU regulation, which specifies 2005 as the baseline, Germany must reduce its effort-sharing emissions by 14 percent by 2020 and by 38 percent by 2030. However, by 2017 its greenhouse gas emissions had fallen by only one percent since 2005. A major culprit here is the transport sector, whose emissions have increased significantly. Industrial and energy supply emissions, which are not included in the emissions trading system, have risen even more.

The Oeko-Institut's study analyses current emissions data and the German government's projections until 2030. This shows that by 2020 Germany would need to buy emission certificates to cover around 120 million tons of greenhouse gases; this could cost in the region of 600 million euros. For the period from 2021 to 2030 the researchers calculate that the gap will amount to around 300 million tonnes of greenhouse gases, and because emission certificates will rise in price this would involve costs of between five and 30 billion euros.

The experts hold that more must be done to curb emissions in the affected sectors. Measures could include fairer taxes on fuels that take carbon emis-

sions into account, incentives to improve energy efficiency and more ambitious standards for low-energy housing in the buildings sector. Germany needs a transport and heating turnaround to achieve its goals, because purchasing emission rights is not a viable alternative: in the short term it results in high costs, and in the long term it delays the transition to a low-emissions society.



1824

Project profile

Brief study: Assessment of the additional purchases of Annual Emission Allowances (AEA) required as a result of the European effort-sharing scheme

Contact: Sabine Gores, s.gores@oeko.de

Jakob Graichen, j.graichen@oeko.de

Institute Division: Energy & Climate

Published: June 2018

Further information:

www.oeko.de/studie-effort-sharing-2018

Sabine Gores

Sabine Gores studied energy and process engineering at university. At the Oeko-Institut, which she joined nearly 20 years ago, she works on numerous aspects of climate policy. As a member of the Energy & Climate Division she works on the achievement of energy and climate goals and on European climate protection instruments.



"The German government must now change course with regard to climate protection policy – because of climate change, but not least for cost reasons as well. Without a permanent reduction in energy consumption and the use of renewables in the heating sector as well as elsewhere, the climate targets that have been set cannot be achieved."



1953

Recommendations for the Textile Partnership

They want to improve conditions in the textile industry. This is why some 150 representatives of business, government and civil society have joined forces in the Partnership for Sustainable Textiles. They commit to binding targets for fairer and more sustainable clothing production, such as minimum standards for collaboration with suppliers and greater transparency throughout the supply chain.

On behalf of the civil-society members of the Partnership, the Oeko-Institut has analysed what ambitious implementation of these targets might look like and produced recommendations for improving content and procedures.

The Textile Partnership asks members to plan improvement measures and to engage in an annual review process that involves reporting on the progress they have made. In their analysis the members of the project team call for more specific targets and a more transparent process. The Partnership for Sustainable Textiles should explain exactly what criteria are used

to determine whether the participating companies have achieved their goals and set out clearly how this can be verified. The Partnership's effectiveness has hitherto been weakened by excessive latitude in the design and implementation of sustainability measures.

In addition, the researchers highlight the need to focus

more strongly on the deeper supply chain. For example, the present situation could be improved by setting up a complaint mechanism that would enable people such as an Indian cotton grower or a Bangladeshi seamstress to pass information about abuses directly to German companies. Other recommendations include drawing up concrete standards for fair purchasing practices and drawing attention to pioneers who implement particularly ambitious targets. This would show other companies that social and environmental conditions in the textile sector can be improved.

Project profile

Project title: Evaluation matrix for ambitious implementation of the Partnership for Sustainable Textiles' time and quantity targets 2018-2020

Contact: Dr Nele Kampffmeyer,
n.kampffmeyer@oeko.de

Institute Division: Environmental Law & Governance

Client: Civil-society stakeholders in the Textile Partnership, represented by Femnet e.V.

Timescale: February – March 2018

Further information:

www.oeko.de/ambitionierte-ziele-textilbuendnis

Dr Nele Kampffmeyer

Corporate Social Responsibility (CSR) is part of the focus of Dr Nele Kampffmeyer's work. Dr Kampffmeyer is a sociologist who has been a researcher in the institute's Environmental Law & Governance Division since 2016; she works on issues such as corporate sustainability strategies and sustainability in supply chains.

