www.oeko.de

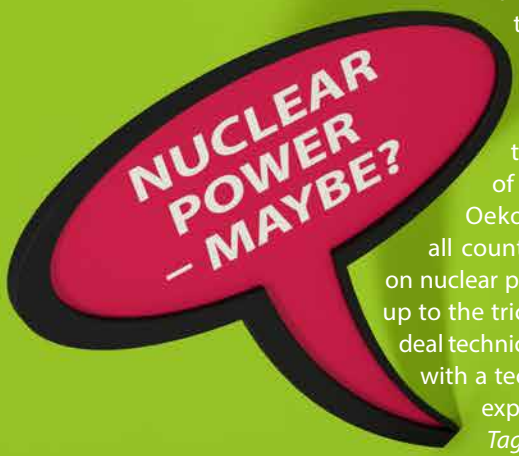
Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Controversy!

Annual Report of the Oeko-Institut 2019

Standing up for the facts

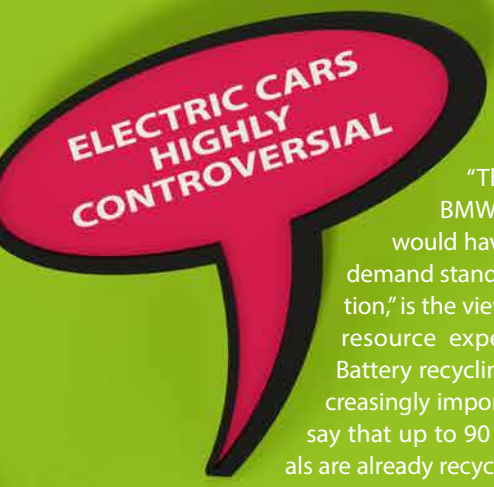
Our society is embroiled in controversy. About the best way to meet climate targets. The right instruments for creating housing that meets people's needs. How to make best use of electricity-based fuels. Science gives us key resources for approaching the discussion on these and other issues in an objective and purposeful way: it provides facts, analyses, classifications. These help to support or refute positions, to underpin arguments or cast doubt on them. Newspaper cuttings from 2019 in which the Oeko-Institut communicates and explains facts demonstrate this.



"Germany is currently heading towards an energy system that is highly flexible and very low-risk. That is an advantage," says Felix Matthes, who is in charge of climate policy at the Oeko-Institut. "In future, all countries that rely heavily on nuclear power will have to face up to the tricky issue of how they deal technically and economically with a technology that is both expensive and inflexible."
Tagesspiegel, March 2019

Rolf Martin Schmitz, CEO of major energy utility RWE, has spoken of severe cuts in the sector as a result of the phasing out of coal. But an Oeko-Institut study shows that the reduction in the use of coal has less impact on jobs than many people fear.
General-Anzeiger, January 2019

Contents



"The car giants like VW, BMW, Toyota and Daimler would have the buying power to demand standards in lithium production," is the view of the Oeko-Institut's resource expert Matthias Buchert. Battery recycling is also becoming increasingly important. Some companies say that up to 90 percent of the materials are already recyclable. Nevertheless, the strong demand would far exceed the supply of reusable materials, says Buchert.
Der Freitag, April 2019

Christoph Pistner of the Oeko-Institut does not believe that there will be a renaissance. "To question the nuclear consensus again would raise all sorts of problems." Nuclear facilities are an accident risk and a potential terrorist target, says Pistner. In addition, an expansion of nuclear energy would increase the risk of proliferation of materials that could be used to make nuclear weapons.
Der Spiegel, December 2019

In the opinion of Hannes Böttcher, energy and climate protection expert at the Oeko-Institut in Berlin, the basic approach to preventing climate change must be to reduce fossil emissions. Because if land use is required to compensate for failed climate policy, other targets such as tackling hunger, conserving biodiversity and protecting the soil are at risk of being sidelined.
Frankfurter Rundschau, May 2019

Günter Dehoust regards the growing popularity of coffee capsules as problematic. Dehoust is a researcher at the Oeko-Institut's Freiburg site who has studied the energy consumption and waste arisings of various ways of making coffee. He says: "The capsules that combine aluminium and plastic have a particularly large environmental footprint."
Lahrer Anzeiger, November 2019

Published by

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

Institute for Applied Ecology
April 2020

Edited by:
Mandy Schoßig (responsible), Anette Nickels, Christiane Weihe, www.wortspektrum.de

Oeko-Institut, Berlin Office
Borkumstrasse 2
13189 Berlin
redaktion@oeko.de
www.oeko.de

Design and layout:
Bertram Sturm, www.bertramsturm.de

Printed by:
LokayDruck, www.lokay.de
Printed on 100% recycled paper

The value of controversy

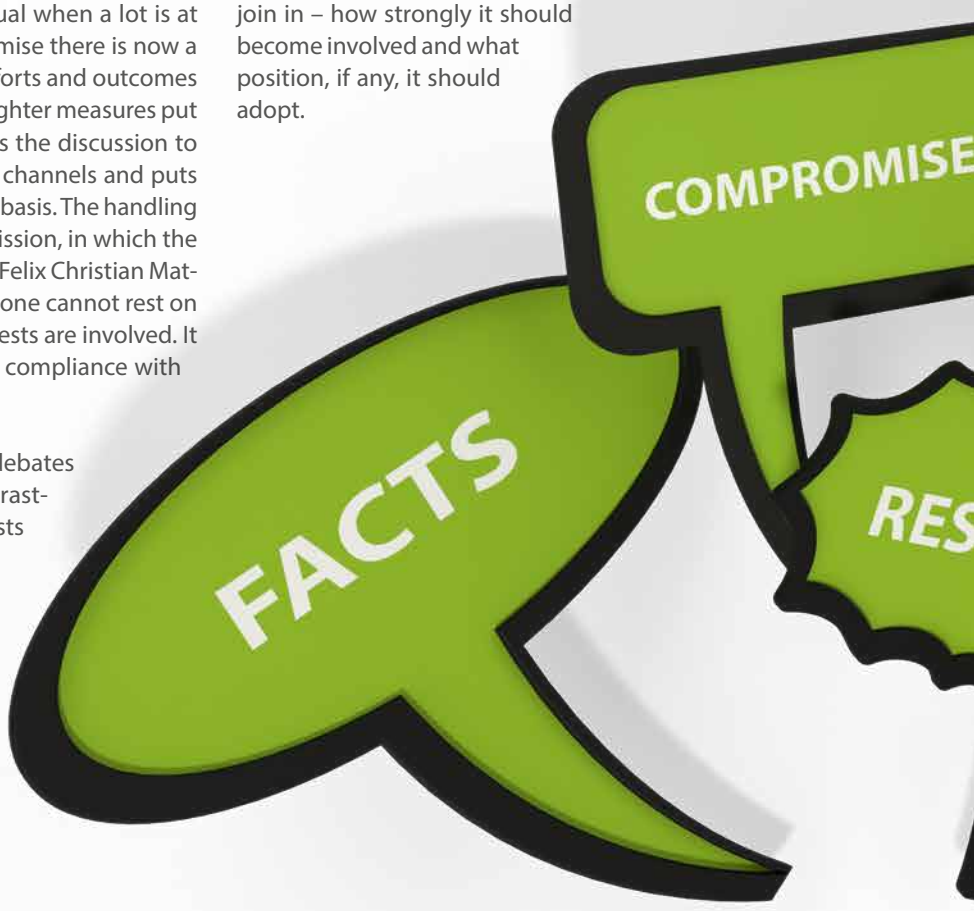
Dear readers,

Last year saw the continuation of a trend that we had already observed in previous years: German society is becoming more politicised and there is more and more controversy in the public arena. The "Fridays for Future" demonstrations brought people onto the streets in numbers not seen for many years. At the same time, this mobilisation produced a counter-reaction. Amidst all the controversy, we should value the fact that all of us in Germany can say what we think. In this past year, people elsewhere in the world have been battling for this very right to dissent – the right to freedom of speech.

