Reference list
Sustainable Products & Material Flows
As per March 2022
Oeko-Institut e.V.

Oeko-Institut is a leading European research and consultancy institute working for a sustainable future. Founded in 1977, the institute develops principles and strategies for realising the vision of sustainable development globally, nationally and locally.

Based on value-oriented research, the institute provides consultancy for decision-makers in politics, industry and civil society, showing them ways of tackling the environmental challenges we face in an age of rapid social change and globalisation. The experts draw upon a broad array of scientific and research methods and also employ a transdisciplinary approach in their work.

Oeko-Institut employs about 170 staff, including almost 120 researchers at three locations in Germany – Freiburg, Darmstadt and Berlin.
Sustainable Products & Material Flows Division

The thematic priorities of the Sustainable Products & Material Flows Division are

- Sustainable products and consumption,
- Sustainable chemistry, materials and technologies,
- Sustainable food systems and bio-based raw materials, and
- International cooperation on circular economy and global value chains.

Our research and consultancy projects are geared to practical implementation, seeking to make the vision of sustainable development operational, both on national and international levels, for specific products and companies, sectors and “areas of need”, consumer practices and lifestyles, as well as for policy instruments and strategies. We provide scientific support to the development and introduction of new technologies, help companies develop innovative products, assess products and services, analyse the prerequisites for a sustainable transformation of production and consumption patterns and provide practical tools to support decisions for both consumers and procurers.

In the various policy areas, we provide advice on the practical implementation of European framework directives (such as REACH, RoHS, WEEE, ELV, Ecodesign and Energy label), on the refinement and alignment of (sustainability) labels and on the further development and implementation of sustainable public procurement practices. In international cooperation, problem solutions are developed and tested in practice under different socio-economic conditions in close collaboration with local partners. This involves the introduction of ecological standards and product labels as well as adapted solutions for issues relating to raw materials and waste management.

When analysing optimisation potential, the entire product life cycle is taken into account – from raw material extraction, production and use to disposal. In addition to ecological aspects, the experts also examine interactions with social issues. A disciplinary and inter-/transdisciplinary set of methods forms the basis for the investigations. These include, for example, life cycle assessments (LCA) and greenhouse gas inventories for products and companies (product or corporate carbon footprint (PCF, CCF); product environmental footprints (PEF)), eco-efficiency and material flow analyses, assessments of the substitution potential of hazardous substances and qualitative analyses to evaluate environmental impacts that are difficult to quantify, such as ecosystem services or the loss of biodiversity. Our political and social science methodological expertise includes cost-benefit analyses, impact assessments, empirical research and policy analyses. Product Sustainability Assessment (PROSA) – a methodology developed by the Institute – provides strategic guidance for numerous projects.

Our team consists of more than twenty committed researchers representing a broad range of disciplines. Our clients include various Directorates-General of the European Commission, national ministries focusing on the environment (BMU) and research (BMBF), the German Federal Environment Agency (UBA), private-sector companies and industry federations, environmental and consumer NGOs and foundations. On the international level, our main commissioning parties are the German Society for International Cooperation (GIZ), the KfW Development Bank, the World Resources Forum (WRF), the Federal Ministry of the Environment, UNEP, and the United Nations University (UNU).
## Contents

1. Transformation & green economy  
   - 5

2. Sustainable consumption  
   2.1. Cross-cutting issues  
   - 11
   2.2. Ecodesign / Energy Labelling  
   - 16
   2.3. Eco Labelling  
   - 19
   2.4. Green procurement  
   - 24
   2.5. Consumer information  
   - 27
   2.6. Sustainable consumption in specific sectors  
   2.6.1. Household appliances  
   - 30
   2.6.2. Information & communication technologies, consumer electronics  
   - 34
   2.6.3. Construction & buildings  
   - 41
   - Publications relating to sustainable consumption  
   - 44

3. Corporate sustainability  
   - 46

4. Sustainable Food Systems and Bio-Based Raw Materials  
   - 50
   - Publications relating to Sustainable Food Systems and Bio-Based Raw Materials  
   - 55

5. International Cooperation on Circular Economy & Global Value Chains  
   - 55
   - Publications relating to International Cooperation on Circular Economy & Global Value Chains  
   - 62

6. Sustainable chemistry  
   6.1. Cross-cutting issues  
   - 64
   6.2. Chemicals management and REACH  
   - 67
   6.3. Hazardous substances assessment and substitution  
   - 70
   - Publications relating to sustainable chemistry  
   - 79

7. Sustainable Materials and Technologies  
   7.1. Cross-cutting issues  
   - 80
   7.2. Nanotechnology  
   - 82
   7.3. Technology development processes  
   - 83
   - Publications relating to technology assessment  
   - 83

8. Methodology  
   8.1. Methodology development and standardization  
   - 84
   8.2. Methodology application  
   - 84
   8.3. Critical reviews  
   - 85
   - Publications relating to methodology  
   - 86
Sustainable Products & Material Flows

1. Transformation & green economy

cULTURE4CLIMATE - Initiative for the implementation of the global climate and sustainability goals in the field of culture (in progress)
Sutter, J.; López, V.; Mottschall, M.; Rüdenauer, I.; Stahl, H.; Stuber-Rousselle, K.; Wagner, T.
Funded by: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

Socio-technical and behavioural aspects of energy efficiency improvement in the heating sector (in progress)
Commissioned by: German Environment Agency (UBA)

Innovative climate protection in private households: Offsetting the additional electricity demand of e-mobility through the expansion of renewable energies and energy efficiency (E-Mob EE) (in progress)
See also: www.e-mob-ee.de
Graulich, K.; in cooperation with Büro Ö-quadrat
Funded by: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

Climate neutrality and GHG neutrality: An analysis of both scientific concepts together with an examination of their public use and understanding (in progress)
Commissioned by: German Environment Agency (UBA)
Social aspects of environmental policy - Sub-project 1: Analysis and environmental policy implications (in progress)
Commissioned by: German Environment Agency (UBA)

Call and proposals for the circular economy (in progress)
Kosińska-Terrade, I.; Dehoust, G.; Löw, C.; Prakash, S.
Commissioned by: Oeko-Institut e.V.

Civic engagement for sustainable public welfare (ENGAGE) (in progress)
See also: https://www.uni-muenster.de/Nachhaltigkeit/engage/index.html
Fischer, C.; Hanke, G.; Scherf, C.; Wolff, F.; in cooperation with Institute for Ecological Economy Research (IÖW); Institute for Social-Ecological Research Ltd. (ISOE); The Center of Interdisciplinary Sustainability Research (ZIN), University of Münster
Funded by: German Federal Ministry of Education and Research (BMBF)

Representative survey on environmental awareness and behaviour including social science analyses (in progress)
Fischer, C.; in cooperation with Institute for Applied Social Sciences (infas); Institute for Social-Ecological Research Ltd. (ISOE)
Commissioned by: German Environment Agency (UBA)

Circular City Berlin - steps from potential towards implementation (2021)
Gröger, J.; Behrens, F.; Liu, R.; in cooperation with Institute for Ecological Economy Research (IÖW)
Commissioned by: Senate Department for the Environment, Transport and Climate Protection Berlin

Environmental policy transfer: Identification and systematisation of its success factors (2021)
Commissioned by: German Environment Agency (UBA)

Shaping ecological change – Implementing and updating the Integrated Environmental Programme 2030 (2021)
Wolff, F.; Gensch, C.; Grießhammer, R.; Heyen, D.; Kampffmeyer, N.; Quack, D.; Teufel, J.; in cooperation with adelphi consult GmbH; Environmental Policy Research Centre - Freie Universität Berlin (FFU); euphorum; Institute for Innovation and Technology; Potsdam Institute for Climate Impact Research (PIK)
Commissioned by: German Environment Agency (UBA)
In-Depth Analysis on “The Role of AI in the European Green Deal” for the Special Committee on Artificial Intelligence in a Digital Age (AIDA) (2021)
Commissioned by: European Parliament, Directorate General for Internal Policies

Living Spaces: Instruments for a needs-based use of living space in municipalities (2021)
Fischer, C.; Kenkmann, T.; in cooperation with Amt für Klimaschutz und Nachhaltigkeit, Kreis Steinfurt; energieland2050 e. V.; Institute for Energy and Environmental Research (ifeu); Institute for Social-Ecological Research Ltd. (ISOE)
Funded by: German Federal Ministry of Education and Research (BMBF)

Strategies for ecologically-driven structural change towards a Green Economy (2020)
Commissioned by: German Environment Agency (UBA)

Viable, sustainable economic stimuli for coping with the economic consequences of the corona crisis (especially for SMEs) (2020)
Commissioned by: German Federal Environmental Foundation (DBU)

Transformative strategies for an integrated neighbourhood development: Action concepts and evaluation options for high-influx cities (so-called “Schwarmstädte”) (TRASIQ) (2020)
See also: www.trasiq.de
Funded by: German Federal Ministry of Education and Research (BMBF)

Commissioned by: European Commission, DG Environment
Publication of the 6th Global Environmental Outlook: Analysis of implications for Germany (2019)
Wolff, F.; Küppers, P.; Prakash, S.; in cooperation with Environmental Policy Research Centre - Freie Universität Berlin (FFU); Freie Universität Berlin
Commissioned by: German Environment Agency (UBA)

Instrumentation options for reducing energy consumption through behavioural changes (2019)
Commissioned by: German Environment Agency (UBA)

Wolff, F.; Brohmann, B.; Fischer, C.; Grießhammer, R.; Gsell, M.; Heyen, D.; in cooperation with Albert-Ludwigs-Universität Freiburg; Environmental Policy Research Centre - Freie Universität Berlin (FFU); Freie Universität Berlin; Institut für Organisationskommunikation GmbH (IFOK); Tübingen University
Commissioned by: German Environment Agency (UBA)

Digitisation and sustainability: Political guidance between opportunities, false promises and risks (2019)
Gensch, C.; Gailhofer, P.; Gsell, M.; Heinemann, C.; Kampffmeyer, N.; Ustohalova, V.
Commissioned by: Stiftung Zukunftserbe

Trafo 3.0 - Governance model for socio-ecological transformation processes in practice: development and testing in three areas of application (2018)
See also: www.trafo-3-0.de
Commissioned by: German Federal Ministry of Education and Research (BMBF)

Prieß, R.; Bleher, D.; Weishäupl, J.; in cooperation with Albert-Ludwigs-Universität Freiburg
Commissioned by: Ministerium für Wissenschaft, Forschung und Kunst Baden Württemberg
Prospects of citizen participation in the energy transition process under consideration of distributional aspects (2018)
Funded by: German Federal Ministry of Education and Research (BMBF)

Research coordination of the funding initiative "An environmentally and socially compatible transformation of the German energy system" conducted by the Federal Ministry of Education and Research (BMBF) (2018)
Commissioned by: German Federal Ministry of Education and Research (BMBF)

Transition to a Green Economy: Necessary structural changes for and enablers of a viable implementation in Germany (2017)
Commissioned by: German Environment Agency (UBA)

Criteria for the success of stakeholder cooperations pertaining to transformations and system innovations (2017)
Brohmann, B.; Grießhammer, R.; Hilbert, I.
Commissioned by: Stiftung Zukunftserbe

Transformation strategies and Models of Change (MoC) to encourage a sustainable social change (2015)
Brohmann, B.; Grießhammer, R.; in cooperation with Kulturwissenschaftliche Institut in Essen (KWI); Zeppelin University gGmbH
Commissioned by: German Environment Agency (UBA)

The Sharing Economy: novel approaches to a collaborative economy (2015)
Commissioned by: German Environment Agency (UBA)
Sufficiency in everyday life – concept, necessity, potentials, and political steering options (2013)
Wolff, F.; Barth, R.; Brohmann, B.; Brunn, C.; Fischer, C.; Heyen, D.
Commissioned by: Stiftung Zukunftserbe

Publications relating to Transformation & green economy


2. Sustainable consumption

2.1. Cross-cutting issues

Together for environmentally sound consumption - information, communication and international cooperation *(in progress)*
Teufel, J.; Gensch, C.; Jacobs, J.; López, V.; Prakash, S.; in cooperation with adelphi research gGmbH
Commissioned by: Federal Agency for Nature Conservation (BfN)

Market observation of sustainable consumption: market analysis and interventions to promote green products, with respect to the sustainable consumption goals of the German Sustainability Strategy *(in progress)*
Fischer, C.; Hanke, G.; Moch, K.; Rüdenauer, I.; Teufel, J.; in cooperation with INFRAS AG
Commissioned by: German Environment Agency (UBA)

Strategic development and scientific support of the activities and services of the Competence Centre for Sustainable Consumption *(in progress)*
Fischer, C.; Quack, D.; in cooperation with co2online gGmbH; ConPolicy - Institute for Consumer Policy
Commissioned by: German Environment Agency (UBA)

Citizens' participation and social inclusion as a building block for the implementation of the National Programme for Sustainable Consumption *(2021)*
See also: https://www.bmuv.de/themen/bildung-beteiligung/beteiligung/buergerbeteiligung-und-soziale-teilhabe-fuer-nachhaltigen-konsum
Fischer, C.; Hanke, G.; Seidl, R.; in cooperation with Institute for Social-Ecological Research Ltd. (ISOE); Zebralog GmbH & Co. KG
Commissioned by: German Environment Agency (UBA)
Ecological financial reform: product-related incentives as drivers for environmentally friendly production and consumption (2021)
Commissioned by: German Environment Agency (UBA)

Rethinking Sustainable Consumption: Evaluation and further development of measures and instruments (2021)
Commissioned by: German Environment Agency (UBA)

Implementation of innovative incentive mechanisms for the promotion of climate-friendly products and services in ASEAN (in progress)
See also: https://www.giz.de/en/worldwide/43629.html
Prakash, S.; Graulich, K.; Hilbert, I.; Manhart, A.; Prieß, R.; Schleicher, T.
Funded by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

What would be the economic and environmental impacts of extending the useful life of electrical/electronic equipment? (2020)
Rüdenauer, I.; Prakash, S.
Commissioned by: Federation of German Consumer Organisations (vzbv)

Conception, design and implementation of a climate protection campaign (2020)
Quack, D.; in cooperation with co2online gGmbH; Oeko-Institut e.V.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Preparing and supporting the German input to the Global Sustainable Development Report (GSDR) (2020)
Wolff, F.; Bunke, D.; Graulich, K.; Kampffmeyer, N.; Loreck, C.; Prakash, S.; Scherf, C.; in cooperation with adelphi research gGmbH
Commissioned by: German Environment Agency (UBA)

Consumer advice as a component of a successful resource policy (2020)
Commissioned by: German Environment Agency (UBA)
Consumers4climate: How to position consumer organisations as relevant players in the debate against climate change?  
Quack, D.; Heyen, D.  
Commissioned by: The European Consumer Organisation (BEUC)

Scientific support for the national programme for sustainable consumption – Subproject 3: Environmental costs of consumer goods as a starting point for the improvement of market-related and non-market-related consumer information (’2nd price tag’)  
Teufel, J.; Brohmann, B.; Gensch, C.; Gsell, M.; Hünneke, K.; Rüdenauer, I.; in cooperation with co2online gmbH; INFRAS AG; minds & makers  
Commissioned by: German Environment Agency (UBA)

Further development of strategies against obsolescence including legal instruments  
Keimeyer, F.; Gailhofer, P.; Graulich, K.; Gsell, M.; Prakash, S.; Scherf, C.; in cooperation with Hochschule Pforzheim  
Commissioned by: German Environment Agency (UBA)

Promoting environmental-friendly services in ASEAN taking the example of Germany’s environmental standards, such as the Blue Angel label  
Prakash, S.; Prieß, R.; Schleicher, T.  
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Evaluation, monitoring and adjustment as well as further development of the German National Climate Initiative (NKI)  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Export of green and sustainable (environmental) infrastructure – Preparation of a delegation trip  
Prakash, S.; Gröger, J.; Köhler, A.; Möller, M.  
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
Scientific study on the development in energy consumption and measures to promote product-related energy efficiency (2018)
Commissioned by: Federal Ministry for Economic Affairs and Energy (BMWi)

Strengthening the ecological design as a purchasing criterion for consumers (2018)
Commissioned by: German Environment Agency (UBA)

Extension of the product lifespan through the enforcement of consumer rights (2018)
Prakash, S.; Gailhofer, P.; Rüdenauer, I.; in cooperation with Oeko-Institut e.V.; Verbraucherinitiative e.V.
Commissioned by: German Environment Agency (UBA)

Sustainability Report Oeko-Institut e.V. 2016 (2017)
Grießhammer, R.; Antony, F.; Brommer, E.; Brunn, C.; Cames, M.; Mottschall, M.
Commissioned by: Oeko-Institut e.V.