"The Textile Partnership is an important yet voluntary association. Not all German textile companies are members. It is time for legally binding human rights due diligence obligations so that all companies at least meet minimum standards. These obligations should, for example, include a human rights risk analysis."



Less fish – more carp!

Sustainable aquaculture

More than a million tonnes of fish and fishery products – mainly salmon, Alaska pollock and herring from marine capture fisheries – end up on German dinner tables every year. Most fish consumed in Germany is imported, but 18% comes from German deep-sea fishing, with only 2% sourced from domestic aquaculture. A self-funded study by the Oeko-Institut shows that there is environmentally sound growth potential in German aquaculture. Non-predatory fish in particular, such as pond-raised carp, has a much smaller ecological footprint than many of the species that Germany imports from all over the world.

In all, Germany's aquaculture sector produced 20,000 tonnes of fish per year between 2012 and 2016. The study identifies the benefits of domestic aquaculture: fish farming, especially in ponds and flow-through systems (raceways), is an excellent source of locally produced, high-quality, low-impact food. In assessing the ecological sustainability of German aquaculture, the project team developed the AMOUNT model (Aquaculture Monitoring Environment and Sustainability) to forecast future trajectories, such as resource consumption and greenhouse gas emissions associated with fish farming in Germany.

The researchers recommend that aquaculture facilities be maintained and expanded if possible and consistently operated in accordance with sustainability principles, ideally as inland fish farms along rivers, lakes and ponds. Attention should focus particularly on the fish food used, as this is one of the main determinants of aquaculture's ecological footprint. Instead of using conventional feed that still partly consists of wild fish meal and oil, there should be more reliance on feed based on microalgae, oilseed

and perhaps insect protein. The study also calls for further research, not only on fish food but also on recirculating aquaculture systems, which are largely closed off from the natural environment.

Project profile

Project title: Policy for sustainable aquaculture 2050

Contact: Florian Antony, f.antony@oeko.de

Institute Division: Sustainable Products & Material Flows

Commissioned by: Self-funded

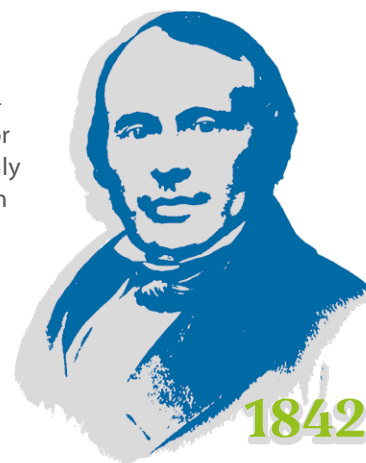
Timescale: October 2016 – November 2018

Further information:

www.oeko.de/nachhaltige-aquakultur-2050

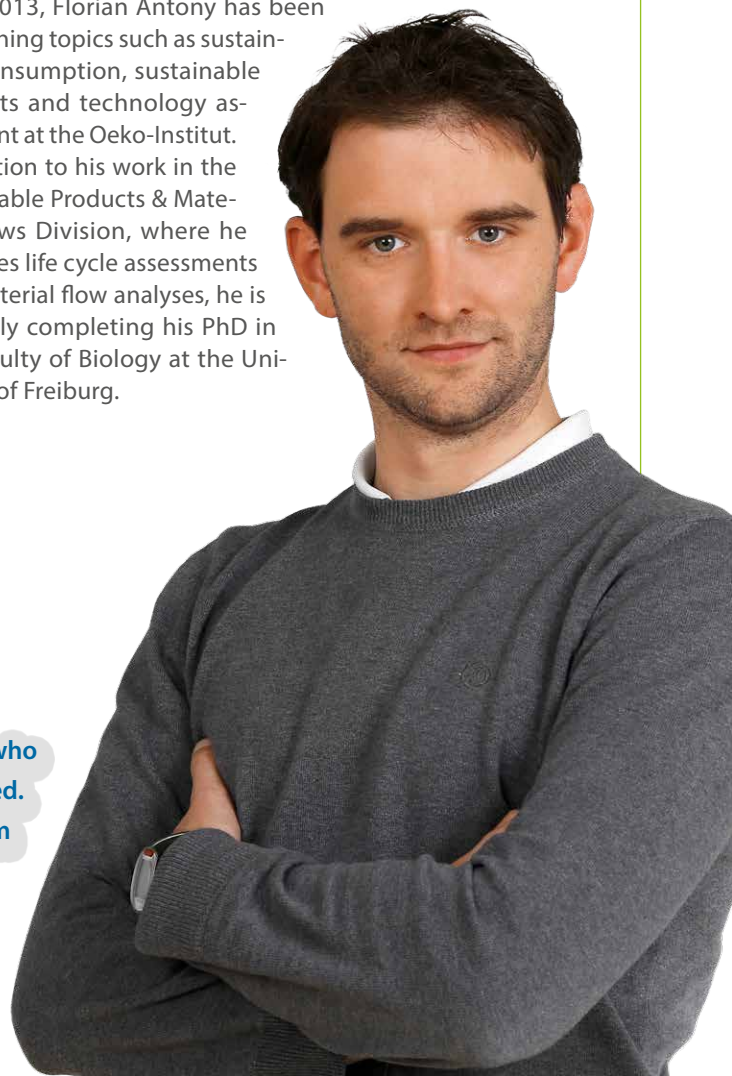
Florian Antony

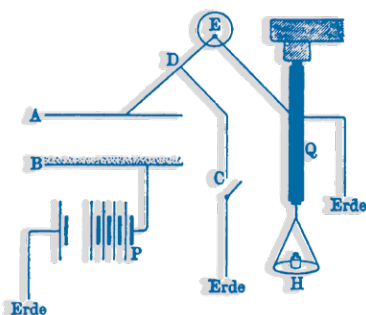
Since 2013, Florian Antony has been researching topics such as sustainable consumption, sustainable products and technology assessment at the Oeko-Institut. In addition to his work in the Sustainable Products & Material Flows Division, where he produces life cycle assessments and material flow analyses, he is currently completing his PhD in the Faculty of Biology at the University of Freiburg.



Louis Agassiz published one of the earliest works on fish ecology in 1842.

"Fish can be part of a healthy and sustainable diet. Anyone who decides to eat fish should make sure it is sustainably sourced. A good option for Germany is to ensure that more fish from local aquaculture features on the menu in future."





1890

Highly enriched uranium (HEU) is weapons-grade uranium. Intensive efforts are therefore under way at the international level to introduce a complete ban on its use for civilian purposes. The FRM II research reactor near Munich, which came into operation in 2004, still relies on the use of HEU as a fuel. The Oeko-Institut has produced a comprehensive study on the conversion of that reactor.

The FRM II reactor, based in the Munich area, produces neutrons for research using uranium with an enrichment of 93% – suitable for direct use in nuclear weapons. When the research reactor came into operation, it was agreed that it should be converted to a fuel enriched in the fissile isotope U-235 to less than 50%. The aim is to use the lowest enrichment possible. The international community recognises 20% as the lowest threshold for weapons-grade uranium; below this level, it is known as low-enriched uranium (LEU).

The Oeko-Institut has shown that conversion poses technical difficulties, partly because the planning of the reactor left little scope for changes to the reactor core. Reducing the enrichment is therefore a major technical challenge, as any attempt at conversion will also impact on the scientific use of the FRM II reactor. Achieving the lowest enrichment possible, close to the 20% target, while minimising neutron losses will

Research without highly enriched uranium

The FRM II research reactor

require the use of new fuels, which have yet to be developed.

The Oeko-Institut's team of experts has analysed the research on new fuels and ongoing conversion efforts. They recommend that the use of highly enriched uranium be reduced to a minimum as soon as possible. To that end, the technically challenging development of high-density fuels must be pursued as a priority. The option of an interim stage to support rapid conversion by changing the nuclear geometry using the current fuel type should also be explored. The Oeko-Institut also proposes that an expert group be established to monitor the conversion and hold regular discussions on the way forward.

