

2019

ENVIRONMENTAL
LAW NETWORK
INTERNATIONAL

RÉSEAU
INTERNATIONAL
DE DROIT DE
L'ENVIRONNEMENT

INTERNATIONALES
NETZWERK
UMWELTRECHT

elni

REVIEW

Strategic Environmental Assessment: The Term “Plans and Programmes” as Interpreted by the European Court of Justice

Thomas Bunge

Strategic Environmental Assessment in Air Quality Planning in Germany

Ulrike Weiland

Remedying Failures to Conduct EIA, Should Not Result in a Game of Snakes and Ladders.

Comment on CJEU Case C-261/18 of 12 November 2019

Attracta Uí Bhroin

Compliance Challenges of the Automotive Industry Concerning Obligations of Article 33 REACH

Simon Johannes Winkler-Portmann

Recent Developments

Market Opportunities for “More Sustainable Chemistry” Through the REACH Regulation

Tricky Relationships: Chemicals, Waste and Product Legislation

International Conference on Green Chemistry

CONTENTS

Editorial	1
Articles	
Strategic Environmental Assessment: The Term “Plans and Programmes” as Interpreted by the European Court of Justice	2
<i>Thomas Bunge</i>	
Strategic Environmental Assessment in Air Quality Planning in Germany	10
<i>Ulrike Weiland</i>	
Remedying Failures to Conduct EIA, Should Not Result in a Game of Snakes and Ladders. Comment on CJEU Case C-261/18 of 12 November 2019.....	18
<i>Attracta Uí Bhroin</i>	
Compliance Challenges of the Automotive Industry Concerning Obligations of Article 33 REACH.....	26
<i>Simon Johannes Winkler-Portmann</i>	
Recent developments	
Market Opportunities for “More Sustainable Chemistry” Through the REACH Regulation	33
Tricky Relationships: Chemicals, Waste and Product Legislation	39
International Conference on Green Chemistry	41
Imprint	43
Authors of this issue	43
elni Membership	44

Editorial

Already the founding conference of elni in 1990 discussed the potential benefits of the ‘Environmental Impact Assessment’ (EIA). The ‘Strategic Environmental Assessment’ (SEA) might be seen as the younger sister of EIA; however in terms of scope bigger. The European Directive on SEA has been subject to a REFIT-process by the European Commission. The results were published at the end of November this year. The conclusion in general terms: The SEA Directive is fit for purpose. However, some Member States expressed their concerns with regard to the recent decisions of the CJEU. *Thomas Bunge* assesses the Term ‘Plans and Programmes’ as interpreted by the highest EU court. Air quality is also a neuralgic point in many cities throughout Europe. In this respect, *Ulrike Weiland* reports on SEA in Air Quality Planning in Germany.

Attracta Ui Bhroin from Dublin based Irish Environmental Network comments on a November 2019 CJEU ruling following the ‘Derrybrien case’ concerning EIA in Ireland. According to *Attracta*, the judgement has profound implications for several legal questions concerning, i.a., obligations to remedy and state liability.

Besides, the current issue of the *elni Review*, once more, features several contributions on the governance of chemical substances. *Simon Johannes Winkler-Portmann* analyses the compliance challenges of the automotive industry concerning obligations of REACH on the communication of ‘substances of very high concern’ (SVHCs). He thus assesses the effectiveness in terms of compliance of the sector’s governance approach to control chemical substances used in every single part of a vehicle, and develops options to overcome existing deficits.

The *Recent Developments* section starts off with *Silke Kleihauer* and *Leonie Lennartz* reporting on the results of a research project aiming to support ‘more sustainable chemistry’ in the textile supply chain, i.a. by broadening the view from the ‘reactive’ compliance position to a ‘proactive’ beyond compliance perspective. Thereby outlining, in addition, the highlights of a ‘Scenario Process’ together with actors from the textile chains, the piece also provides relevant methodological perspectives with a view to supporting transitions of industry sectors in the direction of sustainable development. The contributions by *Winkler-Portmann* and *Kleihauer / Lennartz* are also to be seen in the context of the

pervasive goal of creating more ‘Circular Economies’, which is pushed recently by normative impulses (e.g. recast of the Waste Framework Directive – WFD) and which increasingly is reflected in strategic approaches of companies. Against this background, *Henning Friege* et al. comment on the ‘tricky relationships’ of chemicals, waste and product legislation. Considering the interfaces and intersections of these frameworks they formulate eminent policy recommendations aimed to ensure that ‘Circular Economies’ are capable of avoiding the ‘recycling’ of problematic chemical substances present in (waste) raw materials. Finally, *Martin Wimmer* from the Austrian Ministry for Sustainability and Tourism outlines key findings of an ‘International Conference on Green Chemistry’ during the Austrian EU Presidency. The event discussed perspectives how to foster and better integrate into the legal frameworks the principles of ‘Green Chemistry’, which guide the design of chemical substances, products and processes to avoid hazards and reduce resource use – thus offering potentials for industries to ensure their compliance and also for ‘Circular Economies’.