Power efficiency classes for households: Supporting power-saving innovations in households, market and appliance technology - sub-project 2: optimization potentials, business models and energy saving potentials (2016)
Fischer, C.; Brommer, E.; Grießhammer, R.; in cooperation with Büro Ö-quadrat; Institute for Social-Ecological Research Ltd. (ISOE)
Commissioned by: German Federal Ministry of Education and Research (BMBF)

Developing a concept for the overall reduction of energy demand: potentials, general conditions and tools to achieve energy saving goals of the National Energy Concept (2015)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Further development of the strategy of the German National Climate Initiative: Optimization of the support program with a view to implementation of national climate targets (2015)
Repenning, J.; Brohmann, B.; Graulich, K.; Grießhammer, R.; Jörß, W.; Kenkmann, T.; Schüler, D.; Schumacher, K.; in cooperation with Arepo Consult; Dr. Hans-Joachim Ziesing; Ecologic Institut gGmbH; Institute for Energy and Environmental Research (ifeu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Quack, D.; Brommer, E.; in cooperation with NL Agency (NL EVD Internationaal); Oeko-Institut e.V.
Commissioned by: Executive Agency for Competitiveness and Innovation

The Sharing Economy: suitable products and concepts for ownership-substituting use patterns (2015)
Gsell, M.; Dehoust, G.; Quack, D.
Commissioned by: Stiftung Zukunftserbe

Consumer benefits of standardization (2014)
Fischer, C.; Gattermann, M.; Stratmann, B.; in cooperation with Zeppelin University gGmbH
Commissioned by: German Society for the Promotion of Research on Standardization e.V.

Evaluation of the criteria for the "Bundespreis Ecodesign" (Federal ecodesign award) (2012)
Grießhammer, R.; Quack, D.
Commissioned by: IDZ DesignPartner Berlin GmbH

Target group-specific incentive programmes (2012)
Grießhammer, R.; in cooperation with Büro Ö-quadrat
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Energy-efficient climate protection in products - Project for the further development of the German National Climate Initiative (2012)
Grießhammer, R.; Brommer, E.; Fischer, C.; Gensch, C.; Rüdenauer, I.; Schleicher, T.; in cooperation with Büro Ö-quadrat
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Financial support for product development and marketing of energy-using products offering high efficiency (2011)
Grießhammer, R.; in cooperation with Büro Ö-quadrat; Ruhr West University of Applied Sciences
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Concept for the communication of life-cycle costs to consumers (2011)
Rüdenauer, I.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

conCISE.net: Scientific network on sustainable development, innovation and competitiveness (2011)
Commissioned by: German Federal Ministry of Education and Research (BMBF)

Policies to promote sustainable consumption patterns in Europe (EUPOPP) (2011)
Quack, D.; Brohmann, B.; Fritsche, U.; Schönherr, N.; Wolff, F.; in cooperation with Baltic Environmental Forum (BEF); Eco Institut Barcelona (ECOI); Institute for Social-Ecological Research Ltd. (ISOE); Local Governments for Sustainability (ICLEI); National Consumer Research Center Finland (NCRC); University College London (UCL)
Commissioned by: European Commission, DG Research and Innovation

Beyond consumption restraint: Perspectives for climate compatible consumption. Contribution of the Platform for Climate Compatible Consumption Germany (2011)
Gensch, C.; Schmied, M.; in cooperation with Potsdam Institute for Climate Impact Research (PIK); THEMA1 GmbH
Commissioned by: Oeko-Institut e.V.

Consumer's savings potential of CO2 emissions (2010)
Commissioned by: Federation of German Consumer Organisations (vzbv)

2.2. Ecodesign / Energy Labelling

Support in the preparatory work for ecodesign and energy labelling measures including tyres labelling - Consumer NGOs: Stakeholder representation (in progress)
Graulich, K.; Gröger, J.; Prakash, S.; Prieß, R.; Quack, D.; Rüdenauer, I.; in cooperation with The European Consumer Organisation (BEUC)
Commissioned by: European Commission, DG Energy
Scientific monitoring of the implementation of the Ecodesign Directive and Energy Labelling Regulation - 4th work programme  *(in progress)*
Graulich, K.; Gröger, J.; Prieß, R.; Quack, D.; Rüdenauer, I.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM); Ökopol – Institute for Environmental Strategies GmbH
*Commissioned by: German Environment Agency (UBA)*

ANTI-Circumvention of Standards for better market Surveillance (ANTICSS)  *(2021)*
See also: www.anti-circumvention.eu
Graulich, K.; Rüdenauer, I.; Stratmann, B.
*Funded by: European Climate, Infrastructure and Environment Executive Agency*

Scientific investigation to increase product-related energy efficiency  *(2021)*
*Commissioned by: Federal Ministry for Economic Affairs and Energy (BMWi)*

Preparatory study for the Ecodesign and Energy Labelling Working Plan 2020-2024  *(2021)*
Graulich, K.; Fischer, C.; in cooperation with Viegand Maagøe A/S
*Commissioned by: European Commission, DG for Internal Market, Industry, Entrepreneurship and SMEs*

Support in the preparatory work for ecodesign and energy labelling measures including tyres labelling and Energy Star labelling programme from: Lot 1: Consumer NGOs: stakeholder representation  *(2019)*
*Commissioned by: European Commission, DG Energy*

Scientific monitoring of the implementation of the ecodesign directive and the energy labelling directive - 3rd work programme  *(2019)*
Graulich, K.; Baron, Y.; Gröger, J.; Prieß, R.; Schleicher, T.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM); Ökopol – Institute for Environmental Strategies GmbH
*Commissioned by: German Environment Agency (UBA)*

Consumer survey – Utilization of programs on the occasion of new policy options to improve the eco-design and energy labelling of washing machines  *(2017)*
Graulich, K.; in cooperation with University of Bonn
*Commissioned by: Federal Office for Economic Affairs and Export Control*
Support in the preparatory work for ecodesign and energy labelling measures from consumers and environmental NGOs, Lot 1: Consumers: Stakeholder representation (2017)
Brommer, E.; Baron, Y.; Fischer, C.; Graulich, K.; Gröger, J.; Prakash, S.; Quack, D.; Rüdenauer, I.; Schleicher, T.; in cooperation with The European Consumer Organisation (BEUC)
Commissioned by: European Commission, DG Energy

Scientific monitoring of the implementation of the ecodesign directive and the energy labelling directive - Work programme for 2012 and beyond (2016)
Commissioned by: German Environment Agency (UBA)

Quack, D.; Bleher, D.; Blepp, M.; Stratmann, B.; in cooperation with Institute for Energy and Environmental Research (ifeu); Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)

Fischer, C.; Brommer, E.; Gensch, C.; Graulich, K.; Gröger, J.; Manhart, A.; Prieß, R.; Schleicher, T.; in cooperation with BIO Intelligence Service; ERA Technology Ltd.
Commissioned by: European Commission, DG Enterprise and Industry

Fischer, C.; Diesner, M.; Graulich, K.; Quack, D.; in cooperation with ECOFYS
Commissioned by: European Commission, DG Energy

Technical assistance to the stakeholder representation of consumer organisations in preparatory work for implementing measures - Lot C (2013)
Commissioned by: European Commission, DG Energy

Common appliance policy - all for one, one for all - energy labels (ComeOn Labels) (2013)
See also: www.come-on-labels.eu
Fischer, C.; Brommer, E.; Rüdenauer, I.; Teufel, J.; in cooperation with SEVEEn the energy efficiency centre
Commissioned by: Executive Agency for Competitiveness and Innovation
Energy efficiency labelling and labelling systems (2011)
Fischer, C.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Preparatory studies for eco-design requirements of EuPs (II) and on stakeholder representation - Lot C: consumers' representation (2010)
Commissioned by: European Commission, DG Energy

2.3. Eco Labelling

Further development of the Blue Angel eco-label for software (in progress)
Gröger, J.; Behrens, F.; Liu, R.; in cooperation with Institut für Technik und Journalismus e.V.; Julius-Maximilians-Universität Würzburg (JMU); Trier University of Applied Sciences
Commissioned by: German Environment Agency (UBA)

Substance requirements in the award criteria of the Blue Angel eco-label - development of a guideline (in progress)
Bunke, D.; Moch, K.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
Commissioned by: German Environment Agency (UBA)

Development and revision of criteria for the Blue Angel for textiles (in progress)
Commissioned by: German Environment Agency (UBA)

Extending the integration of social aspects in the ecolabel Blue Angel (2021)
Prakash, S.; Gailhofer, P.; Hilbert, I.; Schleicher, T.; in cooperation with Institute for Ecological Economy Research (IÖW); Südwind - Institut für Ökonomie und Ökumene; Verbraucherinitiative e.V.
Commissioned by: German Environment Agency (UBA)

40 years of Blue Angel – refinement of the existing product range (2021)
Gröger, J.; Behrens, F.; Köhler, A.; Liu, R.; Löw, C.; Moch, K.; Prakash, S.; Quack, D.; Rüdenauer, I.; Schleicher, T.; Stratmann, B.; in cooperation with BertramSturm Design; Carmao GmbH; Trier University of Applied Sciences
Commissioned by: German Environment Agency (UBA)
Market investigation as a preliminary study for a revision of the eco-label DE-UZ 153
Technically dried wood chips / wood pellets (2021)
Quack, D.; Stuber-Rousselle, K.
Commissioned by: German Environment Agency (UBA)

Prakash, S.; Hilbert, I.; Manhart, A.; Rüdenauer, I.; in cooperation with Bocconi University Milano
Commissioned by: German Environment Agency (UBA)

Research on the acquisition of new label holders for existing eco-labels (2020)
Rüdenauer, I.; Gröger, J.; Moch, K.; Stratmann, B.
Commissioned by: RAL - Gütegemeinschaft Rückproduktion von Kühlgeräten e.V.

Development and testing of a concept for introducing independent product controls on the market for the Blue Angel eco-label (2020)
Graulich, K.; Blepp, M.; Brommer, E.; Fischer, C.; Stratmann, B.; in cooperation with TÜV Nord AG
Commissioned by: German Environment Agency (UBA)

Identification of elements for a future "Strategy for the EU Ecolabel" (2020)
Prakash, S.; Prieß, R.; Quack, D.; Seidl, R.; in cooperation with Sant'Anna School of Advanced Studies - Pisa
Commissioned by: European Commission, DG Environment

Further development of the Blue Angel program through new eco-labels and revision of existing ones in innovation-oriented product groups (2020)
Commissioned by: German Environment Agency (UBA)

Revision and further development of the environmental criteria in the clothing and textiles product group (2018)
Teufel, J.; Hilbert, I.; Moch, K.
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

The Blue Angel - a national label with international impact. Award criteria for air conditioning units and international harmonization work (2018)
Schleicher, T.; Gröger, J.; Liu, R.; in cooperation with Heat GmbH
Commissioned by: German Environment Agency (UBA)
Implementation of sustainability criteria for the material use of biomass under the Blue Angel (2019)
*Commissioned by: German Environment Agency (UBA)*

Promoting Sustainable Consumption and Production (SCP) for a Low-Carbon Economy in ASEAN (2018)
Prakash, S.; Antony, F.; Rüdenauer, I.; Schleicher, T.
*Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)*

Evaluation of sustainability standards in the product groups leather, textiles, detergents and cleaning agents (2017)
Moch, K.; Blepp, M.; Teufel, J.; in cooperation with Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
*Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)*

Further development of the Blue Angel program through new eco-labels and revision of the existing ones (2017)
Gröger, J.; Brommer, E.; Graulich, K.; Schleicher, T.; Stratmann, B.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
*Commissioned by: German Environment Agency (UBA)*

Blue Angel for thermal insulation composite systems - Further development of the ecological criteria for the promotion of increased use of biocide-free plasters and coatings (2017)
Blepp, M.; in cooperation with Consultancy for integrated solutions (BiPRO)
*Commissioned by: German Environment Agency (UBA)*

Development of assessment criteria and collection of data for the evaluation of sustainability standards (2016)
*Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)*

Product Carbon Footprint: Options for methodological integration into an existing type 1 eco-label (Blue Angel) with special emphasis on communication aspects and on monitoring of the standardization process (2015)
Gensch, C.; Liu, R.; Prieß, R.; Stratmann, B.; Teufel, J.
*Commissioned by: German Environment Agency (UBA)*
Sustainable Consumption and Production for Low Carbon Economy - Low Emission Public Procurement and Eco-Labelling (SCP4LCE) - Advisory Services on Eco-Labelling in Thailand and the ASEAN-region (2015)
Prakash, S.; Schleicher, T.
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Technical support for the revision of the European Ecolabel criteria: Televisions (2014)
Graulich, K.; Bunke, D.; Groß, R.; Liu, R.; Manhart, A.; Prakash, S.
Commissioned by: European Commission, DG Research and Innovation

Technical support for the revision of the European Ecolabel and Green Public Procurement (GPP) criteria: Desktop and notebook computers (2014)
Commissioned by: European Commission, DG Research and Innovation

Expert advice related to the project "Quality check of sustainability standards" (2014)
Teufel, J.; Fischer, C.; Stratmann, B.; in cooperation with Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)

Strengthening the international use of the eco-label, the Blue Angel (2014)
Prakash, S.; Gröger, J.; in cooperation with Brands GmbH; lichtl Ethics & Brands
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Analysis of Migros’ eco standards for textiles (2014)
Teufel, J.; Bunke, D.; Hünecke, K.; Stratmann, B.
Commissioned by: World Wide Fund For Nature International (WWF International)

Low-emission public procurement and eco-labelling - Support of a GIZ project in the detailed design of the regional workshop "Green Public Procurement and Eco-Labelling" in Thailand (2013)
Manhart, A.
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Revision and further development of the 'Blue Angel' climate label: Expertises on the revision of existing award criteria for eco-labels and on the update of the Top 100 project on climate-relevant products (2014)
Gröger, J.; Gattermann, M.; Prakash, S.; Quack, D.; Schleicher, T.; Stratmann, B.
Commissioned by: German Environment Agency (UBA)
Advisory Services on Eco-Labelling in Thailand and the ASEAN-region (2013)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Indicators and criteria of an overarching sustainability seal (2013)
Teufel, J.; Fischer, C.; Manhart, A.
Commissioned by: Office of Technology Assessment at the German Bundestag (TAB)

Top 100: Feasibility study: climate label for intermodal transportation systems - Developing the award criteria for a climate label (2012)
Gröger, J.; Bleher, D.; Havers, K.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100 - Ecolabel for climate-relevant products (2012)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Bicycles - Developing the award criteria for a climate label (2012)
Gröger, J.; Mottschall, M.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Comparison of the European ecolabel for textile products and the German eco-label 'Blue Angel' for textiles with the bluesign®-Standard (2012)
Teufel, J.; Blepp, M.; Groß, R.; Moch, K.; Quack, D.
Commissioned by: W.L. GORE & Associates GmbH

Green labels - Assessment and critical review of labelling schemes in the field of building and construction (2011)
Gröger, J.; Quack, D.
Commissioned by: European Insulation Manufacturers Association (EURIMA)
Certification of low-carbon product groups in China and Germany (2011)
Grießhammer, R.; Liu, R.; Prakash, S.; Zangl, S.; in cooperation with China Environmental United Certification Center (CEC)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Requirements on Consumer Information about Product Carbon Footprint (2010)
Quack, D.; Teufel, J.
Commissioned by: ANEC

2.4. Green procurement

Development of methodological principles and working aids for climate protection and circular economy aspects in public procurement practice (in progress)
Commissioned by: German Environment Agency (UBA)

Rethinking economic efficiency: Investment decisions in the service of environmental protection (2021)
Commissioned by: German Environment Agency (UBA)