Project profile

Project title: Scientific-technical support to the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) with respect to ad hoc questions in the framework of federal supervision

Contact: Dr Matthias Englert, m.englert@oeko.de

Institute Division: Nuclear Engineering & Facility Safety

Client: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Timescale: July 2017 – February 2019

Further information:

www.oeko.de/nukleartechnik-anlagensicherheit

Dr Matthias Englert

Dr Matthias Englert's main interests include natural science-based peace research. In 2014, Dr Englert, a physicist, joined the Nuclear Engineering & Facility Safety Division, where he produces expert reports on future reactor systems and disarmament.

"The Munich research reactor should be using non-weapons-grade low-enriched uranium – even if this results in some minimal losses for research. If Germany leads by example and phases out the use of highly enriched, weapons-grade uranium, other countries will be persuaded to follow suit."

Transparent expansion of the grid

Participatory modelling for energy transition

Energy system transition calls for large-scale transformation – including transformation of electricity grids, which must be converted and expanded to meet the requirements of renewables. However, constructing new electricity grids and improving and upgrading existing ones involves a number of conflicts – for example, on account of fears about adverse consequences for humans and the environment. With funding from the Federal Ministry of Education and Research, the Oeko-Institut has analysed how the debate on grid expansion can be conducted objectively and how the factual basis of the participatory process can be improved.

Expansion of the grid is the responsibility of the Federal Network Agency and the grid operators. They regularly draw up scenarios that depict anticipated trends in the electricity market and produce a grid development plan based on these expectations. The plan details how the grids can be upgraded, expanded and optimised to maintain a reliable electricity supply. However, many experts consider the process to be in need of improvement, citing in particular the lack of transparency that results from data not being publicly accessible.

The aim of the project was to make the methodology of the grid development plan more transparent for stakeholders and to enable stakeholders to produce their own scenarios and assess the impact of such scenarios on expansion requirements. The project team trialled an innovative process known as participatory modelling, which combines modelling of the electricity grid with stakeholder workshops.

The analysis shows that the process for producing the grid development plan needs to be improved, because the scenarios do not give sufficient weight to Germany's climate change mitigation targets. The researchers are also of the view that both the

expansion of renewables and the phasing out of coal must proceed more quickly. The grid development plan has now been significantly improved in both respects. In addition, the Oeko-Institut recommends that development of the grid is planned on the basis of a long-term scenario – one that is 100-percent renewables-based. It also calls for the setting up of an expert and stakeholder forum, whose tasks would include using various methods of grid modelling to highlight alternatives and improve transparency.

Project profile

Project title: Electricity grid transparency – Increasing transparency with regard to the need to expand the electricity transmission grids

Contact: Franziska Flachsbarth, f.flachsbarth@oeko.de

Institute Division: Energy & Climate

Funding: German Federal Ministry of Education and Research

Project partners: e-fect dialog evaluation consulting eG

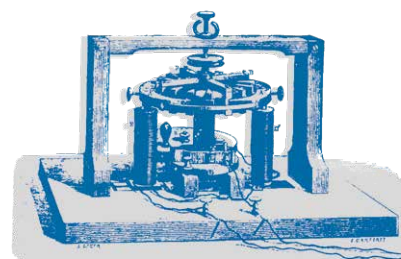
Timescale: May 2013 – December 2017

Further information:

www.transparenz-stromnetze.de

Franziska Flachsbarth

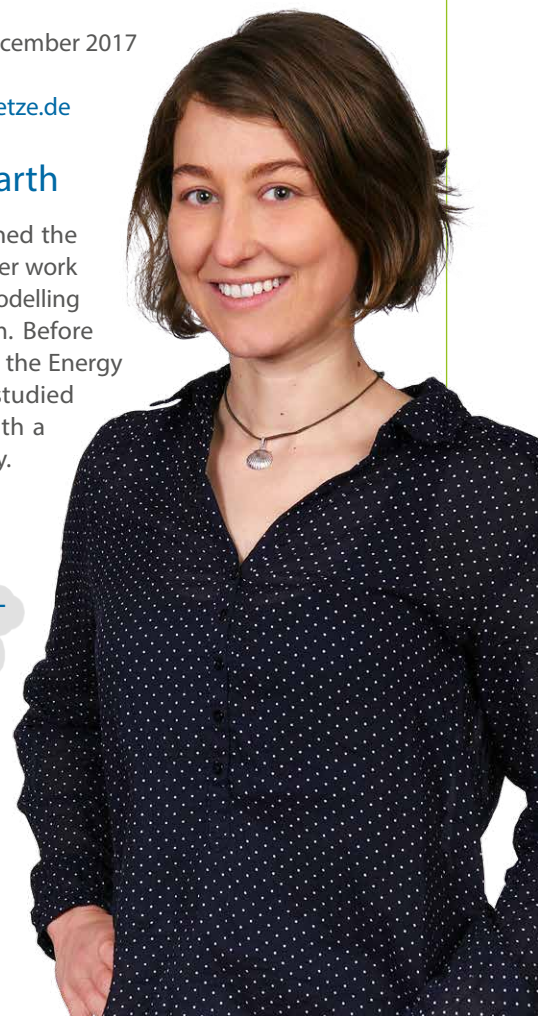
Franziska Flachsbarth joined the Oeko-Institut in 2013; in her work she specialises mainly in modelling the future energy system. Before becoming a researcher in the Energy & Climate Division she studied industrial engineering with a focus on the energy supply.

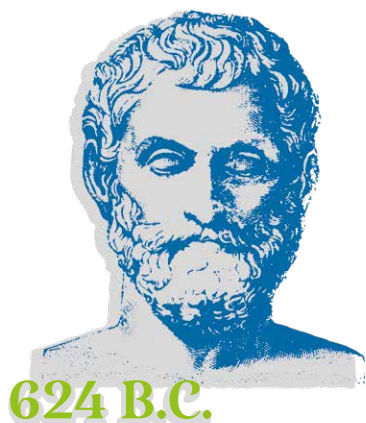


1866

The dynamo-electric principle was discovered by Werner von Siemens in 1866.

"With the support of expertise from environmental and consumer associations and action groups, we have combined scenario development with the refined electricity market model PowerFlex-Grid EU. This enabled valid findings on alternative scenarios to be incorporated into the discussion on the need to expand the grid. External experts should continue to be more strongly involved in the grid development plan in future."





Europe uses raw materials from all over the world – cobalt from the Congo, iron from Brazil, bauxite from Guinea, lithium from Chile. This means that it also has an important part to play in establishing environmental and social

standards in international supply chains. With funding from the European Union, the Oeko-Institut has considered how Europe's supply of raw materials can become sustainable, environmentally sound and socially equitable. Working with six project partners from five countries, the researchers involved in the STRADE project also looked at how international cooperation on this issue between the EU and other countries can succeed.

The project team's activities, which were coordinated by the Oeko-Institut, included running stakeholder workshops on raw material extraction and resource policy with partners from resource-rich regions such as Africa, Latin America and China. European mining was also discussed at European dialogue events. The project was supported by a high-level advisory board comprised of experts with backgrounds in policy-making, science and industry.

STRADE provides a host of policy-oriented recommendations for a long-term European raw materials strategy. To expand sustainable mining in Europe, the project team has produced ideas on how increased investment in European mining can be combined with high environmental and social standards. At international level STRADE recommends that the EU adopts a stronger pioneer-

STRADE

Sustainable raw materials

ing and leadership role. There is an urgent need for more intense, action-oriented global dialogue and it is important to get all the stakeholders from industrialised, developing and emerging countries together around the table. In particular, cooperation with China is at a very early stage and needs to be intensified.

In addition, STRADE has put forward proposals for helping developing countries to deal with hazardous mining waste and legacy pollution in an environmentally sound way. With regard to lithium, which is important for electric transport, the project team recommends tapping deposits within the EU and seeking to develop cooperation with Latin America in order to promote responsible lithium mining in countries such as Chile and Argentina.