2019 also demonstrated that controversy can be productive. The German government has approved a climate action plan and has drafted a Federal Climate Change Act – the results of much wrestling over content. It is true that this compromise itself provoked a great deal of dispute, because some people saw it as going too far while others thought it didn't go far enough. But that is not unusual when a lot is at stake. And as part of the compromise there is now a clear procedure to ensure that efforts and outcomes will be scrutinised annually and tighter measures put in place if necessary. This enables the discussion to continue, steers it into regulated channels and puts it on a constantly updated factual basis. The handling of the findings of the Coal Commission, in which the Oeko-Institut was involved via Dr Felix Christian Matthes, also highlights the fact that one cannot rest on one's laurels when powerful interests are involved. It is often necessary to struggle for compliance with procedures and compromises.

The past year with its intensive debates is not actually exceptional. Contrasting opinions and differing interests have always been part of our everyday life – not just in the political sphere but also in private life, within families and among good friends. I like harmony. But it must not smother our differing points of view. I don't regard controversy as undesirable in itself, provided that it is approached fairly, objectively and considerately. When based on facts and a shared foundation of respect, tolerance and honesty, controversy is an important aspect of decision-making in a pluralistic and democratic society. So we don't just have to put up with different opinions: we need them. Because it is through scrutiny, discussion and comparison that we develop, improve and find the best solutions.

That is how we work at the Oeko-Institut. For example, the "Fridays for Future" movement has challenged us. During the past year we have debated what our role is in this context. It also raised the question of the extent to which science should join in – how strongly it should become involved and what position, if any, it should adopt.



Of course, we often adopt a position of some sort, but only when we have a scientific basis for it. Let us take as an example the widely discussed idea of a revival of nuclear energy: we take a clear stand against it. However, we are not doing that on a whim, but because we are aware of the facts: we know that the risks and costs of nuclear energy are out of all proportion to its benefits.

We see our role as a research institute as being not only to check facts and make them available, but to contribute more widely to objectively conducted argument. An argument involves not just facts but also values and conclusions that result from the facts and the values. In a logical argument, the three elements must go together. We therefore scrutinise the validity of conclusions drawn from given facts and values or propose cogent conclusions ourselves.

Identifying myths and wishful thinking for what they are is another part of our role as we see it. We don't just take goals as our starting point and work out what is needed to achieve them: we also analyse what can be achieved with ambitious but nevertheless realistic measures. An issue to which we devoted a lot of attention in this respect in 2019 was analysis of the potential of electricity-based substances and fuels. When dealing with such issues we cannot remain focused on the here and now but must consider the future. At our annual conference in 2019 we discussed, for instance, what challenges, opportunities and socially controversial questions with regard to sustainability are likely to arise as a result of digitalisation.

Unanswered questions are labelled as such and we seek to explore them. We explain assessments that we make and put them up for discussion. We scrutinise facts, arguments and proposals, identify potentials and calculate consequences. We thus provide a basis for argument so that it can be conducted purposefully.

In Germany there are many problems – not confined to climate and the environment – on which we have made insufficient progress in recent decades, partly because our society and our politicians have been too eager to avoid controversy. Solutions have been postponed until tomorrow. But that hasn't made the problems disappear: instead they have become more pressing. We are now realising collectively that time is running out and it is imperative to act. That is not a sound basis for good decisions that involve everyone and get them on board. I therefore hope that in 2020 we shall not continue to evade the challenges but will dispute with each other in a cultivated manner and with arguments. Not just at the Oeko-Institut but also in Germany, in Europe and in the world. That is essential if we are to be well-prepared to face the future together.

Do you take a different view? Let the argument begin!

Yours,

Jan Peter Schemmel
Chief Executive Officer
of the Oeko-Institut

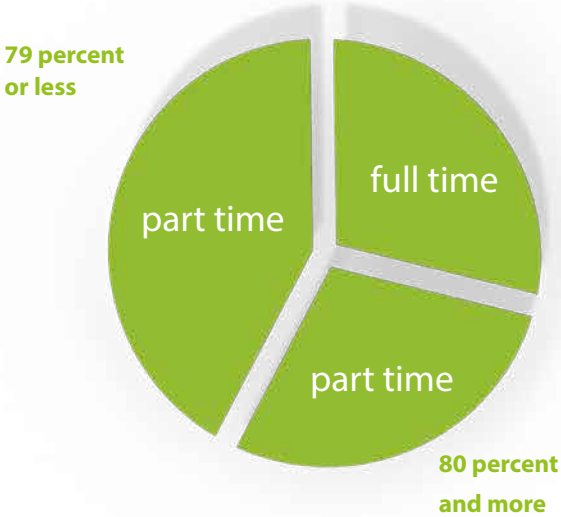
Facts and figures for 2019

Human resources

In 2019 the Oeko-Institut had more than 170 members of staff (excluding auxiliary student personnel and interns) working for the transformation of our society towards sustainability. The workforce comprised more than 110 researchers and around 60 members of staff in research support, Central Services and member management.

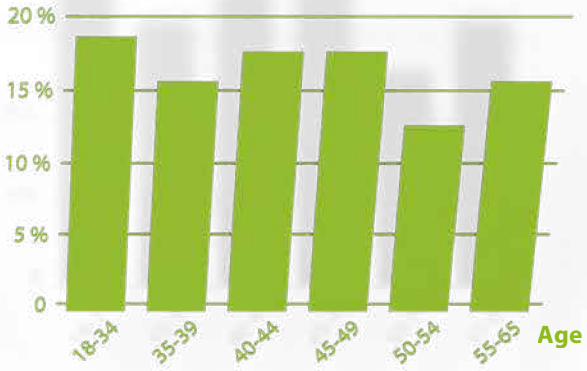
They were employed in roughly equal numbers at the institute's offices in Freiburg, Darmstadt and Berlin.

In terms of gender distribution, more posts at the Oeko-Institut were held by women (96) than by men (76). In terms of full-time-equivalent posts, however, the overall ratio is balanced because more women work part-time. With regard to management functions the ratio is also relatively balanced: 40 percent of management posts are held by women and 60 percent by men.



Overall 29 percent of the workforce work full time, another 29 percent work part time of 80 percent or more and 42 percent work part time of 79 percent or less.

Number of staff



In terms of the age structure at the institute, we are pleased that we bring experienced personnel and young people together in roughly equal numbers: members of staff are distributed almost evenly across the different age groups.

In 2019 13 members of staff (4 men and 9 women) took parental leave, for an average of somewhat more than 11 months each, and two members of staff took a sabbatical for a few months.

At the Oeko-Institut we attach great importance to giving people a voice. Staff members elect three representatives to the Committee, while the extended management elect one. In addition, members of staff have been involved in five staff meetings and three departmental meetings at each site.

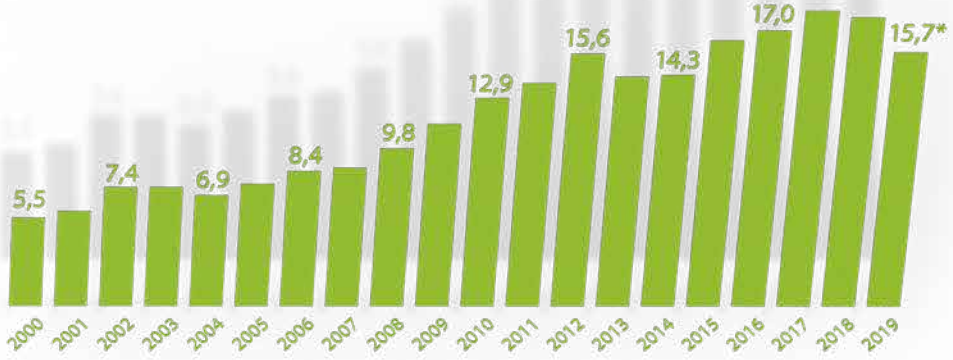
In 2019 we also maintained strong professional contact across division boundaries, holding 19 brown bag lunches at our Berlin office, 10 in Darmstadt and 15 in Freiburg.