Biodiversity criteria in procurement II – Further development and practice-based substantiation of biodiversity criteria in selected product groups of public procurement on the part of the German federal government (2020)
Teufel, J.; Hermann, A.; Hilbert, I.; Stratmann, B.; in cooperation with Dageförde Öffentliches Wirtschaftsrecht Rechtsanwaltsgesellschaft mbH; Institute for Ecological Economy Research (IÖW)
Commissioned by: Federal Agency for Nature Conservation (BfN)

Training courses in the context of the training initiative Green Public Procurement (GPP) Baden-Württemberg (2019)
Rüdenauer, I.; Gröger, J.; Jacobs, J.; Köhler, A.; Teufel, J.
Commissioned by: Landesanstalt für Umwelt Baden-Württemberg (LUBW)

Updating of six product guidelines for sustainable procurement (2019)
Quack, D.; Gröger, J.; Jacobs, J.; Rüdenauer, I.; Seidl, R.; Teufel, J.
Commissioned by: Landesanstalt für Umwelt Baden-Württemberg (LUBW)
Elaboration of scientific principles to promote the inclusion of environmental criteria in the award of contracts by public authorities (2019)
Gröger, J.; Brommer, E.; Hermann, A.; Moch, K.; Stratmann, B.; in cooperation with Institute for Ecological Economy Research (IÖW)
Commissioned by: German Environment Agency (UBA)

Interreg Baltic Sea seed-money project #S008: Green Public Procurement of Pharmaceuticals in the Baltic Sea Region (GrePPP) (2018)
Moch, K.; in cooperation with Stockholm International Water Institute (SIWI)
Commissioned by: Interreg Baltic Sea Region

Adaptation and update of the administrative regulation "Procurement and Environment - VwVBU" (2018)
Rüdenauer, I.; Brommer, E.; Gröger, J.; Hermann, A.; Stratmann, B.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Biodiversity criteria in public procurement and in the building sector - feasibility study & action plans (2017)
Teufel, J.; Hermann, A.; in cooperation with Bodensee Stiftung; Global Nature Fund; Institute for Ecological Economy Research (IÖW)
Commissioned by: Federal Agency for Nature Conservation (BfN)

Scientific monitoring of the relevant processes in green public procurement (2016)
Gröger, J.; Blepp, M.; Brommer, E.; Hermann, A.; Stratmann, B.; Teufel, J.; in cooperation with Institute for Ecological Economy Research (IÖW)
Commissioned by: German Environment Agency (UBA)

Continuation of the former training series as part of the implementation of the administrative regulation on "public procurement and environment" (2015)
Brommer, E.; Blepp, M.; Gröger, J.; Stratmann, B.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Gröger, J.; Prieß, R.; Stratmann, B.; Teufel, J.
Commissioned by: Landesanstalt für Umwelt Baden-Württemberg (LUBW)

Update on the label-review "Evaluation of selected product groups according to environmental and social criteria" (2015)
Brommer, E.; Stratmann, B.
Commissioned by: Landschaftsverband Rheinland (LVR)
Investigation of the effects of GPP in terms of environmental relief, and of costs of relevant products as well as of services and construction works in the framework of sustainable procurement as compared to a conventional procurement in the Land of Berlin (2015)
Gröger, J.; Brommer, E.; Stratmann, B.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Evaluating the implementation of the administrative regulation on green public procurement, and developing measures to optimise procurement implementation (2015)
Gröger, J.; Brommer, E.; Stratmann, B.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Revision of the LUBW brochure "More environment for the same amount of money" on the sustainable procurement of products and services (2014)
Gröger, J.; Brommer, E.; Diesner, M.; Hermann, A.; Stratmann, B.
Commissioned by: Landesanstalt für Umwelt Baden-Württemberg (LUBW)

Preparation of a performance sheet and a life-cycle calculation tool for the public procurement of data centres (2013)
Gröger, J.; Brommer, E.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Revision of the environmental requirements contained in the administrative regulation on green public procurement - VwVBU, annex 1 (performance data sheets), section: indoor lighting (2013)
Schleicher, T.; Gattermann, M.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Preparation of a data sheet for the sustainable public procurement of textiles (2013)
Teufel, J.; Stratmann, B.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Preparation of environmental protection requirements for the public procurement of passenger lifts (2013)
Blepp, M.
Commissioned by: Senate Department for Urban Development and the Environment Berlin

Compilation of environmental and social criteria as regards tendering of postal services (2012)
Quack, D.; Graulich, K.; Stratmann, B.
Commissioned by: Landschaftsverband Rheinland (LVR)
Further development of green procurement with regard to the European Union’s Action Plan for sustainable consumption and production (SCP) and sustainable industrial policy (SIP) and its Communication on Green Public Procurement (2012)
Gröger, J.; Acker, H.; Brommer, E.; Teufel, J.; in cooperation with Institute for Ecological Economy Research (IÖW)
Commissioned by: German Environment Agency (UBA)

Update on the label-review “Evaluation of selected product groups according to environmental and social criteria” (2012)
Manhart, A.; Brommer, E.
Commissioned by: Landschaftsverband Rheinland (LVR)

Early market creation of innovative highly energy-efficient technologies through smarter engagement with the market in the pre-procurement phase (SMART-SPP) (2011)
Gröger, J.; Möller, M.; Seebach, D.; in cooperation with Eco Institut Barcelona (ECOI); Local Governments for Sustainability (ICLEI)
Commissioned by: Intelligent Energy – Europe programme

Evaluation of selected product groups according to environmental and social criteria. Update of the expertise of December 2009 (2011)
Manhart, A.; Gattermann, M.; Stratmann, B.; Teufel, J.
Commissioned by: Landschaftsverband Rheinland (LVR)

2.5. Consumer information

Quack, D.; Jacobs, J.; in cooperation with Büro Ö-quadrat
Commissioned by: Utopia AG

Quack, D.; Jacobs, J.; in cooperation with Büro Ö-quadrat
Commissioned by: Saturn Management Corporation

Identification and development of a strategy for the long-term continuation of the EcoTopTen information platform for top ecological top products www.ecotopten (2019)
Quack, D.; Gröger, J.; Jacobs, J.; Seidl, R.; Stratmann, B.
Commissioned by: Stiftung Zukunftserbe
Quack, D.; Jacobs, J.; in cooperation with Utopia AG
Commissioned by: Saturn Management Corporation

Quack, D.; Jacobs, J.; in cooperation with Utopia AG
Commissioned by: Saturn Management Corporation

Enabling consumer action towards top energy-efficient products (‘TOPTEN ACT’) (2018)
Quack, D.; Brommer, E.; Jacobs, J.; in cooperation with The French Agency for Ecological Transition (ADEME)
Commissioned by: Executive Agency for Small and Medium-sized Enterprises (EASME)

The EcoTopTen product award - focus on Energy Saving (SEK) (2018)
Quack, D.; Hilbert, I.; Jacobs, J.; Rüdenauer, I.; Seidl, R.; Stratmann, B.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Quack, D.; Jacobs, J.; in cooperation with Utopia AG
Commissioned by: Saturn Management Corporation

Quack, D.; Jacobs, J.; in cooperation with Utopia AG
Commissioned by: Saturn Management Corporation

Quack, D.; Jacobs, J.; in cooperation with Utopia AG
Commissioned by: Saturn Management Corporation

Maximising TopTen Communication on Top Runner Products (2014)
See also: www.topten.eu
Quack, D.; Blepp, M.; Brommer, E.; Gattermann, M.; Stratmann, B.; in cooperation with The French Agency for Ecological Transition (ADEME)
Commissioned by: Intelligent Energy – Europe programme
EcoTopTen 2.0 - Promoting energy efficient products and energy savings through market surveys, social media activities and campaigns (2014)
See also: www.ecotopen.de
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Consulting services as part of the energy saving initiative phase IV for "Work package 3: conceptual design and implementation of the "current mirror" (2015)
Quack, D.; in cooperation with co2online gGmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Digital energy savings calculator (2014)
Quack, D.; Brommer, E.
Commissioned by: Media-Saturn-Holding GmbH

Fischer, C.; Quack, D.; in cooperation with Studio Good GbR; Zeitbild Verlag und Agentur für Kommunikation GmbH
Commissioned by: German Environment Agency (UBA)

Utopia Product 2013. Environmentally sound products available at Saturn stores: Current EcoTopTen product recommendations, guidebook for the point of sale and guidelines for the sales staff (2014)
Quack, D.; Brommer, E.; Manhart, A.; Schleicher, T.; in cooperation with Utopia AG
Commissioned by: Saturn Management Corporation

Power-saving initiative by the German Federal Ministry of the Environment, Nature Conservation and Reactor Safety (BMU), Part II: "1st pillar of the BMU Power Saving Initiative: integrated web-based offering" (2013)
Quack, D.; Gattermann, M.; Griebhammer, R.; in cooperation with co2online gGmbH; KNSK Werbeagentur GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
**Smart products fostering green behaviour** (2012)
Brommer, E.
*Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)*

**Utopia Produkt 2012. Developing criteria and providing product ranking lists on the basis of EcoTopTen and Top100** (2012)
Quack, D.; Blepp, M.; Brommer, E.; Gattermann, M.; in cooperation with Utopia AG
*Commissioned by: Saturn Management Corporation*

**Extension and strengthening of the European Topten Initiatives and of the market for innovative and efficient products** (2012)
Quack, D.; Gensch, C.; Griesshammer, R.; Rüdenauer, I.; Stratmann, B.; Zangl, S.; in cooperation with The French Agency for Ecological Transition (ADEME)
*Commissioned by: Intelligent Energy – Europe programme*

**Energy efficiency - now! Campaign for households and companies. EcoTopTen market surveys** (2011)
Quack, D.; Gensch, C.; Möller, M.; Prakash, S.; Rüdenauer, I.; Teufel, J.; Zangl, S.
*Commissioned by: German Federal Environmental Foundation (DBU)*

### 2.6. Sustainable consumption in specific sectors

#### 2.6.1. Household appliances

**Life cycle assessment analysis of design variants for automatic washing machines** (2021)
Rüdenauer, I.; Gensch, C.; Liu, R.
*Commissioned by: Miele &Cie. KG*

**Technical support for the revision of ecodesign and energy/resource label implementing measures for the product group: Household dishwashers** (2016)
Graulich, K.; Rüdenauer, I.; in cooperation with University of Bonn
*Commissioned by: European Commission, DG Research and Innovation*

**Technical support for the revision of ecodesign and energy/resource label implementing measures for the product group: Household washing machines / washer-dryers** (2016)
Graulich, K.; Rüdenauer, I.; in cooperation with University of Bonn
*Commissioned by: European Commission, DG Research and Innovation*
Influence of the service life of products in terms of their environmental impact: Establishing an information base and developing policies against "obsolescence" (2016)
Prakash, S.; Antony, F.; Dehoust, G.; Gensch, C.; Graulich, K.; Gsell, M.; Hilbert, I.; Köhler, A.; Schleicher, T.; in cooperation with University of Bonn
Commissioned by: German Environment Agency (UBA)

Assessment of the recyclability of a flat screen TV and a fridge-freezer (2016)
Antony, F.
Commissioned by: Vaillant Deutschland GmbH & Co. KG

Savings potential of Miele washing machines with "PowerWash 2.0" technology as compared to equivalent appliances of competitors using the traditional technology (2016)
Rüdenauer, I.; Gensch, C.
Commissioned by: Miele &Cie. KG

Savings potentials thanks to the automatic TwinDos dosage in washing machines (2013)
Blepp, M.; Gensch, C.
Commissioned by: Miele &Cie. KG

Top 100: PROSA Accumulator-operated devices - Developing the award criteria for a climate label (2013)
Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Bread machines - Developing the award criteria for a climate label (2013)
Stratmann, B.; Quack, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Electric cookers and stoves for household use - Developing the award criteria for a climate label (2013)
Quack, D.; Bleher, D.; Mottschall, M.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Dishwashers for household use - Developing the award criteria for a climate label (2013)
Gensch, C.; Quack, D.; Stratmann, B.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Top 100: PROSA Steam irons - Developing the award criteria for a climate label  
Brommer, E.; Gröger, J.; Manhart, A.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Vacuum cleaners for household use - Developing the award criteria for a climate label  
Blepp, M.; Quack, D.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Steamers for household use - Developing the award criteria for a climate label  
Brommer, E.; Manhart, A.; Quack, D.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Drip and pod coffee machines - Developing the award criteria for a climate label  
Stratmann, B.; Quack, D.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Solar-operating products - Developing the award criteria for a climate label  
Gröger, J.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Hair care equipment - Developing the award criteria for a climate label  
Manhart, A.; Quack, D.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Self-service laundry - Developing the award criteria for a climate label  
Blepp, M.; Groß, R.; Quack, D.  
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Top 100: PROSA Toasters - Developing the award criteria for a climate label  (2011)
Prakash, S.; Gattermann, M.; Quack, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Microwave devices for household use - Developing the award criteria for a climate label  (2011)
Quack, D.; Mottschall, M.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Cooker hoods for household use - Developing the award criteria for a climate label  (2010)
Gröger, J.; Mottschall, M.; Schüler, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Electric baking ovens for household use - Developing the award criteria for a climate label  (2010)
Quack, D.; Bleher, D.; Mottschall, M.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Work on preparatory studies for eco-design requirements of EuP(s). Lot 24 - Professional washing machines, dryers and dishwashers. Part: Washing machines and dryers  (2011)
Graulich, K.; Blepp, M.; Brommer, E.; Gensch, C.; Rüdenauer, I.; in cooperation with Büro Ö-kraquat
Commissioned by: European Commission, DG Energy

Work on preparatory studies for eco-design requirements of EuP(s). Lot 24 - Professional washing machines, dryers and dishwashers. Part: Dishwashers  (2011)
Rüdenauer, I.; Blepp, M.; Brommer, E.; Gensch, C.; Graulich, K.
Commissioned by: European Commission, DG Energy

Savings potentials of washing machines with automatic dosing systems  (2010)
Gensch, C.; Liu, R.
Commissioned by: Robert Bosch GmbH

LCA of coffee brewing: A comparative analysis of the potential environmental impacts of different ways of coffee brewing  (2010)
Stratmann, B.; Liu, R.; Quack, D.
Commissioned by: Bodum GmbH
2.6.2. Information & communication technologies, consumer electronics

Further development and consolidation of the Blue Angel for energy-efficient data centre operation and climate-friendly co-location data centres as well as the management of advisory services (in progress)
Gröger, J.; Behrens, F.; Liu, R.; in cooperation with Data Center Excellence GmbH
Commissioned by: German Environment Agency (UBA)

Data collection on the environmental impact of cloud computing (eco-cloud computing) on the basis of a life-cycle approach (2021)
Gröger, J.; Liu, R. in collaboration with Stobbe, L.; Druschke, J.; Richter, N.; Sedlak, R.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM); tippingpoints – agency for sustainable communication GmbH
Commissioned by: German Environment Agency (UBA)

Analysis of the software-based influence on a shortened useful life of products (2021)
Gröger, J.; Behrens, F.; Gsell, M.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM); Institut für Sozialinnovation Consulting (ISIconsult UG); Technische Universität Berlin
Commissioned by: German Environment Agency (UBA)

Greening Cloud Computing and Electronic Communications Services and Networks: Towards Climate Neutrality by 2050 (2021)
Gröger, J.; Behrens, F.; Gensch, C.; Köhler, A.; Liu, R.; Quack, D.; in cooperation with Visionary Analytics, UAB
Commissioned by: Directorate-General for Communications Networks, Content and Technology (DG CONNECT)

Germany on the way to climate neutrality: What opportunities and risks result from digitisation (2021)
Gensch, C.; Braungardt, S.; Dolega, P.; Gailhofer, P.; Gröger, J.; Köhler, A.; Sutter, J.; in cooperation with Institute for Futures Studies and Technology Assessment (IZT)
Commissioned by: KiW Group

Data collection on the environmental impact of cloud computing (eco-cloud computing) on the basis of a life-cycle approach (2021)
Gröger, J.; Liu, R.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM); tippingpoints – agency for sustainable communication GmbH
Commissioned by: German Environment Agency (UBA)

Research and compilation of data for a "Digital Ecological Footprint" (2020)
Gröger, J.
Commissioned by: BUND e.V.
Revision of the EU Green Public Procurement (GPP) Criteria for Computers and Monitors (and extension to Smartphones) (2020)
Graulich, K.; Gröger, J.; Köhler, A.; Moch, K.; Quack, D.
Commissioned by: European Commission, DG Research and Innovation