Project profile

Project title: Strategic Dialogue on Sustainable Raw Materials for Europe (STRADE)

Contact: Dr Doris Schöler, d.schueler@oeko.de

Institute Division: Resources & Transport

Funding: European Union (Horizon 2020 programme)

Project partners: SNL Financial, Projekt-Consult GmbH, the Centre for Energy, Petroleum and Mineral Law and Policy at the University of Dundee, DMT Kai Batla, GEORANGE, University of Witwatersrand

Timescale: December 2015 – November 2018

Further information:

www.stradeproject.eu

Dr Doris Schöler

Sustainable resource management is the focus of Dr Doris Schöler's work. Dr Schöler, who studied mechanical engineering at university, joined the Resources & Transport Division in 2002. The issues on which she works include sustainable mining, sustainable supply chains for mineral resources, and recycling.

"There is a huge need for action to create a sustainable raw materials industry. International cooperation on this is crucial, but as yet no nation has led the way in getting all the countries around the table and giving the issue the appropriate level of priority. Europe is the obvious candidate for this role: the EU must step up to the plate and get things moving."



Clients of the Oeko-Institut

2018

Politics & government

- Agence de l'Environnement et de la Maîtrise de l'Énergie, France
- Austrian Environment Agency
- Baden-Württemberg Environment Agency (LUBW)
- Baden-Württemberg Ministry of the Environment, Climate and Energy
- Bavarian Environment Agency (LfU)
- Brandenburg Ministry of Rural Development, Environment and Agriculture
- Bundesgesellschaft für Endlagerung mbH (BGE)
- Bundesstelle für Energieeffizienz (BfEE)
- Cities of Freiburg, Gernsbach, Münster, Offenburg
- City of Hamburg
- City of Wiesbaden
- Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
- Deutscher Bundestag
- European Commission
- European Environment Agency (EEA)
- European Parliament
- German Agency for Nature Conservation (BfN)
- German Energy Agency (dena)
- German Environment Agency (UBA)
- German Ministry for Economic Affairs and Energy
- German Ministry for the Environment, Nature Conservation and Nuclear Safety
- German Ministry of Education and Research
- German Office for the Safety of Nuclear Waste Management (BfE)
- German Offices for Economic Affairs and Export Control (BAFA) and for Radiation Protection (BfS)
- German Research Institute for Public Administration (FÖV)
- Hessenagentur GmbH
- Hessian Ministry of the Environment, Climate Protection, Agriculture and Consumer Protection
- Karlsruhe District Authority
- Ministry of Agriculture, Livestock and Irrigation Department of Rural Development, Myanmar
- Münster District Government
- North Rhine-Westphalian Ministry of Economic Affairs, Innovation, Digitalisation and Energy
- Rhineland-Palatinate Ministry of Environment, Energy, Food and Forestry
- Saarland Ministry of Environment and Consumer Protection
- Stadtentwicklungsgesellschaft Wiesbaden mbH
- Statistical Office of the European Union (Eurostat)
- Swiss State Secretariat for Economic Affairs (SECO)
- The European Consumer Organisation (BEUC)

Industry

- Apple Distribution International
- BASF SE Ludwigshafen
- Bipro GmbH, now Ramboll Group A/S
- Bofrost Dienstleistungen GmbH & Co.KG
- Craig International Supplies Germany GmbH
- Daimler AG
- European Automobile Manufacturers Association
- MVV Energie AG
- Netze BW GmbH
- Tchibo GmbH
- The Netherlands Enterprise Agency
- TÜV Süd
- Werner & Mertz GmbH

Civil society

- Agora Energiewende
- ChemSec – the International Chemical Secretariat
- Co2online
- Deutsche Stiftung Friedensforschung
- Energie Vision eG
- ENTEGA Stiftung
- Fachverband Kartonverpackungen für flüssige Nahrungsmittel e.V. (FKN)
- FEMNET e.V.
- Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
- Foundation for the Future / Stiftung Zukunftserbe
- Friends of the Earth Germany (BUND)
- German Association for Electrical, Electronic & Information Technologies (VDE)
- German Federal Environment Foundation (DBU)
- German Football Association
- German Institute for Economic Research (DIW)
- Gesellschaft für Anlagen- und Reaktorsicherheit gGmbH (GRS)
- Green Budget Germany (FÖS)
- North Rhine-Westphalian Consumer Advocacy Centre
- Renewables Grid Initiative e.V.
- Stockholm International Water Institute
- Umwelthaus gGmbH
- University of Freiburg
- Utopia GmbH
- Verbraucherinitiative e.V.
- World Resources Forum
- WWF Germany