Projects and turnover

Last year, for the first time ever, the institute's researchers worked on more than 400 projects. These were commissioned by policy-makers, the private sector and civil society. In addition, our researchers initiated projects that were funded by the institute itself, thus addressing important sustainability-related issues independently of the order situation.

In 2019 the Oeko-Institut planned to work to a budget of more than 15.7 million euros. The actual amount is likely to be higher and will be published with the annual accounts at the forthcoming General Assembly.

Turnover in million euros



* Target figure

Moving forward together
The Oeko-Institut's management team

Retaining knowledge and experience at the institute, bringing in excellent brains with new ideas – with this philosophy the management team at the Oeko-Institut, together with all the staff, was able to bring 2019 to a successful conclusion. The continuity is demonstrated in the organisation chart on these pages: most of the management staff have been helping to advance scientific work on sustainability and protection of the environment for many years. The members of the Committee also remained unchanged, having being re-elected by the General Assembly.

At the same time there is fresh input at all management levels: Jan Peter Schemmel has been in post as Chief Executive Officer of the Oeko-Institut since October 2019. He succeeds Michael Sailer, who left the institute in July 2019 on grounds of age. Dr Christoph Pistner has taken over from Beate Kallenbach-Herbert as Head of the Nuclear Engineering & Facility Safety Division. In Central Services André Nelius and Dieter Storck have assumed responsibility for the finance and IT departments.

Executive Board

Jan Peter Schemmel
Chief Executive Officer

Anke Herold

Susanne Fröschl

Advisory Board

Prof. Dr Nina Buchmann
Dr Susanne Dröge
Dr Erhard Eppler †
Prof. Dr Klaus Fricke
Prof. Dr Martin Führ
Prof. Dr Regine Kollek
Prof. Dr Ellen Matthies
Prof. Dr Peter C. Mayer-Tasch
Prof. Dr Eckard Rehbinder
Prof. Dr Lucia Reisch
Dr Hartmut Richter
Prof. Dr h.c. Udo E. Simonis

Committee
External members

Dorothea Michaelsen-Friedlieb
(First Chair of the Committee)
Ulrike Schell
(Second Chair of the Committee)
Dr Regina Betz
Prof. Dr Gerald Kirchner
Thomas Rahner
Kathleen Spilok
Prof. Dr Volrad Wollny

Committee
Internal members

Dr Nele Kampffmeyer
Dr Georg Mehlhart
Michael Sailer
(until July 2019)
Jan Peter Schemmel
(from October 2019)
Christof Timpe
Moritz Vogel

Research Divisions and Central Services

Christof Timpe
Head of the Energy & Climate Division (Freiburg / Darmstadt)

Dr Martin Cames
Head of the Energy & Climate Division (Berlin)

Dr Christoph Pistner
Head of the Nuclear Engineering & Facility Safety Division

Dr Matthias Buchert
Head of the Resources & Transport Division

Carl-Otto Gensch
Head of the Sustainable Products & Material Flows Division

Franziska Wolff
Head of the Environmental Law & Governance Division

Martina Strasser
Head of the Tenders & Contracts Department

André Nelius
Head of the Finance & Accounting Department

Dieter Stork
Head of the IT Department

Mandy Schossig
Head of the Public Relations & Communications Department

The basis for debate
Selected projects from 2019

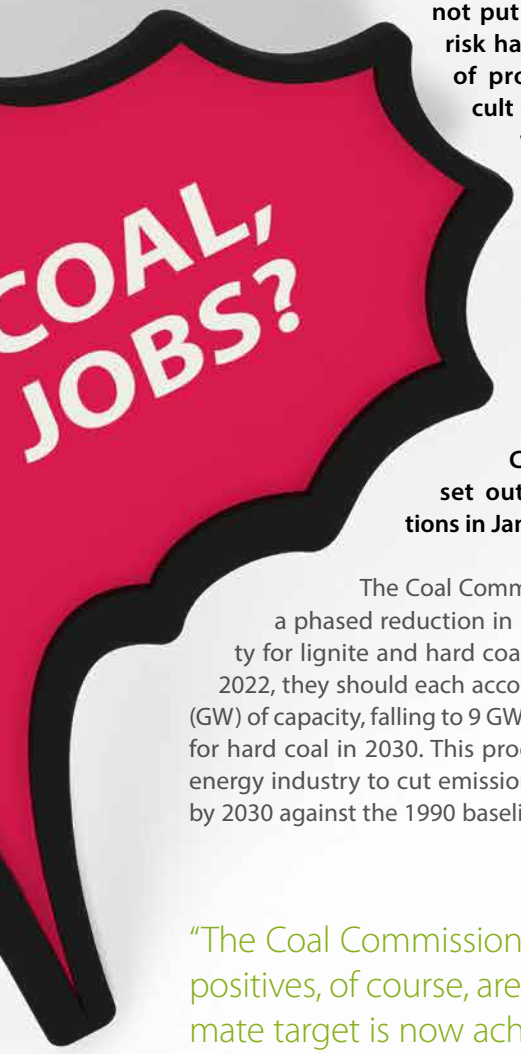
Our society is discussing key questions that affect our future: How can coal be phased out in a socially responsible way? What are the environmental impacts of infrastructure expansion? How can housing be used efficiently? The discussion of such questions often involves controversy, with opposing opinions and conflicting experiences. Through its scientific analyses, the Oeko-Institut provides a vital basis for purposeful debate on relevant issues and, ideally, resolution of the problems. In 2019 its researchers again helped to take the heat off the discussion and make debate more objective.

The ten projects on the following pages illustrate how the Oeko-Institut has made an unbiased and independent contribution to various societal controversies during the past year. For example, Dr Felix Christian Matthes, Research Coordinator for Energy and Climate Policy, was a member of Germany's Coal Commission, which looked at how coal can be phased out in a socially acceptable way and without endangering supply security. With the Resources & Transport Division, the Energy & Climate Division examined another controversial issue: electricity-based fuels. The two divisions also worked together on the issue of how carbon pricing can be made socially fair. In addition, the Resources & Transport Division studied the production and recycling of lithium-ion batteries.

Researchers in the Environmental Law & Governance Division produced a legal opinion on a carbon certificate trading scheme for emissions from buildings and transport – a scheme in which a fixed price for certificates is defined. They also studied the influence that various uses of data can have on the environment and climate. Important analyses from the Sustainable Products & Material Flows Division focused on key social and environmental issues in connection with the cultivation of biogenic resources and on the question of how the existing housing stock can be better used. Both these studies were conducted jointly with the Energy & Climate Division. As examples of the work of the Nuclear Engineering & Facility Safety Division we outline a new environmental assessment methodology – in which the Resources & Transport Division was also involved – and a project that is looking at the disposal of radioactive waste.

Coal-free by 2038

The work of the Coal Commission



Halt climate change without phasing out coal? No chance! There is now a general consensus that Germany can only meet its medium- and long-term climate targets if it stops producing electricity from coal. However, managing the phase-out of coal so that it is socially acceptable and does not put supply security at risk has been the subject of protracted and difficult debate – especially within Germany's Commission on Growth, Structural Change and Employment (Coal Commission). Dr Felix Christian Matthes from the Oeko-Institut was a member of the Commission, which set out its recommendations in January 2019.