Smart Home - Energy consumption and savings potential of intelligent devices (2019)
Quack, D.; Gröger, J.; Liu, R.
Commissioned by: Verbraucherzentrale Nordrhein-Westfalen (VZ-NRW)

See also: www.umweltbundesamt.de/publikationen/computer-am-arbeitsplatz-wirtschaftlichkeit
Liu, R.; Gröger, J.
Commissioned by: German Environment Agency (UBA)

Preparation of a brief expert report on “Energy and resource consumption resulting from digitalisation” (2018)
Gröger, J.; Gensch, C.; Köhler, A.; Liu, R.
Commissioned by: German Advisory Council on Global Change (WBGU)

Systematic description of the EMF emissions of electrical equipment and installations (2017)
Küppers, C.; Gröger, J.; Rüdenauer, I.
Commissioned by: Office of Technology Assessment at the German Bundestag (TAB)

Key data and indicators for the assessment of the efficiency of resource use in data centres and for testing the practical feasibility (2017)
Gröger, J.; Köhler, A.; Liu, R.; in cooperation with Business Engineering Institute St.Gallen (BEI)
Commissioned by: German Environment Agency (UBA)

Computers, Internet & Co. – electronic consumer information on the information and communication technologies (2017)
Gröger, J.; Brommer, E.; in cooperation with tippingpoints – agency for sustainable communication GmbH
Commissioned by: German Environment Agency (UBA)

Development and application of a valuation basis for resource-efficient software, taking into account the existing methodology (2018)
Gröger, J.; Köhler, A.; in cooperation with Trier University of Applied Sciences; University of Zurich (UZH)
Commissioned by: German Environment Agency (UBA)
**Green IT savings potentials** - Evaluation of green IT measures in terms of their specific energy and resource efficiency potentials (2017)
Köhler, A.; Brommer, E.; Gröger, J.; Moritz, S.
Commissioned by: Ministry for the Environment, Climate and Energy Baden-Württemberg

**Green IT inventory Baden-Württemberg** - drafting of the inventories of information and communication equipment in institutions of the federal state of Baden-Württemberg and derivation of IT-related energy consumption (2017)
Gröger, J.; in cooperation with proRZ Rechenzentrumsbau GmbH
Commissioned by: Ministry for the Environment, Climate and Energy Baden-Württemberg

**Sustainable resource-saving infrastructures** - environmentally sound, reliable and resilient to demographic change (2017)
Mottschall, M.; Gröger, J.; in cooperation with German Institute of Urban Affairs (Difu)
Commissioned by: German Environment Agency (UBA)

**Ecological and economical aspects in a comparison of desktop computers intended to be used by public authorities, under consideration of the user behavior** (2016)
Prakash, S.; Antony, F.; Graulich, K.; Köhler, A.; Liu, R.; in cooperation with Technische Universität Berlin
Commissioned by: German Environment Agency (UBA)

Möller, M.; Baron, Y.; Köhler, A.; Manhart, A.; Moch, K.; Prakash, S.; Prieß, R.
Commissioned by: European Commission, DG Research and Innovation

**Expert advice on the product group IT** (2015)
Graulich, K.; Prakash, S.; Teufel, J.; in cooperation with Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)

**Sustainable software - expert talk and documentation** (2015)
Gröger, J.; Brommer, E.; Prakash, S.; Stratmann, B.
Commissioned by: German Environment Agency (UBA)
Estimating the potential of consumer electronics devices in terms of energy and resource efficiency (2014)
Prakash, S.; Gröger, J.; in cooperation with SINUS Markt- und Sozialforschung GmbH; TU Berlin (Institute for Landscape Architecture and Environmental Planning)
Commissioned by: German Environment Agency (UBA)

Study on the practical application of the new framework methodology for measuring the environmental impact of ICT - cost/benefit analysis (SMART 2012/0064) (2014)
Prakash, S.; Bunke, D.; Groß, R.; Liu, R.; Manhart, A.; in cooperation with TU Berlin (Institute for Landscape Architecture and Environmental Planning)
Commissioned by: Directorate-General for Communications Networks, Content and Technology (DG CONNECT)

Top 100: PROSA Small network attached storage (NAS) - Developing the award criteria for a climate label (2013)
Liu, R.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Multiple sockets and socket adapters with automatic switch off - Developing the award criteria for a climate label (2013)
Prakash, S.; Brommer, E.; Grießhammer, R.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Uninterruptible power supplies for emergency backup generators - Developing the award criteria for a climate label (2013)
Gröger, J.; in cooperation with Institute for Energy and Environmental Research (ifeu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Rechargeable batteries in standard sizes - Developing the award criteria for a climate label (2012)
Gröger, J.; in cooperation with Institute for Energy and Environmental Research (ifeu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Smartphones - Developing the award criteria for a climate label (2012)
Manhart, A.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Top 100: PROSA Green data centres - Developing the award criteria for a climate label (2012)
Prakash, S.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Telephone systems - Developing the award criteria for a climate label (2012)
Gröger, J.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA eBook Reader - Developing the award criteria for a climate label (2011)
Manhart, A.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Short study: Rechargeable lithium batteries for use in portable devices - Developing the award criteria for a climate label (2011)
Quack, D.; Schüler, D.; in cooperation with Institute for Energy and Environmental Research (ifeu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Personal desktop computers - Developing the award criteria for a climate label (2011)
Prakash, S.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Broadband routers - Developing the award criteria for a climate label (2011)
Gröger, J.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA External hard discs - Developing the award criteria for a climate label (2011)
Liu, R.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Top 100: PROSA Interactive Whiteboards - Developing the award criteria for a climate label (2011)
Gröger, J.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Computer monitors - Developing the award criteria for a climate label (2011)
Prakash, S.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Thin clients - Developing the award criteria for a climate label (2010)
Manhart, A.; Brommer, E.; Gröger, J.; Prakash, S.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA VoIP phones - Developing the award criteria for a climate label (2010)
Gröger, J.; Quack, D.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Mobile computers - Developing the award criteria for a climate label (2010)
Prakash, S.; Brommer, E.; Gröger, J.; Manhart, A.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Compact hi-fi systems - Developing the award criteria for a climate label (2010)
Prakash, S.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Nettops - Developing the award criteria for a climate label (2010)
Prakash, S.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Solar rechargers - Developing the award criteria for a climate label (2010)
Gröger, J.; in cooperation with Institute for Energy and Environmental Research (ifeu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Towards an overall measurement methodology of the carbon and energy footprints of the ICT sector (2012)
Prakash, S.; Gensch, C.; Liu, R.; in cooperation with BIO Intelligence Service; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: Directorate-General for Communications Networks, Content and Technology (DG CONNECT)

Presenting the results of UBA-commissioned ICT-studies to the International Expert Community (2012)
Prakash, S.; in cooperation with Institute for Futures Studies and Technology Assessment (IZT)
Commissioned by: German Environment Agency (UBA)

PCF-evaluation of a speedport router in the rentable Telekom terminal service pack (Telekom leasing model): Comparison of PCF and primary energy input of the speedport router in leasing and purchase models (2011)
Prakash, S.; Liu, R.; Manhart, A.; Quack, D.
Commissioned by: Deutsche Telekom AG

Data acquisition in the supply chain of products in the field of information and communication technology (ICT) (2011)
Prakash, S.; Gensch, C.; Liu, R.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: German Environment Agency (UBA)

Establishing a data base for the evaluation of ecological and economic effects of ICT products (2011)
Prakash, S.; Gensch, C.; Liu, R.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: German Environment Agency (UBA)

Sustainability Assessment of the Products and Services of Deutsche Telekom AG (2011)
Grießhammer, R.; Brunn, C.; Manhart, A.; Prakash, S.; Schmitt, K.
Commissioned by: Deutsche Telekom AG

Timely replacement of a notebook under consideration of environmental aspects - life-cycle analysis using the data basis of the EuP preparatory study, ProBas, and Ecoinvent (2011)
Prakash, S.; Liu, R.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: German Environment Agency (UBA)
Product Carbon Footprint of De-Mail compared with regular mail (2011)
Quack, D.; Brommer, E.
Commissioned by: Deutsche Telekom AG

2.6.3. Construction & buildings

Double dividend through electricity savings and reinvestment in renewable energies (in progress)
Graulich, K.; Seidl, R.; in cooperation with Büro Ö-quadrat; Elektrizitätswerke Schönau (EWS); Prof. Dr. Rainer Grießhammer
Commissioned by: Elektrizitätswerke Schönau (EWS)

Development of criteria and manufacturers' recommendations for a support programme on photovoltaik battery storage systems launched by EWS (Elektrizitätswerke Schönau) (2017)
Graulich, K.; Manhart, A.
Commissioned by: Elektrizitätswerke Schönau (EWS)

Identification of cost reduction potentials for passenger elevators (2017)
Blepp, M.; in cooperation with Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI)
Commissioned by: Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)

Climate protection and cogeneration: Current developments in the context of economic conditions and technological progress (2016)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Preparation of the study "PCF analysis of road surfaces containing recycled asphalt" for a critical review (2013)
Blepp, M.; Gensch, C.
Commissioned by: Storimpex AsphalTec GmbH

PCF analysis of road surfaces containing recycled asphalt (2013)
Blepp, M.; Gensch, C.; Marquardt, M.
Commissioned by: Storimpex AsphalTec GmbH
Top 100: PROSA Climate-friendly food retailing markets - Developing the award criteria for a climate label  (2013)
Quack, D.; Schleicher, T.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: Background report Energy savings performance contracting - Developing the award criteria for a climate label  (2013)
Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Hybrid heating unit - Developing the award criteria for a climate label  (2013)
Gröger, J.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Office lighting - Developing the award criteria for a climate label  (2013)
Schleicher, T.; Gröger, J.; Liu, R.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Home ventilation appliance with heat exchanger - Developing the award criteria for a climate label  (2013)
Gröger, J.; Schüler, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA sanitary fittings - Developing the award criteria for a climate label  (2013)
Quack, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Ventilating systems - Developing the award criteria for a climate label  (2013)
Gröger, J.; Schüler, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Top 100: PROSA Solar power modules - Developing the award criteria for a climate label  
(2013)
Gröger, J.; Fischer, C.; Gattermann, M.; Liu, R.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Statement on the public debate on energy saving lamps, for use in the training of 'energy saving advisors' in the large-scale German campaign "Energy Saving Check" ('Aktion Stromspar-Check')  
(2013)
Schleicher, T.
Commissioned by: Bundesverband der Energie- und Klimschutzagenturen Deutschlands e.V. (eaD)

Top 100: PROSA Daylighting systems - Developing the award criteria for a climate label  
(2012)
Gröger, J.; Dehoust, G.; in cooperation with Institut für Umweltinformatik (ifu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Photovoltaic inverters - Developing the award criteria for a climate label  
(2012)
Fischer, C.; Brommer, E.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Programmable room heating thermostats - Developing the award criteria for a climate label  
(2012)
Liu, R.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Light management systems for use in buildings - Developing the award criteria for a climate label  
(2012)
Stratmann, B.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Technically dried wood chips / wood pellets - Developing the award criteria for a climate label  
(2011)
Gröger, J.; in cooperation with Institute for Energy and Environmental Research (ifeu)
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
Top 100: PROSA Passenger elevators - Developing the award criteria for a climate label (2011)
Blepp, M.; Quack, D.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Energy and water saving shower heads - Developing the award criteria for a climate label (2011)
Quack, D.; Brommer, E.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Door phone and intercom systems - Developing the award criteria for a climate label (2011)
Stratmann, B.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: PROSA Power meters for household use - Developing the award criteria for a climate label (2010)
Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Top 100: Background report Isolating windows - Developing the award criteria for a climate label (2010)
Gröger, J.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Publications relating to sustainable consumption


3. Corporate sustainability

Holistic management of energy- and resource efficiency in companies (MERU) (in progress)
Wolff, F.; Gensch, C.; Gsell, M.; Kampffmeyer, N.; Prieß, R.; in cooperation with Alpensped; B.A.U.M. e.V.; DC-Datacenter-Group GmbH; Institute for Ecological Economy Research (IÖW); Leuphana Universität Lüneburg, Centre for Sustainability Management; Miele &Cie. KG
Funded by: German Federal Ministry of Education and Research (BMBF)
Utopia 2021: Particularly environmentally friendly products at Saturn: Current EcoTopTen product recommendations  
(ina progress)  
Quack, D.; in cooperation with Büro Ö-quadrat  
Commissioned by: Media-Saturn-Holding GmbH

Fostering sustainable digitalisation in small and medium enterprises (SME)  
(ina progress)  
Scherf, C.; Brunn, C.; Gensch, C.; Köhler, A.; in cooperation with Collaborating Centre on Sustainable Consumption and Production  
Commissioned by: Bundesnetzagentur

Scientific monitoring of 100 green productions as part of the sustainability initiative of the working group ‘Green Shooting’  
(ina progress)  
Gensch, C.; López, V.; Prieß, R.; Rüdenauer, I.  
Commissioned by: Green Shooting vertreten durch Medien- und Filmgesellschaft Baden-Württemberg

Climate-friendly production in the automotive industry  
(2021)  
Gensch, C.; Prieß, R.; Stuber-Rousselle, K.; in cooperation with Prof. Dr. Rainer Grießhammer

Environmental and human rights due diligence as a means to strengthen sustainable business conduct  
(2019)  
Scherf, C.; Gailhofer, P.; Hilbert, I.; Kampffmeyer, N.; Schleicher, T.; in cooperation with Geulen & Klinger Rechtsanwälte  
Commissioned by: German Environment Agency (UBA)

Empowering stakeholders to deliver highly energy efficient professional cold products (‘ProCold’)  
(2018)  
Commissioned by: Executive Agency for Small and Medium-sized Enterprises (EASME)

Implementation of the Sustainable Assessment Framework (SASF) in the global ICT industry  
(2018)  
Prakash, S.; Prieß, R.; in cooperation with Stakeholder Reporting GmbH  
Commissioned by: Global Enabling Sustainability Initiative (GeSI)

Environmental protection guards human rights! The global responsibility of German businesses. Donation project 2016  
(2018)  
Schleicher, T.; Gailhofer, P.; Kampffmeyer, N.; Scherf, C.; Westphal, I.  
Commissioned by: Oeko-Institut e.V.
Hipp Strategy Workshop 'Product Environmental Footprint (PEF)' (2017)
Antony, F.; Liu, R.; Prieß, R.
Commissioned by:

Continuation and updating of the advisory services provided in the “sustainability” project (2017)
Möller, M.; Rausch, L.
Commissioned by: MVV Energie AG

Consultation services in relation to decisions on propellants for PU foams (2017)
Blepp, M.; Antony, F.; Gensch, C.
Commissioned by: Liebherr-Hausgeräte Ochsenhausen GmbH

Strengthening ecological design as a quality criterion in enterprises (2017)
Commissioned by: German Environment Agency (UBA)

Wolff, F.; Brunn, C.; Heyen, D.; Klink, D.; Prakash, S.; Scherf, C.; Teufel, J.; in cooperation with Aalto University; BRAC; Center for Evaluation; Central European University; Copenhagen Business School; Ludwig Boltzmann Institute for Human Rights; Sokoine University of Agriculture, Tanzania; Sustainalytics; University of Nottingham
Commissioned by: European Commission, DG Research and Innovation

Relevance of the sustainability aspects in "Industry 4.0" (2016)
Prakash, S.
Commissioned by: Oeko-Institut e.V.