A full list of references is available (in German) at www.oeko.de/referenzen2018

Expanding communication pathways

The Oeko-Institut has joined the bloggers: at blog.oeko.de our staff have since May 2018 been writing a weekly post on sustainability issues, current projects and personal points of view.

The contributions – ranging from statements and brief interviews to specialist articles and consumer tips – reflect the many facets of the Oeko-Institut's work and introduce the people who together make up the institute. The blog provides a flexible platform for statements and debates and enables all readers to engage with the Oeko-Institut's research topics in a different and more informal way.

SIGNET

„Blog – Contributions and points of view from the Oeko-Institut“



TIMELINE

The history of the Oeko-Institut

Our multimedia look at the past, created to mark the 40th anniversary of the Oeko-Institut, has become a much-visited site that we are happy to retain and add

to. The timeline not only covers the eventful history of the Oeko-Institut – from the years leading up to its foundation to the latest developments, events and projects – but also looks at contemporaneous developments in Germany and the world.



Find it online at: zeitreise.oeko.de (only available in German)

Other communication channels

The Public Relations & Communications Department also uses the social media channels Twitter, YouTube, Flickr and Slideshare, publishes the members' magazine *eco@work* and assists the research divisions with the production of leaflets, brochures, project websites and graphics.

Further information can be found online at these addresses:

- www.oeko.de
- www.oeko.de/presse
- www.oeko.de/epaper
- [www.twitter.com/oekoinstitut](https://twitter.com/oekoinstitut)
- www.slideshare.net/oeko-institut
- www.flickr.com/oekoinstitut

Visionaries

The Oeko-Institut's members

Around 2,200 members and numerous other supporters of the Oeko-Institut regularly support our work with donations and subscriptions. Their assistance enables us to research issues that we consider important but for which we do not have a mandate via projects financed by our clients. An example of this is the donation-funded project launched in the autumn of 2018 that looks at the effects of a systematic reduction in plastic use.

Donation-funded project 2018: "Living without plastic – but how?"

The harmful effects of plastic waste are observable in the oceans, in dead animals and in microplastics in food. Many people would like things to change, yet even environmentally aware consumers find plastic virtually impossible to avoid.

The Oeko-Institut's latest donation project "Living without plastic – but how?" therefore asks whether we can radically reduce our use of plastic. In a range of scenarios the researchers consider the effects of systematically cutting back on plastic use. They analyse what a radical renunciation of plastic would mean for our way of life and what the effects of gradually replacing plastic with other materials would be.

They consider the advantages and disadvantages in social and economic terms as well as from an environmental perspective. As well as exploring the consequences of doing without plastic, the members of the project team examine the reasons for using it and identify possible alternative materials. They also discuss possible strategies with social groups.

The project aims not only to develop a nuanced picture of possible changes and of the scope for action but also to weigh up usefulness and practicality on the basis of robust evidence. The experts also evaluate "green-green" conflicts between different environmental aspects, for example with regard to the transport weight of plastic vs. glass.

To continue working independently on projects that are particularly important to us and urgent from an environmental point of view, we need your help. Please support us with a donation!

There are plenty of opportunities for donations to the Oeko-Institut not linked to our projects. Perhaps you are celebrating a birthday, wedding, summer fair, company anniversary or church festival and would like to request donations to a good cause in place of presents. Why not ask your relatives and friends for donations to the Oeko-Institut?

OR SUPPORT US REGULARLY AND BECOME A MEMBER OF THE OEKO-INSTITUT!

For further information visit our members' website

<http://mitglieder.oeko.de>
(only available in German)

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