The Coal Commission recommends a phased reduction in power plant capacity for lignite and hard coal. The aim is that by 2022, they should each account for 15 gigawatts (GW) of capacity, falling to 9 GW for lignite and 8 GW for hard coal in 2030. This process will enable the energy industry to cut emissions by 60-63 percent by 2030 against the 1990 baseline. The Commission also recommends that, as far as possible, power plant closures should be implemented progressively. The end date for coal-fired generation should be reached between 2035 and 2038.

In its recommendations the Coal Commission also outlines mechanisms for the phase-out, and an accompanying energy policy programme. Numerous measures to support structural change are proposed, such as investment in innovation and infrastructure, labour market policies and support programmes for municipalities. Moreover, an Oeko-Institut study shows that a progressive phasing out of coal would have a moderate impact on electricity prices while a simultaneous expansion of renewable energies would result in wholesale prices falling by at least the same amount.

Project profile

Title of commission: Commission on Growth, Structural Change and Employment (Coal Commission)
Appointed by: Federal government of Germany
Commission members: 28 voting members representing government, industry, environmental groups, trade unions and the scientific community
Timescale: June 2018 – January 2019
Further information:
www.oeko.de/aktuelles/ecodialog-kohleausstieg

"The Coal Commission compromise has both strengths and weaknesses. The positives, of course, are that we have an end date and the energy industry's climate target is now achievable. However, the wording of the reduction targets for 2023 to 2030 is somewhat weak, which means that we need to keep our eye on the ball. That also applies to the expansion of grids and renewable energies."
Dr Felix Christian Matthes

Dr Felix Christian Matthes
Research Coordinator for Energy and Climate Policy and member of the Coal Commission
f.matthes@oeko.de

Hauke Hermann
Senior Researcher, Energy & Climate Division, and "Sherpa" in the Coal Commission
h.hermann@oeko.de

A dialogue-oriented process

The disposal of radioactive waste

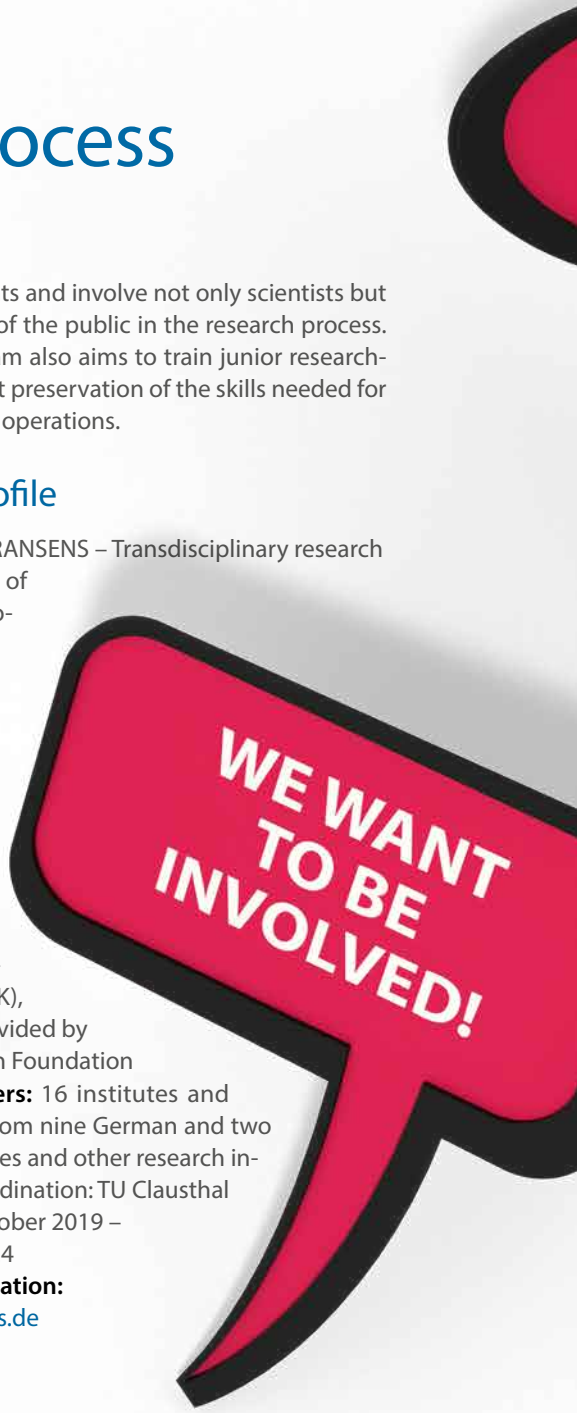
Regardless of whether the issue is the transport of nuclear waste or the selection of a site for a final repository – the disposal of nuclear waste remains one of the most contentious issues in Germany. One of the main reasons for this is the loss of trust that has resulted from the fact that for a long time the responsible bodies were not prepared to engage in a public debate. These days, society expects to be involved in decision-making and organisation of the process right from the start. How this can be achieved is one of the key questions addressed in transdisciplinary research. For example, new knowledge on controversial issues is assembled jointly with lay people and the interested public and combined with scientific findings in transdisciplinary research processes.

The Oeko-Institut has explored the issue of radioactive waste disposal in a number of research projects with input from various stakeholders. One such project was SOTEC-radio, which looked at the interactions between technology and society in decision-making processes relating to interim and final storage. In addition, the collaborative project ENTRIA promoted interdisciplinary cooperation and dialogue among scientists, focusing on options for the disposal of high-level radioactive waste.

The current collaborative project, TRANSENS, adopts a resolutely transdisciplinary approach. With funding from the Federal Ministry for Economic Affairs and Energy (BMWi) and the Ministry of Science and Culture of Lower Saxony (MWK), TRANSENS aims to forge closer links between society and science. It focuses on disposal strategies, safety, fairness and trust. Among other things, it aims to combine basic research with dialogue formats and involve not only scientists but also members of the public in the research process. The project team also aims to train junior researchers and support preservation of the skills needed for future disposal operations.

Project profile

Project title: TRANSENS – Transdisciplinary research on the disposal of high-level radioactive waste in Germany
Funding: Federal Ministry for Economic Affairs and Energy (BMWi), Ministry of Science and Culture of Lower Saxony (MWK), from funds provided by the Volkswagen Foundation
Project partners: 16 institutes and departments from nine German and two Swiss universities and other research institutions, Coordination: TU Clausthal
Timescale: October 2019 – September 2024
Further information: https://transens.de



"At TRANSENS we generate knowledge together – it emerges from controversy and dissent just as much as through dialogue and the exchange of ideas. We have the opportunity to develop shared perspectives and thus advance research into how bridges can be built between technology and society on the difficult issue of nuclear waste disposal."
Julia Mareike Neles

Julia Mareike Neles
Head of the Nuclear Waste Management Subdivision of the Nuclear Engineering & Facility Safety Division
j.neles@oeko.de

Comprehensive environmental impact assessment

Oeko-Institut develops new methodology

The energy transition has impacts on the environment – for example, it involves the construction of new generation facilities and energy grid structures. If our energy system is to be successfully transformed, it is important that these impacts are understood and accepted by society. Assessments of environmental impacts support this by creating transparency. In the ENSURE project, a Copernicus project for the energy transition, the Oeko-Institut has developed a new methodology for comprehensive environmental assessment. The work was funded by the German Federal Ministry of Education and Research.

The project set out to assess not only the environmental impacts at the site of a new energy transition construction project but all the environmental impacts involved – including global impacts, such as those arising during the production of concrete. The researchers also wanted to develop an environmental assessment method that can be used during the planning stage when little information about the project and the project site has been gathered.