Technical support to the development of BEMPs in 4 EMAS priority sectors. Lot 1: Electric and electronic equipment manufacturing (2016)
Möller, M.; Baron, Y.
Commissioned by: European Commission, DG Research and Innovation

Prakash, S.; Manhart, A.; Prieß, R.; Schleicher, T.; in cooperation with Stakeholder Reporting GmbH
Commissioned by: Global Enabling Sustainability Initiative (GeSI)
As per February 2022

‘Plastics’ workshop for Waschbär (2015)
Prieß, R.; Blepp, M.
Commissioned by: Triaz Corporation (Waschbaer - the ecological mail order company)

Preparation of an environmental report for the German Environment Foundation (DBU) for the reference year 2013 (2015)
Antony, F.; Grießhammer, R.
Commissioned by: German Federal Environmental Foundation (DBU)

Gensch, C.; in cooperation with Martin-Luther-Universität Halle-Wittenberg
Commissioned by: German Federal Environmental Foundation (DBU)

The Utopia Changemaker Manifesto for SME - Improvement and Quantification of the Sustainability Performance and Communication of Enterprises (2015)
Grießhammer, R.; Brommer, E.; Brunn, C.
Commissioned by: German Federal Environmental Foundation (DBU)

Investigation of life time and replacement strategies of Miele household appliances (2014)
Gensch, C.; Blepp, M.; Schleicher, T.
Commissioned by: Miele &Cie. KG

Consulting service on the group-wide "Sustainability" project (2013)
Gensch, C.; Möller, M.; Rausch, L.; Timpe, C.
Commissioned by: MVV Energie AG

Comparative climate footprint of motorhome travel – today and tomorrow (2013)
Bleher, D.; Baron, Y.; Bunke, D.; Möller, M.
Commissioned by: Caravaning Industrie Verband e.V.

Supporting Stadtwerke Karlsruhe (SWK) in their transformation towards a climate friendly municipal utility company and towards climate neutral products (2013)
Möller, M.; Antony, F.; Bleher, D.; Bracker, J.; Marquardt, M.; Timpe, C.
Commissioned by: Stadtwerke Karlsruhe

Top 100: PROSA videoconference systems - Developing the award criteria for a climate label (2013)
Liu, R.; Gröger, J.
Commissioned by: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
PROSA ProClimate - product related climate strategies of companies (2010)
Grießhammer, R.; Bleher, D.; Gensch, C.; Groß, R.; Hochfeld, C.; Möller, M.; Quack, D.; Seum, S.; in cooperation with Chemical Industries Basel (CIBa); Henkel AG & Co. KGaA; Primondo GmbH; TAZ GmbH & Co. Medien KG
Commissioned by: German Federal Ministry of Education and Research (BMBF)

4. Sustainable Food Systems and Bio-Based Raw Materials

Sustainability impacts of alternative approaches for pesticide use. Assessment of multidimensional conflicts of objectives. (in progress)
Bunke, D.; Antony, F.; Möller, M.; Teufel, J.
Funded by: German Federal Environmental Foundation (DBU)

Sustainable management: socio-ecological transformation of the food system. Shaping the future by involving pioneers of change and economically relevant actors (in progress)
Quack, D.; Antony, F.; Brunn, C.; Hanke, G.; López, V.; Scherf, C.; Teufel, J.; in cooperation with Bund Ökologische Lebensmittelwirtschaft (BÖLW); Ecologic Institut gGmbH; e-fect dialog evaluation consulting eG
Commissioned by: German Environment Agency (UBA)

Examination of the resource efficiency of organic food based on the Product Environmental Footprint and integration into a sustainability strategy (in progress)
Antony, F.; Baron, Y.; Liu, R.; López, V.; Quack, D.; Stuber-Rousselle, K.; Teufel, J.; in cooperation with Association of organic food processors e.V.; Research Institute of Organic Agriculture (FiBL)
Funded by: Federal Office for Agriculture and Food

Ambitious GHG mitigation in the agricultural sector: Analysis of sustainable mitigation potential in selected countries (2021)
Siemons, A.; Antony, F.; Böttcher, H.; Fallasch, F.; Förster, H.; Liste, V.; Michalscheck, M.; Moosmann, L.; Scheffler, M.; Schneider, L.; Wiegmann, K.; Wisnser, N.; in cooperation with NewClimate – Institute for Climate Policy and Global Sustainability gGmbH
Commissioned by: German Environment Agency (UBA)

Climate-friendly production in the food industry: scientific assessment of climate-related statements such as "climate neutral" or "climate positive" on products (2021)
Quack, D.; Antony, F.; Liu, R.; Timpe, C.; in cooperation with 3f design
Commissioned by: Foodwatch e.V.
Design options for economically sustainable biodiversity-enhancing milk production systems in the model organic regions of Freiburg (2021)
Quack, D.; Antony, F.; López, V.; Teufel, J.; in cooperation with grünweg Projektmanagement & Beratung; Johann Wolfgang Goethe-University of Frankfurt, Institute for Rural Development Research (IfLS); Prof. Birgit Grahl
Funded by: German Federal Ministry of Education and Research (BMBF)

Visualization of hidden environmental costs of unsustainable agriculture under consideration of different milk production systems (2021)
Teufel, J.; Antony, F.; Liu, R.; in cooperation with INFRAS AG; Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. (KTBL)
Commissioned by: German Environment Agency (UBA)

Sustainable utilization of resources – requirements for a sustainable bio-based economy as part of the implementation of Agenda 2030/SDGs (2020)
Möller, M.; Hennenberg, K.; Hünecke, K.; López, V.; Schleicher, T.; Wolff, F.; in cooperation with Ecologic Institut gGmbH; University Mannheim; University of Sussex Institute of Development Studies (IDS)
Commissioned by: German Environment Agency (UBA)

Bioeconomic power aspects in global value chains – approaches, impacts and perspectives for certification and due diligence schemes for biogenic bulk raw materials (2021)
Schleicher, T.; Hilbert, I.; Manhart, A.; Prakash, S.; in cooperation with Albert-Ludwigs-Universität Freiburg; Pesticide Action Nexus Association, (PAN-Ethiopia); Réseau pour la Conservation et la Réhabilitation des Ecosystèmes Forestiers (Réseau CREF); University Padjadjaran
Funded by: German Federal Ministry of Education and Research (BMBF)

Systemic monitoring and modelling of the bioeconomy (in progress)
Böttcher, H.; Antony, F.; Benndorf, A.; Hennenberg, K.; Hünecke, K.; López, V.; Reise, J.; Scheffler, M.; Wiegmann, K.; Winger, C.; in cooperation with Deutsches Biomasseforschungszentrum (DBFZ); INFRO - Information Systems for Resources; Institute of Economic Structures Research (GWS); Meo Carbon Solutions GmbH; University of Kassel
Funded by: German Federal Ministry of Education and Research (BMBF)

Organic farming in the context of transformation impulses towards a sustainable regional food system (2020)
Teufel, J.; Jacobs, J.; Quack, D.; in cooperation with Albert-Ludwigs-Universität Freiburg
Commissioned by: Ministerium für Wissenschaft, Forschung und Kunst Baden Württemberg
Identification of stakeholder-related options of action for a transformation of food and agriculture with a view to shaping the common agricultural policy (CAP) after 2020 (2021)
Commissioned by: Stiftung Zukunftserbe

Orientative life-cycle assessment of an aquaculture facility (2020)
Antony, F.; López, V.
Commissioned by: EXIST-Gründerteam ocean[cube] - Hochschule für Technik und Wirtschaft des Saarlandes (htw saar)

Advisory services for the development of EU GPP criteria for food and catering services (2017)
Teufel, J.
Commissioned by: European Environmental Bureau (EEB)

Creating an open dialogue on "sustainable school catering" (2018)
Teufel, J.; Stratmann, B.
Commissioned by: City of Freiburg im Breisgau

Drawing up of a best practice guide for the project "Avoidance of food waste in facilities of the catering and foodservice sector" (2016)
Antony, F.; Gensch, C.; in cooperation with a´verdis
Commissioned by: German Environment Agency (UBA)

Synopsis of the general conclusions drawn from the sustainability assessment of research and development projects in the context of the DBU funding initiative "Sustainable Aquaculture" (2015)
Möller, M.; Antony, F.
Commissioned by: German Federal Environmental Foundation (DBU)

Drawing up a best practice guide and an event concept relating to "Strategies to successfully introduce organic food in the catering of municipalities ('More organic food in municipalities')" (2016)
See also: www.biostaedte.de/mehr-bio-in-kommunen/das-projekt.html
Teufel, J.; Gröger, J.; Hermann, A.; in cooperation with a´verdis
Commissioned by: City of Munich

Assessment of the product portfolio of a food retail company in terms of climate impact, and identification of the life cycles with climatic relevance on the basis of existing analyses and studies (2015)
Teufel, J.
Commissioned by: World Wide Fund For Nature International Germany (WWF Germany)
Funding initiative on aquaculture: Process-accompanying sustainability assessment on research and development projects under the DBU funding initiative "Sustainable Aquaculture" (2015)
Möller, M.; Antony, F.; Marquardt, M.; Moch, K.; Teufel, J.
Commissioned by: German Federal Environmental Foundation (DBU)

Is good food really expensive? The actual costs of our foods (2014)
Teufel, J.
Commissioned by: Oeko-Institut e.V.

Copper in organic farming: Background, challenges and recommended actions (2014)
Diesner, M.; Blepp, M.; Bunke, D.; Groß, R.
Commissioned by: Stiftung Zukunftserbe

Quack, D.; Liu, R.; Marquardt, M.
Commissioned by: Tchibo GmbH

Comparison of the Product Carbon Footprint (PCF) of Egyptian potatoes with the PCF of stored potatoes organically grown in Germany (2013)
Teufel, J.; Antony, F.; Gensch, C.; Liu, R.
Commissioned by: World Wide Fund For Nature International Germany (WWF Germany)

Product carbon footprints for food products (2013)
Teufel, J.
Commissioned by: World Wide Fund For Nature International Germany (WWF Germany)

Allocation coefficients of nitrogen fertilizers for poly-cultures of coffee production (2013)
Liu, R.; Quack, D.
Commissioned by: Sustainable Agriculture Initiative (SAI) Platform

Advising the Rapunzel Naturkost GmbH on structure and design of the website 'Veggie Guide' on the issue of climate and environmental impacts of nutrition (2013)
Teufel, J.; Stratmann, B.
Commissioned by: Rapunzel Naturkost GmbH
Evaluation of the PCF of table salt and formulation of PCF-related activity options for the Südsalz Corporation (2012)
Quack, D.; Stratmann, B.
Commissioned by: Südsalz GmbH

Comparison of frozen food with other types of presentation in terms of climate (2012)
Gensch, C.; Gattermann, M.; Marquardt, M.; Seum, S.
Commissioned by: Deutsches Tiefkühlinstitut e.V. (DTI)

Critical review of the ecological efficiency analysis "Comparison of different types of processing and of packaging alternatives for apple juice" (2011)
Gensch, C.; Gattermann, M.
Commissioned by: Verband der deutschen Fruchtsaft-Industrie e.V. (VdF)

Product Carbon Footprint of five selected cookie products (2011)
Teufel, J.; Gattermann, M.; Liu, R.
Commissioned by: Griesson - de Beukelaer GmbH & Co. KG

Product Carbon Footprint of the Krombacher Pils 20 x 0,5 l returnable bottle crate (2010)
Gensch, C.; Liu, R.; Seum, S.
Commissioned by:

Screening to produce a typology of product groups in the food sector according to their anticipated carbon footprints (2010)
Teufel, J.; Brommer, E.; Gattermann, M.; Stratmann, B.
Commissioned by: Landesamt für Natur, Umwelt und Verbraucherschutz des Landes NRW

Compilation of relevant sustainability aspects along the value chain of meat and meat products bearing the QS quality label (2010)
Teufel, J.; Gattermann, M.; Hünecke, K.; Manhart, A.; Stratmann, B.
Commissioned by: QS Qualität und Sicherheit GmbH

Carbon Footprint analysis of five selected fish products (2010)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Critical review of the CO2 inventory analysis by FiBL Austria of milk, bread and potatoes (2010)
Teufel, J.; Liu, R.; Stratmann, B.
Commissioned by: Research Institute of Organic Agriculture (FiBL)
Sustainability analysis of the product portfolio of the German deep-frozen products industry, and identification of strategic options for sustainable development (2010)

Teufel, J.; Gattermann, M.; Gensch, C.; Liu, R.
Commissioned by: Deutsches Tiefkühlinstitut e.V. (DTI)

Publications relating to Sustainable Food Systems and Bio-Based Raw Materials


5. International Cooperation on Circular Economy & Global Value Chains

Transforming production and consumption patterns by strengthening eco-labelling and green public procurement in five Asian countries (in progress)


Funded by: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
Sustainable Recycling Industries - Component Ghana  *(in progress)*
See also: www.sustainable-recycling.org
Schleicher, T.; Hilbert, I.; Manhart, A.; Michalscheck, M.; in cooperation with Mountain Research Institute (MRI); SOFIES (Solutions for Industrial Ecosystems) SA
*Commissioned by: World Resources Forum (WRF)*

Sustainable solutions for reducing plastic packaging in Asia  *(in progress)*
See also: https://www.exportinitiative-umweltschutz.de/de/aktuelles/news/cap-sea-startet-internationale-dialogserie-zu-upstream-policies-and-business-cases-for-single-use-plastic-prevention201d
*Funded by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)*

Technical support for KfW in managing the FC project "Environmentally compatible disposal of electrical scrap in Ghana"  *(in progress)*
Manhart, A.
*Commissioned by: KfW Group*

Environmentally sound disposal and recycling of e-waste: Capacity Development and operation of the Technical Training Centre at the Old Fadama Scrap Yard  *(in progress)*
Manhart, A.; Hilbert, I.; Michalscheck, M.; in cooperation with Mountain Research Institute (MRI)
*Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)*

Support to assessing the impacts of amendments to the proposal of the Commission for a Regulation on Batteries  *(in progress)*
Stahl, H.; Betz, J.; Dolega, P.; Hay, D.; Magrini, C.; Sutter, J.; in cooperation with Ramboll (Munich)
*Commissioned by: European Commission, DG Environment*

E-waste Compensation and International Financing Mechanisms with Nigeria  *(in progress)*
See also: https://prevent-waste.net/wp-content/uploads/2021/03/PREVENT_PP_Factsheet_Nigeria_2021-03.pdf
Schleicher, T.; Betz, J.; Gensch, C.; Hilbert, I.; Manhart, A.; in cooperation with Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ); Sustainable Research And Action For Environmental Development Nigeria
*Funded by: German Federal Ministry for Economic Cooperation and Development (BMZ)*

Measures catalogue for end of life (EoL) management in solar energy access projects  *(in progress)*
Manhart, A.; Hilbert, I.; Michalscheck, M.; Schleicher, T.
*Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)*
Developing Directive/Regulation on Extended Producer Responsibility (EPR) and Take-back Scheme for Used Lead-acid Batteries (ULAB) and Lithium Ion Batteries (LIB) Management in Ethiopia (in progress)
Manhart, A.; Hilbert, I.; Michalscheck, M.; Schleicher, T.; in cooperation with Dr. Tadesse Amera; Pesticide Action Nexus Association, (PAN-Ethiopia)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

"Greening supply and demand: Advancing Eco-Labels and Sustainable Public Procurement for climate and biodiversity protection (Eco-Advance)" - Preparation phase (in progress)
Prakash, S.; López, V.; McLennan, A.; in cooperation with Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Marine litter and microplastics: Promoting the environmentally sound management of plastic wastes and achieving the prevention and minimization of the generation of plastic wastes (2021)
Manhart, A.; Dehoust, G.; Prakash, S.; Schleicher, T.; in cooperation with Mountain Research Institute (MRI)
Commissioned by: Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

Challenges in the collection and disposal of WEEE with atypical design and materials ("atypical" WEEE) (2021)
Köhler, A.; Baron, Y.; Beilke, N.; Gsell, M.; Hermann, A.; Löw, C.; Moch, K.; in cooperation with German Institute of Urban Affairs (Difu)
Commissioned by: German Environment Agency (UBA)

Developing recommendations for technical standards and a licensing scheme for the management of lead-acid batteries in Ethiopia (2021)
Manhart, A; Hilbert, I.; Michalscheck, M.; in cooperation with Dr. Mellese Damtie Dandi; Pesticide Action Nexus Association, (PAN-Ethiopia)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Voluntary certification scheme for waste treatment (CEWASTE) (2021)
See also: www.cewaste.eu
Baron, Y.; Hilbert, I.; López, V.; Manhart, A.; in cooperation with World Resources Forum (WRF)
Commissioned by: Executive Agency for Small and Medium-sized Enterprises (EASME)
Research & stakeholder engagement for improved management of used batteries in Africa (2021)
Manhart, A.; Betz, J.; in cooperation with Vivid Economics Ltd
Commissioned by: World Economic Forum (WEF)

Scientific Support to Ecolabel - Research into circular economy perspectives in the management of textile products and textile waste in the European Union (2021)
Köhler, A.; Baron, Y.; Graulich, K.; Löw, C.; Moch, K.; in cooperation with PlanMiljø ApS
Commissioned by: European Commission, Directorate-General Joint Research Centre