A new feature of the methodology is that it combines several established methods. Firstly, it involves an environmental impact assessment (EIA) that examines the environmental impacts at the construction site on humans, animals, plants, soil, air and so on. Secondly, life-cycle assesment (LCA) is used to systematically analyse the quantifiable and scalable environmental impacts of construction materials and other inputs over their entire life cycle. And, thirdly, it includes elements of strategic environmental assessment (SEA), which provides guidance at the design and planning stage.

This comprehensive environmental assessment thus enables the environmental impacts that need to be accepted by the general public to be rendered transparent and discussed at an early stage. In addition, prevention and mitigation measures can be planned early on. Not least, the environmental impacts of different facilities and scenarios can be presented clearly, systematically and in a way which ensures comparability.

Project profile

Project title: New Energy Grid Structures for the Energy Transition (ENSURE)
Commissioned by: German Federal Ministry of Education and Research
Project partners: Interdisciplinary consortium of 23 partners from research, industry and civil society
Timescale: September 2016 – August 2019
Further information:
www.oeko.de/jb2019-umweltbewertung/

"The new environmental assessment methodology is designed to provide a comprehensive overview of possible environmental impacts, both locally and globally. This is an important basis for planning new grid structures and discussing environmental impacts transparently and at an early stage."
Angelika Spieth-Achtnich

Angelika Spieth-Achtnich
Senior Researcher, Nuclear Engineering & Facility Safety Division
a.spieth-achtnich@oeko.de

Jürgen Sutter
Researcher, Resources & Transport Division
j.sutter@oeko.de

Digitalisation and sustainability

Data regulation as an environmental policy tool?

The advance of digitalisation has sparked a heated debate about data. The question of who can make use of data, and how, is also crucial in terms of how the new technologies impact on the environment. In a recent working paper, the Oeko-Institut highlights the significance of data regulation for sustainable digitalisation.

Its researchers examine various regulatory options – in particular the issues of who should have access to data in future and how and for what purposes this data can be used. They evaluate three proposals for improvements to the legal situation from an environmental policy perspective.

One version of data ownership law involves everyone having the right to data that they generate. The Oeko-Institut believes that this system is not suitable for promoting eco-friendly innovations, because it might impede the necessary access to data. There is also a risk that data will go to the highest bidder – who may not necessarily use it sustainably. A second proposal involves making data available to the market on as broad a scale as possible. This can indeed promote innovation, but it might be difficult to influence whether such innovation is sustainable or environmentally damaging. The third idea that was considered involves acting more directly to steer innovation in a sustainable direction through policy institutions or participatory processes. From a sustainability perspective, this type of management seems feasible, but further research is needed to establish exactly how it would work. From its analysis of these proposals the Oeko-Institut has identified a number of aspects that need to be considered in connection with sustainable data regulation. They include giving sustainability actors preferential access to valuable datasets that are currently the exclusive preserve of large data monopolies and introducing a data law that prioritises the sustainability aspects of data use.

Project profile

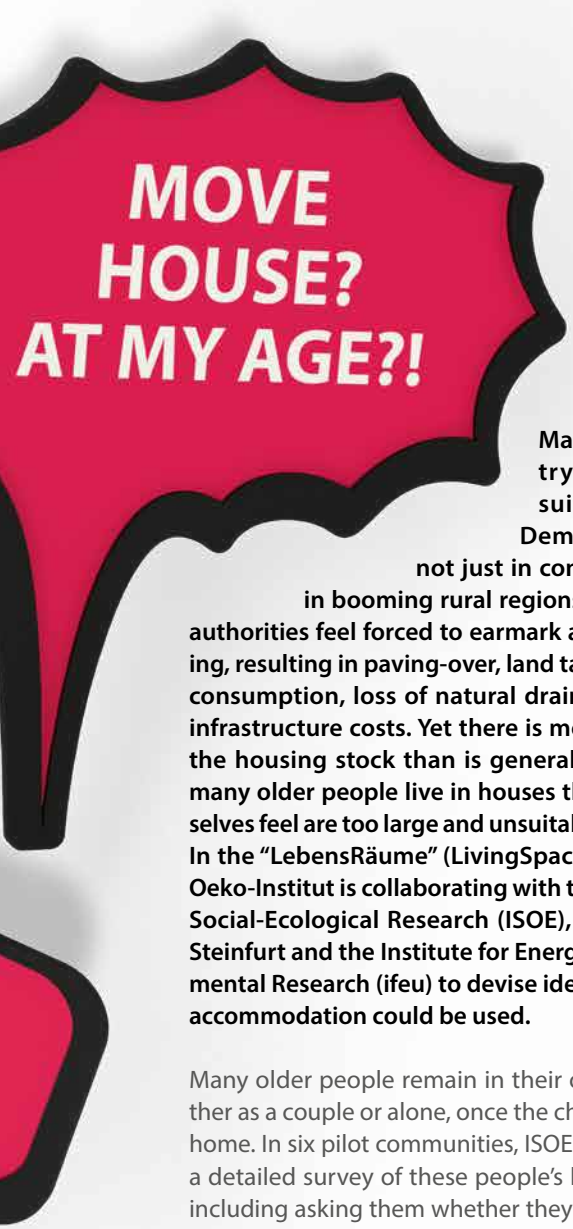
Project title: Regulation of the data economy – Towards an eco-friendly position
Commissioned by: Self-funded project "Digitalisation and Sustainability"
Funding: Legacy for the Future Foundation
Timescale: March 2018 – April 2019
Further information: www.oeko.de/jb2019-datenregulierung/

"Regulation of who can in future use the resource that data represents and what they can do with it is widely regarded as a crucial determining factor in our future development – especially with regard to the economy and privacy rights. We have established that clarifying this issue is also important for environmental policy and we have identified key points of leverage for taking sustainability aspects into account."

Dr Peter Gailhofer

Dr Peter Gailhofer
Researcher, Environmental Law & Governance Division (project manager)
p.gailhofer@oeko.de

Cara-Sophie Scherf
Researcher, Environmental Law & Governance Division
c.scherf@oeko.de



Appropriate housing

Homes to suit people's age and needs

Many people are trying to find suitable homes. Demand is rising, not just in conurbations but in booming rural regions as well. Local authorities feel forced to earmark areas for building, resulting in paving-over, land take and energy consumption, loss of natural drainage and high infrastructure costs. Yet there is more capacity in the housing stock than is generally thought, as many older people live in houses that they themselves feel are too large and unsuitable at their age. In the "LebensRäume" (LivingSpaces) project the Oeko-Institut is collaborating with the Institute for Social-Ecological Research (ISOE), the district of Steinfurt and the Institute for Energy and Environmental Research (ifeu) to devise ideas for how this accommodation could be used.

Many older people remain in their own homes, either as a couple or alone, once the children have left home. In six pilot communities, ISOE has carried out a detailed survey of these people's living situation, including asking them whether they would rent out unused parts of their house or move to a smaller, age-appropriate home. Three-quarters of respondents can imagine this in principle – but only 14 percent want to change their living arrangements in the next five years.

For this reason, the Oeko-Institut has developed a personal advice service and workshops addressing the subject of homes for old age, which it is trialling in partnership with Steinfurt district and a number of municipalities. Specially trained advisers ask what people want in terms of housing, tell them about alternative housing options and help homeowners make up their minds. Districts and municipalities plan to follow this up by providing practical support – for example, by advising older people on financing a conversion or on landlords' rights. This will enable them to reach a decision more easily, make previously unused vacant properties available to people who urgently need housing, and save resources, energy and land.

Project profile

Project title: LivingSpaces – Instruments for needs-based use of the housing stock in municipalities
Funding: German Federal Ministry of Education and Research
Project partners: District of Steinfurt Office for Climate Protection and Sustainability, Institute for Social-Ecological Research (ISOE), Institute for Energy and Environmental Research (ifeu)
Timescale: March 2017 – August 2020
Further information:
www.oeko.de/jb2019-lebensraeume/

"In Steinfurt district just over half of homeowners over the age of 55 said that they had unused rooms in their house. These are often self-contained flats or rooms divided off from their own living areas that could be rented out. Yet many homeowners rule this out, mainly because they don't want to share their home with other people."

Dr Corinna Fischer

Dr Corinna Fischer
Senior Researcher,
Sustainable Products &
Material Flows Division
(project manager)
c.fischer@oeko.de

Tanja Kenkmann
Senior Researcher,
Energy & Climate Division
t.kenkmann@oeko.de

Raw materials for alternative drives

Production and recycling of lithium-ion batteries

By 2050, 80 percent of new cars worldwide could be manufactured with an alternative drive. If very ambitious climate change mitigation measures are put in place, the figure might even be as high as 100 percent. Yet as the number of electric vehicles increases, so does the demand for batteries. As part of the Fab4LiB research project, the Oeko-Institut analysed what this means for the global demand for lithium, cobalt and nickel and calculated the recycling potential.

The project team estimated that up to 6,600 gigawatt-hours of battery capacity will be needed annually if the targets set in the Paris Agreement are to be met. Manufacturing batteries in this quantity would require 220 gigafactories. The study, which was funded by the German Federal Ministry of Education and Research, also established what quantities of the most important materials for lithium-ion cells will be needed in the period to 2050: if these cells remain the preferred storage technology for electric vehicles, a significant increase in the demand for lithium, cobalt and nickel can be expected. The researchers do not anticipate physical shortages of the raw materials, but temporary bottlenecks cannot be ruled out.

Recycling is also considered: the Oeko-Institut calculates that around 10 percent of the global requirements for these resources could be met through battery recycling by 2030, rising to as much as 40 percent by 2050. However, ambitious expansion of the recycling structure is needed if this is to be achieved. If Germany plans to establish itself as one of the leading markets for electromobility, a large part of the value chain must be located here. At present, the majority of battery cells are being purchased from companies in Asia.

As part of the project, there are also plans to produce a report on the environmental and socioeconomic impacts of supply chains for battery resources. The report will address not only much-discussed problems such as water consumption in the extraction of lithium from salt lake brine but also less frequently raised issues such as lithium mining in Australia and graphite mining in China.

Project profile

Project title: Fab4Lib – Research into measures to increase material and process efficiency in lithium-ion battery cell production across the entire value chain
Funding: German Federal Ministry of Education and Research
Project partners: Seventeen research institutes and industrial companies, Project management: TerraE Holding GmbH
Timescale: January 2018 – December 2019
Further information:
www.oeko.de/jb2019-fab4lib/

"As part of the Fab4Lib project, the Oeko-Institut is studying innovative solutions along the lithium-ion technology value chain. The project's findings are having a direct influence on practice: the company that is managing the project, TerraE GmbH, is looking at setting up cell production here in Germany in the medium term."

Peter Dolega

Peter Dolega
Researcher, Resources & Transport Division
p.dolega@oeko.de

Dr Matthias Buchert
Head of the Resources & Transport Division (project manager)
m.buchert@oeko.de

Hotspots in supply chains
Palm oil cultivation in Indonesia

No other country produces as much palm oil as Indonesia: in terms of volume, more than 50 percent of the palm oil traded around the world comes from there. However, the cultivation of biogenic resources such as palm oil is often associated with severe social and environmental risks. In three case studies, the Oeko-Institut and the University of Freiburg have looked at social and environmental hotspots: cotton growing in Ethiopia, timber production in the Democratic Republic of the Congo and palm oil production in Indonesia.

The first stage of the study of palm oil production was an analysis of agrotechnical growing conditions and the Indonesian palm oil market. In addition, the project team looked at the different sustainability certificates for palm oil. In relation to social and environmental criteria, the standards set by these schemes vary widely: for example, not all the certificates take into account factors such as biodiversity and water abstraction, and there are also variations in the evaluation of land-use rights, human rights and employment rights. The researchers conducted fieldwork in collaboration with Padjadjaran University and spoke to businesses, authorities and smallholders in West Java, Sumatra and Kalimantan. The analysis found that the certificates are of only limited benefit in helping to prevent deforestation. One of the reasons for this is that conventional palm oil can still fetch a high price on certain markets. There are, however, some positive social impacts, such as farm training programmes.

In the course of 2020 the project team will be developing guidelines for businesses and will recommend additional improvement measures, such as stringent due diligence requirements and financial incentives for higher standards. The study also advocates an integrated review of policy frameworks, economic incentives and practical approaches to certification.

Project profile

Project title: Bio-economic power in global supply chains (Biopower)
Funding: German Federal Ministry of Education and Research
Project partners: University of Freiburg, Padjadjaran University (Bandung, Indonesia), PAN Ethiopia (Addis Ababa, Ethiopia), Réseau CREF (Network for the Conservation and Restoration of Forest Ecosystems – Goma, Democratic Republic of the Congo)
Timescale: February 2017 – January 2020
Further information:
www.oeko.de/jb2019-palmoelanbau/

"Our value chains form a complex, widely-branching network – in the case of palm oil, and other resources such as cotton and timber as well. We are working with the Energy & Climate Division on the biopower project to address the issue of how a transition to sustainability can be achieved at international level."
Inga Hilbert

Inga Hilbert
Researcher,
Sustainable Products & Material Flows Division
i.hilbert@oeko.de

Tobias Schleicher
Researcher,
Sustainable Products & Material Flows Division
t.schleicher@oeko.de

Getting climate action on track
Socially balanced CO_2 pricing

Climate action and social acceptability can be combined – if approached correctly. This is the finding of a study produced on behalf of Agora Verkehrswende and Agora Energiewende which demonstrates that a carbon tax on petrol, diesel, heating oil and natural gas could be a key element of action to mitigate climate change. At the same time, appropriate redistribution of the money raised can buffer possible distributional effects and offset the extra burden on low-income or severely affected households. Socially balanced carbon pricing is therefore feasible and viable.

The study shows that if the system is properly designed, low- and medium-income households and households with children can actually benefit from carbon pricing. In the proposed model, high-income and one-person households are on average subject to only a very moderate additional burden. In addition, the tax imposes no substantial extra burden on households in rural regions and commuter households. Overall, 56 percent of households are better off. Thus, the widely discussed social imbalance does not occur – if the instrument is properly designed.

The analysis by the Freie Universität Berlin and the Oeko-Institut assumes a starting price of 50 euros per tonne of CO_2 and first steps towards alignment of the tax on diesel and petrol. This will increase the tax revenue by more than eleven billion euros. The project team also shows how this money can be appropriately redistributed to private households. Firstly, the bulk of the revenue will be returned to citizens as a "climate premium" of 100 euros per person. Secondly, the study proposes that the electricity tax be reduced to the European minimum tax rate of 0.1 cents per kilowatt hour and that a compensation fund of 300 million euros be set up. This can be used to fund compensation payments for severely affected households. Thirdly, the commuter allowance would be replaced by a mobility allowance of 10 cents per kilometre between home and workplace which would be deducted directly from the tax liability.