Using emerging data streams for monitoring the uptake of Circular Economy in Europe (2021)
Graulich, K.; in cooperation with IDEA Consult; PlanMiljø ApS
Commissioned by: European Environment Agency (EEA)

Impact of COVID-19 on single-use plastics and the environment in Europe (2021)
Graulich, K.; Köhler, A.; Löw, C.; Sutter, J.; in cooperation with Georg Mehlhart Consulting; IDEA Consult; PlanMiljø ApS
Commissioned by: European Environment Agency (EEA)

Emerging waste streams – Challenges and opportunities (2021)
Graulich, K.; Betz, J.; Bulach, W.; Hermann, C.; Manhart, A.; in cooperation with IDEA Consult; Institute for European Environmental Policy
Commissioned by: European Environment Agency (EEA)

Environmentally sound disposal and recycling of e-waste: Expert pool policy advice (2021)
Manhart, A.; Schleicher, T.; in cooperation with World Resources Forum (WRF)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Assessment of options to improve particular aspects of the EU regulatory framework on batteries (2020)
Stahl, H.; Baron, Y.; Buchert, M.; Dolega, P.; Gsell, M.; Hay, D.; Heutmanek, U.; Mehlhart, G.; Sutter, J.; in cooperation with Dr. Christoph Neef
Commissioned by: European Commission, DG Environment

Concepts for sustainable solid waste management (2020)
Manhart, A.; Prakash, S.; in cooperation with Heat GmbH; Pesticide Action Nexus Association, (PAN-Ethiopia); Sofies SA; United Nations University (UNU); World Resources Forum (WRF)
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
Supporting the Pre-Feasibility for the project "Climate Adaption in urban areas in Bangladesh, Phase III - Component Sirajganj" (2019)
Manhart, A.; Prakash, S.
Commissioned by: KfW Group

Options under public international law to increase resource efficiency (2019)
Wolff, F.; Kampffmeyer, N.; Manhart, A.; Scherf, C.; in cooperation with Ecologic Institut gGmbH; Leuphana University of Lüneburg
Commissioned by: German Environment Agency (UBA)

Further action options for an ecological raw materials policy (ÖkoRessIi) (2020)
Dehoust, G.; Dolega, P.; Manhart, A.; in cooperation with adelphi consult GmbH; Institute for Energy and Environmental Research (ifeu); Projekt-Consult GmbH
Commissioned by: German Environment Agency (UBA)

Manhart, A.; in cooperation with Sofies SA
Commissioned by: PAS Solar (PAS BBOXX Ltd)

Hermann, A.; Gailhofer, P.; Manhart, A.; Schleicher, T.; Schüler, D.; in cooperation with Ecologic Institut gGmbH; Projekt-Consult GmbH
Commissioned by: German Environment Agency (UBA)

E-waste Ghana Lot 3: Enhancing capacities of informal sector stakeholders & payment system for e-waste (2020)
Manhart, A.; Prakash, S.; Schleicher, T.; in cooperation with Sofies SA
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Indo-German Financial Cooperation - Scoping Assignment Solid Waste Management (2019)
Manhart, A.; Prakash, S.; in cooperation with Empa Materials Science and Technology; Saahas zero waste; Wolfgang Pfaff-Simoneit
Commissioned by: KfW Group

Manhart, A.
Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
Short term technical expert assignment in the field of off-grid rural electrification via solar home systems (SHS) with the specific focus on recycling of batteries used in SHS (2018)
Manhart, A.; Hilbert, I.; in cooperation with Total Business Solutions Co. Ltd.
Commissioned by: KfW Group

Implementation of the Sustainable Recycling Industries (SRI) Program in Ghana and Egypt (2018)
Manhart, A.; Buchert, M.; Schleicher, T.; in cooperation with SOFIES (Solutions for Industrial Ecosystems) SA
Commissioned by: World Resources Forum (WRF)

Assessment of the ecological limits of primary raw material production and development of a method for assessing the environmental availability of raw materials in order to further develop the criticality concept (2017)
Dehoust, G.; Buchert, M.; Kießling, L.; Manhart, A.; Möck, A.; in cooperation with Institute for Energy and Environmental Research (ifeu); Projekt-Consult GmbH
Commissioned by: German Environment Agency (UBA)

Ghanaian-German Financial Cooperation (FC): Sound disposal and recycling of electrical and electronic equipment - Feasibility Study for the preparation of a new FC project (2017)
Manhart, A.; Prakash, S.; in cooperation with Sustainable Ghana Ltd.
Commissioned by: KfW Group

Development of policy recommendations for the further development and refinement of strategic approaches for sustainable and efficient raw material extraction and use (RohPolRess) (2017)
Hermann, A.; Buchert, M.; Manhart, A.; Schleicher, T.; Schüler, D.; Schulze, F.; in cooperation with adelphi research gGmbH; Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
Commissioned by: German Environment Agency (UBA)

Research on resource efficiency in the ICT sector (2016)
Manhart, A.; Blepp, M.; Fischer, C.; Graulich, K.; Prakash, S.; Schleicher, T.
Commissioned by: Greenpeace

The Lead Recycling Africa Project - Standards for lead smelters: Towards a strong environmental movement in Africa (2016)
Manhart, A.; Degreif, S.; Schleicher, T.; in cooperation with Pesticide Action Nexus Association, (PAN-Ethiopia)
Commissioned by: Oeko-Institut e.V.
Pre-Feasibility study on the possible commitment of the German Development Cooperation (EZ) in the sector of waste management in Ghana (2015)
Manhart, A.; Mehlhart, G.; in cooperation with Sustainable Ghana Ltd.
Commissioned by: KfW Group

Global circular economy of strategic metals (Bo2W) (2015)
Buchert, M.; Degreif, S.; Manhart, A.; Mehlhart, G.; Merz, C.; Schleicher, T.; in cooperation with Centre for Environment and Development for the Arab Region and Europe (CEDARE); City Waste Management Co Ltd; Umicore
Commissioned by: German Federal Ministry of Education and Research (BMBF)

Manhart, A.; Schleicher, T.; in cooperation with Pesticide Action Nexus Association, (PAN-Ethiopia)
Commissioned by: United Nations Industrial Development Organization (UNIDO)

Regulatory approaches to increase the resource efficiency in the IT sector (2014)
Manhart, A.; Fischer, C.; Graulich, K.; Schleicher, T.
Commissioned by: Germanwatch e.V.

Workshop on actions to avoid the input of (plastic) wastes from ashore into the marine environment (2013)
Blepp, M.; in cooperation with Team Ewen
Commissioned by: BKV GmbH

Rare earths analysis: Permanent magnets in industrial applications in Baden-Württemberg (2013)
Buchert, M.; Manhart, A.; Sutter, J.
Commissioned by: Ministry for the Environment, Climate and Energy Baden-Württemberg

Conflict minerals - Study on the Dodd-Frank Act and further possible resource-related measures (2013)
Manhart, A.; Schleicher, T.
Commissioned by: The Voice of German Industry (BDI)

E-waste country study Ethiopia (2013)
Manhart, A.; in cooperation with Pesticide Action Nexus Association, (PAN-Ethiopia)
Commissioned by: United Nations University (UNU)
Study on land-sourced litter (LSL) in the context of the initiative on marine litter established by Plastics Europe and European Plastics Converters (EUPC) (2012)
Blepp, M.; Mehlhart, G.; Möller, M.
Commissioned by: BKV GmbH

Identification of the use of critical resources in the manufacture of selected electronic units and development of proposals for the recovery of these resources from end-of-life equipment (2012)
Buchert, M.; Bleher, D.; Manhart, A.; Pingel, D.
Commissioned by: Landesamt für Natur, Umwelt und Verbraucherschutz des Landes NRW

Initial e-waste country study Ethiopia (2011)
Manhart, A.; Stratmann, B.
Commissioned by: United Nations University (UNU)

Informal e-waste management in Lagos, Nigeria - socio-economic impacts and feasibility of international recycling co-operations (2011)
Manhart, A.; Prakash, S.
Commissioned by: Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

Study on Rare Earths and Their Recycling (2011)
Schüler, D.; Buchert, M.; Degreif, S.; Liu, R.; Merz, C.
Commissioned by: Greens/EFA Group- European Parliament

Socio-economic assessment and feasibility study on sustainable e-waste management in Ghana (2010)
Prakash, S.; Manhart, A.; in cooperation with Ghana Environmental Protection Agency (EPA); Green Advocacy Ghana
Commissioned by: Ministry of Housing, Spatial Planning and the Environment, VROM-Inspectorate

Publications relating to International Cooperation on Circular Economy & Global Value Chains
Prakash, S.; Schleicher, T.; Michalscheck (2021): Barrier Analysis and Strategies for Ecolabels and Sustainable Public Procurement Implementation - Commonly encountered barriers and strategies for successful implementation; Prepared for the project “Implementation of innovative incentive mechanisms for the promotion of climate-friendly products and services in ASEAN”, funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH”, Öko-Institut, Freiburg

Prakash, S.; López Hernández, V. et al. (2021): Implementing circular economy in Mexico: Recommendations for strategies against obsolescence of smartphones & textiles; Prepared for the project “Implementation of innovative incentive mechanisms for the promotion of climate-friendly products and services in ASEAN”, funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH”, Öko-Institut, Freiburg
Löw, C.; Prakash, S.; Stuber-Rousselle, K. (2021): Why are biobased and biodegradable plastic not part of the solution to reduce plastic waste? Checking the facts! Prepared for the project “Sustainable solutions for reducing plastic packaging in Asia, funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH”, Öko-Institut, Freiburg


Löw, C.; Manhart, A.; Prakash, S.; Michalscheck, M.; (2021): Design-for-recycling (D4R) – State of play, Prepared for the project “Sustainable solutions for reducing plastic packaging in Asia, funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH”, Öko-Institut, Freiburg

Löw, C.; Manhart, A.; Prakash, S.; (2021): Recycled content in plastic material with focus on PET, HDPE, LDPE, PP – State of play, Prepared for the project “Sustainable solutions for reducing plastic packaging in Asia, funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH”, Öko-Institut, Freiburg


6. Sustainable chemistry

6.1. Cross-cutting issues

System innovation for sustainable development  (in progress)
Brohmann, B.; Bunke, D.; Mbah, M.; Schulda, B.
_Funded by: German Federal Ministry of Education and Research (BMBF)_

Jörß, W.; Baron, Y.; Hünecke, K.; Liste, V.; Ludig, S.; Schumacher, K.; Wissner, N.; in cooperation with Öko-Recherche; Ricardo Energy & Environment (Ricardo-AEA)
_Commissioned by: European Commission, DG Climate Action_

Consultation and support for the Partnership for Sustainable Textiles in the implementation of corporate due diligence, in particular the further development of the environmental strategy  (in progress)
Kampffmeyer, N.; López, V.; Löw, C.; Moch, K.; Scherf, C.; Teufel, J.; in cooperation with Arqum Gesellschaft für Arbeitssicherheits-, Qualitäts- und Umweltmanagement mbH
_Commissioned by: Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)_

Yesterday PCBs - today PFCs and brominated flame retardants - and tomorrow?  (2021)
Bunke, D.; Löw, C.; Moch, K.; in cooperation with ETH Zurich University (ETH Zürich); P.O.P. Consultance
_Commissioned by: German Environment Agency (UBA)_

Pharmacies as central places for the (environmentally) conscious handling of drugs  (2019)
Moch, K.; Blepp, M.; Moritz, S.; Seidl, R.; in cooperation with Institute for Social-Ecological Research Ltd. (ISOE)
_Commissioned by: German Environment Agency (UBA)_

Environmental Specimen Bank Workshop – Terrestrial transmission 2018  (2019)
Bunke, D.; Moch, K.
_Commissioned by: German Environment Agency (UBA)_


Practical, environment-related information on water-relevant active pharmaceutical ingredients (2019)
Bunke, D.; Moch, K.
Commissioned by: Ministry for the Environment, Climate and Energy Baden-Württemberg

Sustainable Chemistry as part of the International Chemicals Management - Analysis and concept development for initiatives, instruments, financing and networking (2018)
Bunke, D.; Blepp, M.; in cooperation with Consultancy for integrated solutions (BiPRO)
Commissioned by: German Environment Agency (UBA)

Solutions for present and future emerging pollutants in land and water resources management (2019)
Bunke, D.; Moch, K.; Moritz, S.; in cooperation with Helmholtz-Centre for Environmental Research GmbH
Commissioned by: European Commission, DG Environment

Identifying interesting companies for ChemSec's Marketplace website (2018)
Blepp, M.; Baron, Y.; Moch, K.
Commissioned by: International Chemical Secretariat (chemsec)

Sustainable management of chemicals: further development of sustainability criteria for chemical leasing and application in case studies (2018)
Bunke, D.; Blepp, M.; in cooperation with Consultancy for integrated solutions (BiPRO)
Commissioned by: German Environment Agency (UBA)

Contribution to the Green Economy by sustainability of companies in the chemical industry: Selection of substances or processes on the basis of the criteria for a sustainable chemistry developed by the German Federal Environment Agency (UBA) (2016)
See also: www.umweltbundesamt.de/publikationen/leitfaden-nachhaltige-chemikalien
Bunke, D.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)

Contributions to the sustainability strategy: reducing the use of resources in the chemicals industry by applying instruments of sustainable chemistry (2016)
Bunke, D.; Blepp, M.; in cooperation with Consultancy for integrated solutions (BiPRO)
Commissioned by: German Environment Agency (UBA)
Scientific and educational activities of German research facilities relating to sustainable chemistry (2015)
Blepp, M.; Moritz, S.; in cooperation with Consultancy for integrated solutions (BiPRO)
Commissioned by: German Environment Agency (UBA)

Smart protection goals for priority hazardous substances (EG/2008/105) (2015)
Bunke, D.; Groß, R.; in cooperation with Society for Institutional Analysis (sofia) e.V.
Commissioned by: German Environment Agency (UBA)

Examining the coherence of environmental policy objectives and instruments for the purpose of environmental reporting (2015)
Commissioned by: German Environment Agency (UBA)

Reducing microcontaminants in the water cycle through targeted chemical design, a contribution of sustainable chemicals management to sustainable water resources management: The example of textile finishing, Sub-project 3 (2013)
Bunke, D.
Commissioned by: German Federal Ministry of Education and Research (BMBF)

Selection and application of chemicals in SMEs. Assessment of sustainability (2013)
Bunke, D.; Groß, R.
Commissioned by: German Environment Agency (UBA)

Carcinogenic and mutagenic substances and reproductive toxicants (CMR) and other problematic substances in consumer products - identification of relevant substances and articles, analytical control and consequences for the chemical regulation framework (2010)
Bunke, D.; in cooperation with Eurofins Product Testing A/S; Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
Commissioned by: German Environment Agency (UBA)

Guideline for sustainable chemistry - Formulation and practical application of strategies and criteria for assessing and selecting sustainable chemicals (2010)
Bunke, D.; Groß, R.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)
6.2. **Chemicals management and REACH**

**Maintenance of the chemical indicator set - IV** *(in progress)*
Bunke, D.; Löw, C.; Moch, K.; Stahl, H.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
Commissioned by: European Commission, Directorate General ESTAT

**REACH Radar Plus - Support for SMEs on problematic substances, detection, substitution, conformity testing** *(2021)*
Bunke, D.; Moch, K.; in cooperation with Furtwangen University
Commissioned by: German Federal Environmental Foundation (DBU)

**Advancing REACH: Proposals for the updating and further development of the European Chemicals Regulation after 2018 and strategies for implementation** *(2021)*
See also: https://www.umweltbundesamt.de/publikationen/advancing-reach-reach-sustainable-chemistry
Bunke, D.; Hermann, A.; Löw, C.; Moch, K.; in cooperation with Environment and Health Consulting; Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG); Ökopol – Institute for Environmental Strategies GmbH; Risk & Policy Analysts ltd. (RPA); Society for Institutional Analysis (sofia) e.V.
Commissioned by: German Environment Agency (UBA)

**Scientific and technical assistance for the maintenance and further development of indicators to monitor environmental and health benefits of the EU chemicals legislation** *(2020)*
Bunke, D.; Stahl, H.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG); German Federal Institute for Risk Assessment (BfR); Risk & Policy Analysts ltd. (RPA)
Commissioned by: European Commission, DG Environment