Project profile

Project title: Getting climate protection on track: How socially balanced CO_2 pricing works
Commissioned by: Agora Verkehrswende and Agora Energiewende
Project partners: Freie Universität Berlin
Timescale: December 2018 – March 2020
Further information: www.oeko.de/jb2019-co2-bepreisung/

"In this project we focused primarily on the costs, but socially balanced action on climate change also involves many other issues, such as structural change in particular sectors and regions, the retention of jobs and the noise levels that affect people living on busy roads. All these points need to be addressed together in a constructive dialogue."
Ruth Blanck

Ruth Blanck
Senior Researcher, Resources & Transport Division (project manager)
r.blanck@oeko.de

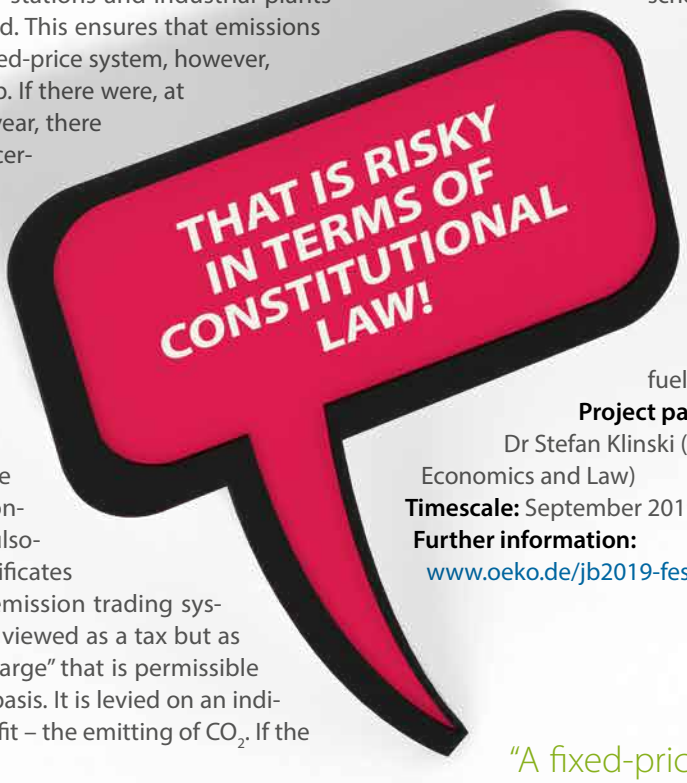
Dr Katja Schumacher
Deputy Head of the Energy & Climate Division (Berlin)
k.schumacher@oeko.de

High legal risk

A fixed CO_2 price for transport and buildings

What makes an emission trading system permissible under constitutional law? The Federal Constitutional Court provided a clear answer to this question in March 2018: there needs to be a politically defined cap on the available emissions. In the opinion of the Oeko-Institut and Dr Stefan Klinski from the Berlin School of Economics and Law, the constitutional rules give rise to significant concerns about the validity of a national carbon certificate trading scheme for the emissions from buildings and transport in which a fixed certificate price is defined.

In the EU Emissions Trading System, the upper limit or cap for power stations and industrial plants is gradually reduced. This ensures that emissions actually fall. In a fixed-price system, however, there is no such cap. If there were, at some point in the year, there would be no more certificates available and petrol and heating oil could no longer be sold. This is emphasised by the experts in their legal opinion.



According to the Federal Constitutional Court, the compulsory purchase of certificates in the traditional emission trading system should not be viewed as a tax but as a "benefit setoff charge" that is permissible on an exceptional basis. It is levied on an individual special benefit – the emitting of CO_2. If the law-makers decide on management in accordance with market principles, then according to the Federal Constitutional Court the commodity that is being described as scarce – the permissible emitting of CO_2 – must be limited in quantity. Since this is not possible with a fixed price, the Oeko-Institut and Dr Stefan Klinski regard a fixed-price certificate scheme as posing a very high risk under the financial provisions of the constitution. Instead they recommend levying a CO_2 surcharge as part of the existing energy tax. This could be introduced very simply and in a legally secure way. In addition, it would save the high administrative costs that all affected parties would incur if a new national emissions trading scheme were introduced.

Project profile

Project title:
On the admissibility under the financial provisions of the constitution of a national certificate trading scheme for CO_2 emissions from fuels

Project partners:
Dr Stefan Klinski (Berlin School of Economics and Law)

Timescale: September 2019

Further information:
www.oeko.de/jb2019-festpreis-co2

"A fixed-price certificate trading scheme for the transport and buildings sectors is not compatible with the existing case law of the Federal Constitutional Court and is therefore legally risky. The law-makers are thus well advised to instead choose the legally safe way of introducing a CO_2 price via a surcharge on the energy tax."

Friedhelm Keimeyer

Friedhelm Keimeyer
Deputy Head of the Environmental Law & Governance Division
f.keimeyer@oeko.de

Power-to-X

Climate potential of electricity-based substances

Are they the fuel of the future for emission-free cars and planes? Or just an inefficient and expensive substitute with a poor carbon footprint? Electricity-based or power-to-X (PtX) substances feature prominently in many discussions about the future of energy supplies, resources and mobility. They are produced from electricity and CO_2. The Oeko-Institut is pursuing various projects that explore the production of PtX substances and their costs and uses. The focus is always on the role of these substances in mitigating climate change. This is the case in a recent background report produced as part of a project funded by the German Federal Ministry of Education and Research.

The Oeko-Institut emphasises that from the point of view of mitigating climate change, PtX substances are only beneficial and able to contribute to mitigation targets if at least 75 percent of the electricity used to make them comes from additional renewable energies. If less renewable energy is used, the greenhouse gas balance of PtX substances is actually worse than with fossil fuels such as diesel.

It is hoped that the Oeko-Institut report will bring some objectivity into the debate on electricity-based fuels. The report stresses that power-to-X substances will play an important part in climate change mitigation in the medium and long term. However, they should be used mainly in sectors in which it is difficult or impossible to use electricity directly – for example, in steel production and in aviation and maritime transport. In addition, demand for energy must first be reduced as much as possible through efficiency measures – in the electricity and transport sectors, in buildings and in industry. Moreover, the Oeko-Institut calls for a consistent political strategy for the expansion of PtX technologies that addresses the technical challenges, reduces costs and imposes criteria that ensure that these technologies are sustainable.

Project profile

Project title: The role of electricity-based substances in climate protection in Germany
Funding: Background report as part of the project "ENSURE – New energy grid structures for the energy transition" funded by the German Federal Ministry of Education and Research
Project partners: Freie Universität Berlin
Timescale: September 2016 – December 2019
Further information:
www.oeko.de/jb2019-ptx1
www.oeko.de/jb2019-ptx2

"The CO_2 source is an important aspect of the mitigation effect of PtX substances. The substances that are produced are only greenhouse gas neutral if the carbon dioxide is taken from the air or from processes in which biomass is used sustainably. If, however, the PtX technology uses CO_2 from industrial processes, this could put a brake on the reduction of emissions in industry."

Peter Kasten

Christoph Heinemann
Senior Researcher, Energy & Climate Division (project manager)
c.heinemann@oeko.de

Peter Kasten
Senior Researcher, Resources & Transport Division
p.kasten@oeko.de

Clients of the Oeko-Institut

1. Politics & government

- 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)
- City of Hamburg
- City of Offenburg
- City of Stuttgart
- City of Wiesbaden
- Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
- Deutscher Bundestag
- Environment Agency Austria
- European Commission
- European Environment Agency (EEA)
- European Parliament
- Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)
- German Agency for Nature Conservation (BfN)
- German Environment Agency (UBA)
- German Ministry for Economic Affairs and Energy (BMWi)
- German Ministry for Economic Cooperation and Development (BMZ)
- German Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
- German Ministry of Education and Research (BMBF)
- German Office for Economic Affairs and Export Control (BAFA)
- German Office for Radiation Protection (BfS)
- German Office for the Safety of Nuclear Waste Management (BfE)
- German Research Institute for Public Administration (FÖV)
- Gesellschaft für Anlagen- und Reaktorsicherheit gGmbH (GRS)
- Karlsruhe District Authority
- Kreditanstalt für Wiederaufbau (KfW)
- Ludwigsburg District Authority Waste Management Company
- Münster District Government
- Rhineland-Palatinate Ministry of Environment, Energy, Food and Forestry
- Statistical Office of the European Union (Eurostat)
- The Finnish Innovation Fund Sitra
- United Nations Environment Programme (UNEP)

2. Industry

- Apple Distribution International
- Daimler AG
- EWS Vertriebs GmbH
- MVV Umwelt Ressourcen GmbH
- Netze BW GmbH
- RAL gGmbH
- Rügenwalder Mühle Carl Müller GmbH & Co.KG
- Sofies UK Consulting Ltd.
- TÜV Nord GmbH & CO. KG
- Werner & Mertz GmbH

3. Research and civil society

- Agora Energiewende
- Baden-Württemberg Energy Research Foundation (SEF)
- EnergieVision e.V.
- European Climate Foundation
- FEMNET e.V.
- Friends of the Earth Germany (BUND)
- German Federal Environment Foundation (DBU)
- German Football Association
- German Foundation for Peace Research (DSF)
- Green Budget Germany (FÖS)
- GRS Batterien
- International Carbon Action Partnership (ICAP)
- NABU – Naturschutzbund Deutschland e.V.
- North Rhine-Westphalian Consumer Advocacy Centre
- Seas at Risk
- Stockholm International Water Institute
- The European Consumer Organisation (BEUC)
- The Federation of German Consumer Organisations (VZBV)
- World Resources Forum
- WWF Deutschland

These are some of our funders and clients.
A full list of references is available (in German) at
www.oeko.de/referenzen2019

Hear, hear!
Communication at the Oeko-Institut

At our events, we bring people into the debate. The Oeko-Institut's annual conference is a long-established highlight. New event formats such as the "eco@dialog" series and the Ecornet Future Forum have also helped bring professionals together.

In our research work, too, we attach great importance to communication: it is one of our core competences and stakeholder workshops are an integral component of many projects. We organise stakeholder dialogues in our transdisciplinary research projects.

Top contributions 2019

Top website announcement

Positive impacts of the German government's climate action plan

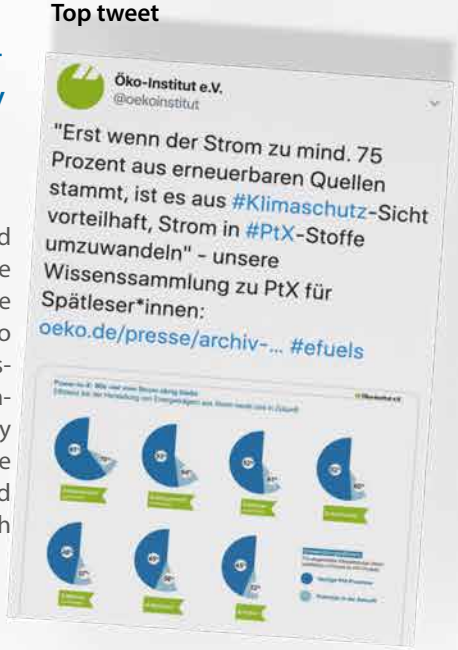
If Germany achieves its climate targets for 2030 and 2050, this will have positive impacts on the economy. In particular, if energy efficiency becomes a maxim in the modernisation of business and industry, future cost savings could more than offset the investment that is needed now. These are the key findings of a study by a research consortium headed by the Oeko-Institut.

Top blog contribution

Carbon pricing – looking beyond the empty phrases that create consensus

Carbon pricing is being talked about everywhere. But is the present approach anything more than empty phrases designed to create consensus? Dr Felix Christian Matthes, Research Coordinator for Energy and Climate Policy at the Oeko-Institut, analyses the debate in an opinion paper and identifies five key issues on which agreement must be reached.

Top tweet



We communicate online

www.oeko.de – blog.oeko.de – www.oeko.de/presse – www.oeko.de/epaper
www.twitter.com/oekoinstitut – www.slideshare.net/oeko-institut – www.flickr.com/oekoinstitut

Loyal companions
The Oeko-Institut's members

Through their subscriptions, the Oeko-Institut's members support independent, principled research. There are active and passive members and temporary and life membership schemes.

Three questions to Andrea Droste,

who has been looking after the Oeko-Institut's members and managing fundraising for 14 years.

What is the Oeko-Institut's current membership structure?
The Oeko-Institut has nearly 2,000 members. Quite a number of them have been with us since the early years. 350 are life members who have paid a one-off subscription of 1,000 euros. They therefore support us long-term, which is particularly helpful.

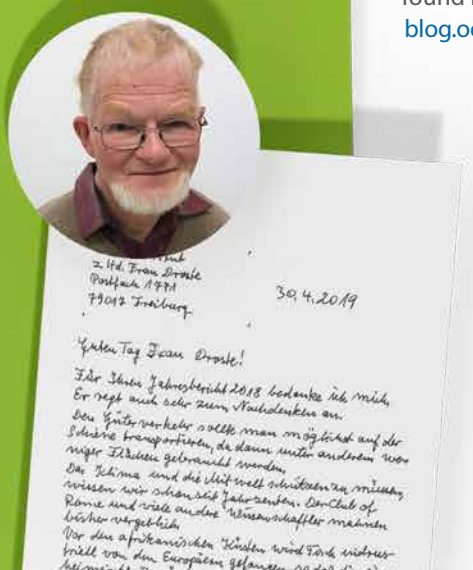
Why do people join the Oeko-Institut?
Because they see it as neutral and independent and want to support our research. Many have a scientific background themselves.

What specific things have the members achieved?
The "Sonnenschiff" – the "Sunship" building that houses our office in Freiburg – was the first plus-energy building to be erected in Germany. We were able to build it because our members gave us low-interest loans and because they made donations. The members also help finance an annual donation-funded project and provide valuable input on project design. These projects enable us to conduct research into a topical issue that would not otherwise be commissioned.

Committed member

Hans-Hermann Oehlerking (80) has been a member of the Oeko-Institut for 34 years. He regularly comments on the magazine eco@work and the annual reports and puts forward his own ideas.

"In my opinion the Oeko-Institut and the work that it does is incredibly good. I do everything possible to save the climate – in part for future generations."



New donation-funded project 2019:

Why flying is bad for the climate and what we can do about it

It is well known that aviation damages the climate. But just what can policy-makers in Germany and Europe do to regulate it? As consumers, what are our options for travelling by other means? And what gaps are there in the scientific knowledge that is needed to bring about the necessary change? The donation-funded project will collate information for the media, policy-makers and the general public on a platform and bring together the basic scientific facts in relation to the future of flying.

#plastikfrei leben – living without plastic

Results of the 2018 donation-funded project

Three Oeko-Institut researchers have got on the trail of microplastics. Their most important finding is that consumers must use plastic products longer and more intensively by reusing, repairing and sharing. The central call to policy-makers is that the costs of plastic waste must be added to prices, preferably in the form of a resource tax. All #plastikfrei texts on the subjects of food packaging, man-made fibre textiles and car tyres can be found in our blog:
blog.oeko.de/kategorie/plastikfrei/

Contact for members:

Andrea Droste

Freiburg Office
Tel.: +49 761 45295-0
E-mail: a.droste@oeko.de
https://mitglieder.oeko.de

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

Freiburg Head Office
PO Box 1771
D-79017 Freiburg
Merzhauser Strasse 173
D-79100 Freiburg
Tel.: +49 761 45295-0
Fax: +49 761 45295-288

Darmstadt Office
Rheinstrasse 95
D-64295 Darmstadt
Tel.: +49 6151 8191-0
Fax: +49 6151 8191-133

Berlin Office
Borkumstrasse 2
D-13189 Berlin
Tel.: +49 30 405085-0
Fax: +49 30 405085-388

info@oeko.de
www.oeko.de