**Maintenance of the Eurostat Chemical Indicator Set - III** *(2019)*
Bunke, D.; Stahl, H.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
Commissioned by: European Commission, Directorate General ESTAT

**PBT - quo vadis? Review and update of the PBT assessment approach for the identification of environmental SVHC** *(2018)*
Blepp, M.; Bunke, D.; Moch, K.; in cooperation with Consultancy for integrated solutions (BiPRO); ETH Zurich University (ETH Zürich)
Commissioned by: German Environment Agency (UBA)

**REACH in practice IV: Supporting stakeholders in the establishment and maintenance of REACH expertise** *(2017)*
Bunke, D.; Moch, K.; in cooperation with Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)
Supply of statistical services: REACH Baseline Study - 10 years update (2017)
Bunke, D.; in cooperation with Dansk Hydraulisk Institut (DHI); Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG); Institut National de l'Environnement industriel et des risques
Commissioned by: European Commission, DG for Internal Market, Industry, Entrepreneurship and SMEs

Advisory services on REACH (2017)
Blepp, M.; Bunke, D.
Commissioned by: Kunststofftechnik Buzzi GmbH

Advisory services: REACH supply chain communication (2017)
Blepp, M.; Bunke, D.
Commissioned by: UNIWELL Rohrsysteme GmbH & Co. KG

Reach Radar Network - Systematic Identification and Prioritisation of Substances of Very High Concern for the Group of Galvanisation Companies (2017)
Bunke, D.; Blepp, M.; in cooperation with Furtwangen University; Kunststofftechnik Buzzi GmbH; UNIWELL Rohrsysteme GmbH & Co. KG
Commissioned by: German Federal Environmental Foundation (DBU)

Maintenance of the chemical indicator set - II (2016)
Bunke, D.; Jenseit, W.; Stahl, H.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
Commissioned by: European Commission, Directorate General ESTAT

Collection and analysis of exposure and usage data to determine the relevance of potentially endocrine disrupting chemicals - preparation for nomination as Substance of Very High Concern (SVHC) under REACH (2015)
Bunke, D.; Groß, R.; Moch, K.; in cooperation with Consultancy for integrated solutions (BiPRO)
Commissioned by: German Environment Agency (UBA)

Strengthening of the provisions for (imported) articles in the REACH regulation (2015)
Bunke, D.; Hermann, A.; in cooperation with Society for Institutional Analysis (sofia) e.V.
Commissioned by: German Environment Agency (UBA)

Conferences for the implementation of REACH (2014)
Bunke, D.; in cooperation with Ökopool – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)
Mixtures in the environment - Developing evaluation strategies for the regulation of chemicals under REACH (2014)
Bunke, D.; Groß, R.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG); Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)

Maintenance of the chemical indicator set - I (2013)
Bunke, D.; Jenseit, W.; Rausch, L.; in cooperation with Dansk Hydraulisk Institut (DHI); Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG); German Federal Institute for Risk Assessment (BfR); Institut National de l'EnviRonnement industriel et des riSques
Commissioned by: European Commission, Directorate General ESTAT

Socio-economic analysis (SEA) in authorisation and restriction under REACH: Assessment of abatement costs of chemicals - ex ante and ex post (2014)
Gensch, C.; Baron, Y.; Blepp, M.; Bunke, D.; in cooperation with Consultancy for integrated solutions (BiPRO); Georg-August-University Göttingen
Commissioned by: German Environment Agency (UBA)

REACH Baseline Study: 5 years update (2013)
Bunke, D.; Groß, R.; Jenseit, W.; Rausch, L.; in cooperation with Dansk Hydraulisk Institut (DHI); Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG); Institut National de l'EnviRonnement industriel et des riSques
Commissioned by: European Commission, Directorate General ESTAT

Evaluation and coordination of methods and indicators for the environmental monitoring of chemicals in Germany to implement an efficacy assessment and a success control under REACH (2013)
Groß, R.; Heyen, D.; in cooperation with Society for Institutional Analysis (sofia) e.V.
Commissioned by: German Environment Agency (UBA)

Legal analysis on the applicability of the substance definition on nanomaterials under REACH (2012)
Groß, R.; Hermann, A.; Möller, M.
Commissioned by: German Environment Agency (UBA)

Examination and assessment of consequences for industry, consumers, human health and the environment of possible options for changing the REACH requirements for nanomaterials (2013)
Bunke, D.; Diesner, M.; Groß, R.; Hermann, A.; Möller, M.; in cooperation with Consultancy for integrated solutions (BiPRO)
Commissioned by: European Commission, DG Research and Innovation
Guidance for Scaling under REACH (2011)
Bunke, D.; Groß, R.; Moch, K.
Commissioned by: German Environment Agency (UBA)

REACH in practice (2011)
Bunke, D.; Gensch, C.; Groß, R.; in cooperation with adelphi research gGmbH; Ökopol – Institute for Environmental Strategies GmbH; Society for Institutional Analysis (sofia) e.V.
Commissioned by: German Environment Agency (UBA)

REACH guide on exposure assessment and supply chain communication (2010)
Bunke, D.; Groß, R.; in cooperation with Forschungs- und Beratungsinstitut Gefahrstoffe GmbH (FoBiG)
Commissioned by: Verband der Chemischen Industrie e.V.

6.3. Hazardous substances assessment and substitution

Study to support the assessment of impacts associated with the general review of Directive 2011/65/EU (RoHS Directive) (in progress)
Baron, Y.; Gensch, C.; Löw, C.; Magrini, C.; Moch, K.; in cooperation with Ramboll Kopenhagen
Commissioned by: European Commission, DG Environment

Study to support the impact assessment for the review of Directive 2000/53/EC on end-of-life vehicles (in progress)
Commissioned by: European Commission, DG Environment

Study to assess requests for two (-2-) exemptions, for mercury in pressure transducer and DEHP in a PVC base material, in Annex IV of Directive 2011/65/EU (in progress)
Moch, K.; Baron, Y.; Behrens, F.; Gensch, C.; Löw, C.; Magrini, C.; in cooperation with Ramboll (Munich)
Commissioned by: European Commission, DG Environment

Study to assess requests for a renewal of seven (-7-) exemptions 18(b), 18(b)-l, 24, 29, 32 and 34 of Annex III and exemption 34 of Annex IV of Directive 2011/65/EU (2021)
Moch, K.; Baron, Y.; Gensch, C.; Köhler, A.; Liu, R.; Löw, C.
Commissioned by: European Commission, DG Environment
Study to assess requests for a renewal of nine (-9-) exemptions 6(a), 6(a)-I, 6(b), 6(b)-I, 6(b)-II, 6(c), 7(a), 7(c)-I and 7 (c)-11 of Annex III of Directive 2011/65/EU (2021)
Baron, Y.; Gensch, C.; Köhler, A.; Liu, R.; López, V.; Löw, C.; Moch, K.; in cooperation with Ramboll (Munich)
Commissioned by: European Commission, DG Environment

Service contract for technical assistance to the Commission pertaining to exemptions l(a - e), l(f), 2(a), 2(b)(3), 2(b)(4), 3, 4(a), 4(b), 4(c), 4(e), and 4(f) of Annex III of Directive 2011/65/EU (2021)
Baron, Y.; Gensch, C.
Commissioned by: European Commission, DG Environment

Persistent degradation products of halogenated blowing agents and refrigerants in the environment: type, environmental concentrations and fate with particular regard of new halogenated substitutes with low global warming potential (2021)
Rüdenauer, I.; Jörß, W.; Ludig, S.; in cooperation with Öko-Recherche
Commissioned by: German Environment Agency (UBA)

Study to support the review of the list of restricted substances and to assess a new exemption request under RoHS 2 - Pack 15 (2020)
Baron, Y.; Blepp, M.; Bunke, D.; Gensch, C.; Köhler, A.; Löw, C.; Moch, K.; Möller, M.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Study to assess one request for renewal of exemption 12 of Annex IV to Directive 2011/65/EU - Pack 19 (2020)
Moch, K.; Baron, Y.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Study to assess one (1) request for a new exemption to Annex IV of Directive 2011/65/EU for bis-(2-ethylhexyl) phthalate (DEHP) in plastic components in MRI detector coils (2020)
Moch, K.; Baron, Y.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Study to assess seven exemption requests relating to Annex III and IV to Directive 2011/65/EU: request for renewal of exemptions 6(a), 6(b), 6(c), 7(a) and 7(c)-I of Annex III; request for renewal of exemption 27 of Annex IV; and request for a new exemption (2020)
Moch, K.; Baron, Y.
Commissioned by: European Commission, DG Environment
ENV.F.1/FRA/2014/0063 - Trinomics-Batterie Assess / Study to identify and assess the feasibility of measures to enhance the impact of Directive 2006/66/EG on the protection of the environment, on the promotion of circular economy and on the smooth function (2020) Stahl, H.; Baron, Y.; Buchert, M.; Dolega, P.; Gsell, M.; Mehlhart, G.; Sutter, J.; in cooperation with Trinomics BV
Commissioned by: European Commission, DG Environment

Best available techniques for PFOS substitution in the surface treatment of metals and plastics and analysis of alternative substances to PFOS in chrome plating and plastic pickling (2020)
Baron, Y.; Blepp, M.; in cooperation with IUW-integrierte Umweltberatung; POPs Environmental Consulting - Dr. Roland Weber
Commissioned by: German Environment Agency (UBA)

Mehlhart, G.; Baron, Y.; Stahl, H.; in cooperation with Trinomics BV
Commissioned by: European Commission, DG Environment

Study to assess three exemption requests relating to Annex IV to Directive 2011/65/EU: request for amendment of existing exemption 31a; request for a new exemption for Bis-(ethylhexyl) phthalate (DEHP) in ion selective electrodes for point of care analysis (2020)
Moch, K.; Gensch, C.; López, V.
Commissioned by: European Commission, DG Environment

Study to assess two exemption requests in Annexes III and IV to Directive 2011/65/EU: renewal of exemption IV.42, and request for a new exemption for lead and hexavalent chromium compounds in electric and electronic initiators of explosives for civil (pro) (2019)
Moch, K.; Gensch, C.; Möller, M.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Review in the light of scientific and technical progress of exemptions 8(e), 8(f)(b), 8(g) and 14 and re-evaluation of entry 8(j) of Annex II to Directive 200/53/EC (ELV) (2019)
Baron, Y.; Moch, K.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Baron, Y.; Moch, K.
Commissioned by: European Commission, DG Research and Innovation
Study to assess eight exemption requests in Annexes III and IV to Directive 2011/65/EU: renewal of exemptions III.41, IV.37, IV.41, and requests for new exemptions for lead and DEHP in certain NRMM engines applications, lead in solder and hexavalent chrom (2019)
See also: http://rohs.exemptions.oeko.info/
Baron, Y.; Gensch, C.; Moch, K.
Commissioned by: European Commission, DG Environment

Stahl, H.; Baron, Y.; Hay, D.; Hermann, A.; Mehlhart, G.; Müller, N.; Weishäupl, J.; in cooperation with Ernst & Young (EY); Trinomics BV
Commissioned by: European Commission, DG Environment

Study to assess three exemption requests: exemption l(g) (Annex III) for mercury in single capped compact fluorescent lamps for general lighting purposes and two new exemptions (lead in soldering of certain printed circuit board assembly in gas detectors (2018)
Baron, Y.; Blepp, M.; Gensch, C.; Moch, K.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

The relevance of commercial textile and dish cleaning on the entry of phosphate and other phosphate compounds (P) into the waste water (2018)
Commissioned by: German Environment Agency (UBA)

Mehlhart, G.; Baron, Y.; Hermann, A.; Kosińska-Terrade, I.; in cooperation with Argus; Institut de Conseil et d’Etudes en Développement Durable (Institute for Consultancy and Studies in Sustainable Development – ICEDD); Resources and Waste Advisory Group (RWA); Wolfgang Kaerger Environmental Consultancy
Commissioned by: European Commission, DG Environment

Study to assess socio-economic impact of substitution of certain mercury-based lamps currently benefitting of RoHS 2 exemptions in Annex III (2017)
See also: http://rohs.exemptions.oeko.info/
Baron, Y.; Gensch, C.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment
Analysing substance derogation requests under Article 6.7 of Ecolabel Regulation EC 66/2010  
Baron, Y.  
Commissioned by: European Commission, DG Research and Innovation

Evaluation of small brominated alkyl alcohols for a possible RoHS restriction  
Baron, Y.; Gensch, C.; Moch, K.; in cooperation with COWI Denmark Holding A/S  
Commissioned by: Danish Environmental Protection Agency (EPA)

Study to assess two RoHS exemption requests: #1 for lead in bearings and bushes of professional-use non-road equipment engines; #2 for lead in solders used to construct and connect to Peltier thermal cyclers used for in-vitro diagnostic analysers that use  
Baron, Y.; Gensch, C.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)  
Commissioned by: European Commission, DG Environment

Study to assess two RoHS exemption requests: #1 Cadmium in colour converting II-VI LEDs (< 10 μg Cd per mm2 of light-emitting area) for use in solid state illumination or display systems (Request for renewal of exemption 39 of Annex III of Directive 2011/  
See also: http://rohs.exemptions.oeko.info/  
Baron, Y.; Blepp, M.; Gensch, C.  
Commissioned by: European Commission, DG Environment

Study to assess renewal requests for 29 RoHS 2 Annex III exemptions [no. 1(a to e - lighting purpose), no. 1(f - special purpose), no. 2(a), no. 2(b)(3), no. 2(b)(4), no. 3, no. 4(a), no. 4(b), no. 4(c), no. 4(e), no. 4(f), no. 5(b), no. 6(a), no. 6(b), n  
Baron, Y.; Blepp, M.; Gensch, C.; Moch, K.; Moritz, S.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)  
Commissioned by: European Commission, DG Environment

8th Adaptation to scientific and technical progress of exemptions 2(c), 3 and 5 of Annex II to Directive 2000/53/EC (ELV)  
Baron, Y.; Gensch, C.; Moch, K.; in cooperation with Eunomia Research and Consulting Ltd.  
Commissioned by: European Commission, DG Environment

Study to assess three RoHS exemption requests (#1 for lead in thin film electronic sensor elements such as pyroelectric sensors or piezoelectric sensors; #2 for lead in high voltage cables and cable assemblies (for industrial monitoring and control instru  
See also: http://rohs.exemptions.oeko.info/  
Baron, Y.; Gensch, C.; Moch, K.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)  
Commissioned by: European Commission, DG Environment
As per February 2022

**Reporting to the European Commission pursuant to Article 12 of the EU Regulation (EC) No 850/2004 on POPs** (2015)
Blepp, M.; in cooperation with IUW-integrierte Umweltberatung; POPs Environmental Consulting - Dr. Roland Weber
*Commissioned by: German Environment Agency (UBA)*

**Study to assess four renewal requests for RoHS 2 Annex III exemptions no. 7(b), no. 9(b), no. 13(a) and no. 13(b). (RoHS Directive) - Pack 7** (2015)
See also: http://rohs.exemptions.oeko.info/
Baron, Y.; Gensch, C.; Moch, K.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
*Commissioned by: European Commission, DG Environment*

**Assistant to the Commission on technological, socio-economic and cost-benefit assessment related to exemptions from the substance restrictions in electrical and electronic equipment (RoHS Directive) - Pack 6** (2015)
See also: http://rohs.exemptions.oeko.info/
Gensch, C.; Baron, Y.; Hünecke, K.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
*Commissioned by: European Commission, DG Environment*

**Study for the analysis of impacts from RoHS 2 on non-road mobile machinery without an on-board power source, on windows and doors with electric functions, and on the refurbishment of medical devices** (2015)
Baron, Y.; Gensch, C.; Moch, K.; in cooperation with Eunomia Research and Consulting Ltd.
*Commissioned by: European Commission, DG Environment*

**Analysis and trend assessment of environmental and foods contamination with selected POPs, and enhancement of the Dioxin Database Federation/Länder with the aim of path-related investigation of causes** (2015)
Blepp, M.; in cooperation with POPs Environmental Consulting - Dr. Roland Weber
*Commissioned by: German Environment Agency (UBA)*

Baron, Y.; Blepp, M.; Gensch, C.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
*Commissioned by: European Commission, DG Environment*
Assistance to the Commission on technological, socio-economic and cost-benefit assessment related to exemptions from the substance restrictions in electrical and electronic equipment (RoHS Directive) - Pack 5 (2014)
See also: http://rohs.exemptions.oeko.info/
Baron, Y.; Gensch, C.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Study for the review of the list of restricted substances under RoHS 2 - Analysis of impacts from a possible restriction of several new substances under RoHS 2 (2014)
Baron, Y.; Blepp, M.; Gensch, C.; Moch, K.; in cooperation with Eunomia Research and Consulting Ltd.
Commissioned by: European Commission, DG Environment

See also: http://rohs.exemptions.oeko.info/
Baron, Y.; Diesner, M.; Gensch, C.; in cooperation with Eunomia Research and Consulting Ltd.
Commissioned by: European Commission, DG Environment

Underestimation of the environmental risk by not considering parallel uses of biocidal products: Cumulative exposure and risk assessment of biocidal products (2014)
Groß, R.; Bunke, D.; Hermann, A.; in cooperation with Hydrotox GmbH
Commissioned by: German Environment Agency (UBA)

Assistance to the Commission on technological, socio-economic and cost-benefit assessment related to exemptions from the substance restrictions in electrical and electronic equipment (RoHS Directive) - Pack 4 (2014)
Baron, Y.; Blepp, M.; Gensch, C.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Evaluation of the Salewa Restricted Substance List (2013)
Groß, R.; Bunke, D.; Stratmann, B.; Teufel, J.
Commissioned by: Salewa, Oberalp Deutschland GmbH

Status Report: Substitution of PFOS in the metal-plating sector with fluorine-free alternatives (2013)
Blepp, M.; Baron, Y.; Bunke, D.
Commissioned by: German Environment Agency (UBA)
Assistance to the Commission on technological, socio-economic and cost-benefit assessment related to exemptions from the substance restrictions in electrical and electronic equipment (RoHS Directive) - Pack 3 (2013)
See also: http://rohs.exemptions.oeko.info/
Gensch, C.; Baron, Y.; Blepp, M.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

See also: http://rohs.exemptions.oeko.info/
Gensch, C.; Baron, Y.; Blepp, M.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Technical support on reporting obligations and update of the Community Implementation Plan under the POP Regulation (2013)
Zangl, S.; Blepp, M.; Moch, K.; in cooperation with BIO Intelligence Service
Commissioned by: European Commission, DG Environment

Assistance to the Commission on technological, socio-economic and cost-benefit assessments related to the implementation and further development of EU waste legislation: Study to assess RoHS exemptions - Pack 1 (2013)
See also: http://rohs.exemptions.oeko.info/
Gensch, C.; Baron, Y.; Blepp, M.; Manhart, A.; Moch, K.; in cooperation with Eunomia Research and Consulting Ltd.; Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Development of a list of potential POP candidates for the Stockholm Convention and refinement of the POP criteria - Which strategy is to be adopted for a successful identification of new POPs? (2013)
Blepp, M.; Bunke, D.; Groß, R.; Moch, K.; in cooperation with ETH Zurich University (ETH Zürich)
Commissioned by: German Environment Agency (UBA)

Gensch, C.; Baron, Y.; Blepp, M.; Manhart, A.; Moch, K.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment
National-level implementation of the Stockholm convention on persistent organic pollutants (POPs) - PBDE and PFOS in products and in the recycling loops (2013)
Blepp, M.; Marquardt, M.; Moch, K.; in cooperation with Eurofins GfA Lab Service GmbH; Ökopol – Institute for Environmental Strategies GmbH
Commissioned by: German Environment Agency (UBA)

Zangl, S.
Commissioned by: European Commission, DG Environment

Adaptation to scientific and technical progress under Directive 2002/95/EC - evaluation of new requests for exemptions and/or review of existing exemptions (2011)
Zangl, S.; Blepp, M.; Liu, R.; Moch, K.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Determination of the quantities of poorly biodegradable organic ingredients in detergents and cleaning products in relation to the quantities of these substances used in other sectors, with regard to the benefit of substance substitution (2011)
Groß, R.; Bunke, D.; Moch, K.
Commissioned by: German Environment Agency (UBA)

Elaboration of a concept for the cumulative environmental exposure assessment of biocides (2010)
Groß, R.; Bunke, D.; Moch, K.
Commissioned by: German Environment Agency (UBA)

Zangl, S.; Blepp, M.; Gensch, C.; Liu, R.; Moch, K.; in cooperation with Fraunhofer Institute for Reliability and Microintegration (Fraunhofer IZM)
Commissioned by: European Commission, DG Environment

Groß, R.; Bunke, D.; Gensch, C.; Zangl, S.; in cooperation with Büro Ö-quadrat
Commissioned by: European Automobile Manufacturers’ Association
Study of critical substances in hand dishwashing and machine dishwasher detergents, identification of substitution options, and assessment of the environmental risk posed by dishwasher detergents (2010)
Groß, R.; Bunke, D.; Moch, K.
Commissioned by: German Environment Agency (UBA)

Publications relating to sustainable chemistry


Sustainable Products & Material Flows division: Reference list


7. Sustainable Materials and Technologies

7.1. Cross-cutting issues

Study for the comparative ecological and economical evaluation of the resource consumption for the use of recycled plastics in packaging materials (2022)
Köhler, A.; Bulach, W.; Eckert, D.; Schleicher, T.; in cooperation with Jokey Holding GmbH & Co. KG
Commissioned by: VDI Zentrum Ressourceneffizienz GmbH

Life cycle assessment of high and extra high-voltage lines in Germany (in progress)
Sutter, J.; Flachtsbarth, F.; Hermann, C.; Liu, R.
Commissioned by: German Environment Agency (UBA)

Donation project 2020 Criteria for sustainable hydrogen import (2021)
Commissioned by: Oeko-Institut e.V.

Comparative analysis of electrical energy storage systems - application scenarios, economic and ecological evaluation (2020)
Bulach, W.; Baron, Y.; López, V.; Möller, M.
Commissioned by: Bayerisches Landesamt für Umwelt

SME innovative – collaborative project on resource efficiency: UpcyclePET – Development of innovative processes and formulations designed for the upcycling of PET-bottles and blister recyclates for high-tech plastic applications, TV 2: assessment of sustainability (2019)
Köhler, A.; Blepp, M.; López, V.; Möller, M.; in cooperation with Easicomp GmbH; Fraunhofer-Institut für Betriebsfestigkeit und Systemzuverlässigkeit (Fraunhofer LBF)
Funded by: German Federal Ministry of Education and Research (BMBF)

A plastic-free world? What would happen if the use of plastics in selected application fields was consistently reduced? (2019)
Köhler, A.
Commissioned by: Oeko-Institut e.V.
Preparation of a study for comparative economic and ecological evaluation of additive and conventional manufacturing technologies in industrial production (2019)
Köhler, A.; Baron, Y.; Bulach, W.; in cooperation with Fraunhofer Institute for High-Speed Dynamic Ernst-Mach-Institut (Fraunhofer EMI)
Commissioned by: VDI Zentrum Ressourceneffizienz GmbH

Substitution as a strategy for reducing the criticality of raw materials for environmental technologies - Determination of potentials for second best solutions (2018)
Commissioned by: German Environment Agency (UBA)

Evaluation of the impact of energy management systems (EnMS) (2018)
Köhler, A.; in cooperation with adelphi consult GmbH; German Energy Agency (dena); PricewaterhouseCoopers GmbH - Wirtschaftsprüfungsgesellschaft; University of Stuttgart
Commissioned by: Federal Ministry for Economic Affairs and Energy (BMWi)

Comparative economic and ecological assessment of innovative stationary energy storage technologies in industrial production (2017)
Köhler, A.; Baron, Y.; Buchert, M.; Bulach, W.; Möller, M.; Stahl, H.; in cooperation with Institute for Futures Studies and Technology Assessment (IZT)
Commissioned by: VDI Zentrum Ressourceneffizienz GmbH

Baron, Y.; in cooperation with ACTeon environment research & consultancy; Copenhagen Resource Institute (CRI); Ecorys; IDEA Consult; The Regional Environmental Center (REC)
Commissioned by: European Commission, DG Environment

Substitution of critical raw materials in permanent magnets in wind turbines and electric vehicles, and in phosphors and LEDs for lighting (2015)
Schüler, D.; Buchert, M.; Degreif, S.; Jenseit, W.; Schleicher, T.
Commissioned by: European Commission, DG Research and Innovation

Innovative hydrogen storage solutions for the future: Recycling and environmental requirements and strategies for avoiding supply risks of their production (2015)
Commissioned by: German Environment Agency (UBA)
7.2. Nanotechnology

**NANOnotechnology Risk Governance (in progress)**
Köhler, A.; Hermann, A.; Möller, M.; Seidl, R.; in cooperation with Aarhus University
*Funded by: EU Horizon 2020*

**Ensuring proper risk assessment of nanomaterials to establish a precaution-based regulatory framework for their production and use (2017)**
Hermann, A.; Köhler, A.; Möller, M.; in cooperation with Center for International Environmental Law; European Environmental Citizens Organisation for Standardisation (ECOS)
*Commissioned by: The Velux Foundation, Søborg*

**Legal feasibility study on the legal implementation possibilities for a nano-plants and installation register (2016)**
Hermann, A.; Möller, M.
*Commissioned by: Landesamt für Natur, Umwelt und Verbraucherschutz des Landes NRW*

**Contribution to the OECD Working Party on Manufactured Nanomaterials (WPMN) (2013)**
Möller, M.; Hermann, A.
*Commissioned by: German Environment Agency (UBA)*

**Assessments of impacts of a European register of products containing nanomaterials (2013)**
Diesner, M.; Hermann, A.; in cooperation with Consultancy for integrated solutions (BiPRO)
*Commissioned by: German Environment Agency (UBA)*

**Investigation of the effects related to selected nanotechnology-based products on resource and energy requirements (2013)**
Möller, M.; Diesner, M.; Küppers, P.; Manhart, A.; Pistner, C.; Spieth-Achtnich, A.
*Commissioned by: German Environment Agency (UBA)*

**Nanomaterials: Impacts on environment and health (2013)**
Möller, M.; Diesner, M.; Groß, R.; Hermann, A.; Küppers, P.; in cooperation with VDI Technologiezentrum GmbH
*Commissioned by: Center for Technology Assessment*

**Analysis and strategic management of nanoproducts with regard to their sustainability potential; Nano-Sustainability Check (2012)**
*Commissioned by: German Environment Agency (UBA)*
Legal feasibility study on the introduction of a nanoproduct register (2010)
Hermann, A.; Möller, M.
Commissioned by: German Environment Agency (UBA)

7.3. Technology development processes

Development accompanying sustainability analyses in the cross-sectional project for the "Digital GreenTech" funding measure (in progress)
Möller, M.; Antony, F.; Gensch, C.; Gröger, J.; Köhler, A.; in cooperation with Gesellschaft für Informatik
Commissioned by: German Federal Ministry of Education and Research (BMBF)

GreenManufacturing - Expert group for the development and evaluation of ecologically and economically efficient production processes; Sub-project: Integrated evaluation of the substance and material inventory with regard to its compatibility with legal re (in progress)
Köhler, A.; Baron, Y.; Bunke, D.; Gensch, C.; Löw, C.; Magrini, C.; Moch, K.; Möller, M.; in cooperation with Fraunhofer Institute for Solar Energy Systems (Fraunhofer ISE)
Funded by: Federal Ministry for Economic Affairs and Energy (BMWi)

Development of a dynamic upcycling process for the use of different PET secondary raw material sources for technically high-quality plastics applications; Subproject 4: "Ecological assessment of the UpcyclePETplus LFT process chain accompanying development" (in progress)
Köhler, A.; Liu, R.; in cooperation with Easicomp GmbH
Funded by: German Federal Ministry of Education and Research (BMBF)

Publications relating to technology assessment


8. Methodology
8.1. Methodology development and standardization

Product Environmental Footprint – Further development and application (in progress)
Gensch, C.; Antony, F.; Köhler, A.; Liu, R.; Prieß, R.; Rüdenauer, I.; Teufel, J.; in cooperation with ECOFYS; Institute for Energy and Environmental Research Heidelberg GmbH (ifeu); Integrahl AS
Commissioned by: German Environment Agency (UBA)

Möller, M.; Antony, F.; Grießhammer, R.; Gröger, J.; Prieß, R.; in cooperation with Prof. Dr. Rainer Grießhammer; Verbraucherinitiative e.V.; Zentrum für Nachhaltige Unternehmensführung (ZNU)
Funded by: German Federal Ministry of Education and Research (BMBF)

Development of a consistent methodology for estimating the Carbon Footprint of the Berlin senate and district administration (2017)
Antony, F.; Kenkmann, T.; Winger, C.
Commissioned by:

Policy for Sustainable Aquaculture 2050 - Recommendations from the Target Perspective (2018)
Antony, F.; Möller, M.; Teufel, J.
Commissioned by: Oeko-Institut e.V.

Methods and tools of the eco design of plastics packagings (2015)
Möller, M.; Köhler, A.; Moritz, S.; in cooperation with Technische Universiteit Delft
Commissioned by: German Association for Plastics Packagings and Films

Review of the LCA methodology developed by the German Federal Environment Agency (UBA) (2016)
Gensch, C.; in cooperation with Institute for Energy and Environmental Research (ifeu); Integrahl AS
Commissioned by: German Environment Agency (UBA)

Environmental information on products and services - requirements, tools, examples (2014)
Gensch, C.
Commissioned by: The Voice of German Industry (BDI)

8.2. Methodology application

Ex-post evaluation of benefits and costs of environmental legislation (2021)
Hünecke, K.; Baron, Y.; Löw, C.; Schumacher, K.; in cooperation with Centre for European Economic Research; German Research Institute for Public Administration (FOEV)
Commissioned by: German Environment Agency (UBA)
**Life cycle assessment as well as cost-benefit analysis of two pilot aquaponics systems** (2018)
Antony, F.; Baron, Y.
Commissioned by: Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB)

**Study on the Energy Saving Potential of Increasing Resource Efficiency** (2016)
Mehlhart, G.; Antony, F.; Bergmann, T.; Hay, D.; Jenseit, W.; Köhler, A.; Möller, M.; Mottschall, M.; Sutter, J.; in cooperation with Copenhagen Resource Institute (CRI); Ecorys
Commissioned by: European Commission, DG Environment

**Life-cycle comparison of reusable and non-reusable crockery for mass catering in the USA** (2017)
Antony, F.; Gensch, C.
Commissioned by: Meiko Maschinenbau GmbH & Co. KG

**Round Table "Improvement of the Groundwater Situation in the Hessisches Ried" - Scientific Monitoring** (2014)
Alt, S.; Asmus-Miu, D.; Baron, Y.; Bertram, M.; Brommer, E.; Claus, M.; Gensch, C.; Spieth-Achtnich, A.; in cooperation with Martin Bertram; NW Forstw. Versuchsanstalt
Commissioned by: Hessisches Ministerium f. Wirtschaft, Verk. U. L.

**Scoping LCA comparing multiple way bedpans with disposable bedpans made of bioplastics** (2013)
Antony, F.; Blepp, M.; Gensch, C.
Commissioned by: Meiko Maschinenbau GmbH & Co. KG

Gensch, C.
Commissioned by: Ministry for Climate Protection, Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia

**Comparative life cycle assessment of packaging systems for gas heaters** (2010)
Möller, M.; Blepp, M.; Liu, R.
Commissioned by: Vaillant Deutschland GmbH & Co. KG

### 8.3. Critical reviews

**City of Freiburg: Assessment of the environmental performance of acetylated wood** (2015)
Antony, F.; Blepp, M.; Heyen, D.; Moch, K.
Commissioned by: City of Freiburg, Environmental Protection Agency
Critical Review of a comparative LCA on printing processes with particular reference to a technical innovation (2013)
Gensch, C.; Liu, R.
Commissioned by: Henkel AG & Co. KGaA

Möller, M.; Gensch, C.; Liu, R.
Commissioned by: W.L. GORE & Associates GmbH

Critical review of a life cycle analysis study on tomato grown in Morocco (2011)
Gensch, C.; Moch, K.
Commissioned by: Azura Group - Disma International

Publications relating to methodology