Claudia Schreider, Julian Schenten and Martin Führ
December 2019

Tricky Relationships: Chemicals, Waste and Product Legislation

Henning Friege, Beate Kummer, Klaus-Günter Steinhäuser, Joachim Wuttke, Barbara Zeschmar-Lahl

The European Commission targets two essential goals in the handling of substances and materials known by the buzzwords ‘non-toxic environment’ and ‘circular economy’. There are numerous interfaces in product, waste and chemicals legislation in these two areas. This leads to conflicting objectives, e.g. with regard to the classification of waste in analogy to chemicals as well as at the border between waste and secondary raw materials that are further processed into products.¹

First of all, it should be noted that neither the one nor the other objective can be completely achieved, and certainly not in combination: The REACH regulation does not include the term ‘non-toxic’. The Waste Framework Directive (WFD) does not define the terms ‘circular economy’ or ‘material cycles’. It is not possible to dispense completely with hazardous substances. In many cases, the hazard (e.g. corrosive, oxidising or flammable properties) is closely linked with the intended function of a substance. Moreover, an environment without any toxins is not realistic because of naturally occurring toxicants. From a scientific perspective, material cycles cannot be closed completely due to the second law of thermodynamics². Most products are not pure but ‘contaminated’ for technical reasons with various substances, such as alloy components, stabilisers, plasticisers, colorants, etc. Moreover, the components or materials of many products cannot be easily disassembled because they are irreversibly bonded. This may require a higher energy input for recycling or prevent it completely for chemical reasons.

No doubt: we must strive to keep hazardous chemicals out of consumer products and also massively reduce the depletion of primary resources! So far, we agree with the European Parliament’s and the Commission’s remark: “[...] it is necessary to promote measures to reduce the content of hazardous substances in materials and products, including recycled materials, and to ensure that sufficient information about the presence of hazardous substances and especially substances of very high concern is communicated throughout the whole lifecycle of products and materials. In order to achieve those objectives, it is necessary to improve the coherence among the law of the Union on waste, on chemicals and on products [...]” (WFD, preliminary note No. 38).

A holistic view on the ‘life cycle’ of products is required, from the extraction of raw materials to waste. Since considerably more resources are to be extracted and recycled from waste in the future, limit values for (potentially) hazardous substances are necessary in both primary and secondary materials. Is such an approach also applicable to waste? How can the interface between product and chemicals legislation and waste management be designed? The Commission launched a consultation in 2018 on the interfaces between waste, chemicals and product legislation³. A statistical analysis of the consultation is now available. However, the Commission does not indicate what conclusions it will take.⁴

We analysed the European legislation (e.g. REACH, WFD, etc.), international Conventions (e.g. GHS, Stockholm, Basel), and some interesting national approaches on the basis of our professional experience in waste management, risk assessment of chemicals and consumer protection. The following considerations might be helpful in order, on the one hand, to take a holistic view of the material flows and, on the other hand, to differentiate at the respective levels so that chemical safety and resource protection can be achieved together in practice.

Chemicals are used in manifold products; manufacturers decide on the type and quantity of materials and chemicals needed for their products. In addition, chemicals, as well as the products into which they have been applied, may be used differently to the intentions of the manufacturers. Hazard classifications as stipulated by the CLP regulation are therefore unavoidable. Substances are processed with other substances to materials, combined to make products and finally mixed as waste with other used products. This can also be coupled with material changes due to biochemical or chemical reactions. This means that the properties of a few starting materials are usually irrelevant for waste with the exception of specific pre-consumer wastes (production wastes). Only in these cases is it still possible to classify and label them as hazardous in accordance with the CLP regulation. For all other types of waste, a risk assessment based on the presence of the substance in the respective product matrix, its physical state and additionally on potential

1 See the comprehensive article published by the authors in Environmental Sciences Europe 31, Article number: 51 (2019); <https://enveurope.springeropen.com/track/pdf/10.1186/s12302-019-0236-7>

2 Kümmerer, K.: “The Second Law says that only under perfect conditions we won’t lose anything. The Third Law says that we will never reach perfect conditions. In other words, we cannot completely avoid losses.” <https://onlinelibrary.wiley.com/doi/full/10.1002/anie.201709949>

3 Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation as of 16.01.2018. COM(2018) 32 final.

4 Summary Report of the Public Consultation conducted by the European Commission based on the main issues identified in the Commission’s Communication on the interface between chemical, product and waste legislation; <https://ec.europa.eu/info/sites/info/files/summary-report-public-consultation-chemical-product-waste-legislation.pdf>.

reactions of the waste mixture is required. Therefore, identical classification criteria at each level are not necessary, and may even be counterproductive.

As re-use and recycling processes should be increased on a major scale to save resources, the flow of information from material and product level to waste management urgently needs to be improved and extended: For the recycling of waste fractions or used goods, information on the presence of substances of concern is needed in order to ensure not only recovery according to the waste hierarchy but at the same time the removal of pollutants and their destruction or transfer to final sinks. However, a database covering only ‘substances of very high concern’ (SVHC) in products foreseen in the new WFD is by no means sufficient. Information is required for possible re-use (e.g. repair instructions, spare parts) and for material recovery (materials suitable for recycling, materials interfering the recycling process). This is the only chance to introduce highly differentiated ‘used product’ or ‘used material’ types. This means that an obligatory information transfer on the content of substances of concern and substances which interfere with recycling processes must also cover articles and should reach the waste manager and recycler. Responsibility for this transfer of information must become part of product responsibility and involve all stakeholders in the product chain – manufacturers, retailers, consumers. Collection systems for specific products with a similar composition for which a recycling process has been established are already a proven solution in some B2B cases and could be extended to consumer products preferably motivated by economic instruments like deposits. However, such systems for ‘pre-sorted’ waste will only work if all parties in the value-added chain (including the waste owner) play their part correctly. This will be even more successful if ‘design for recycling’ is taken into account in product design. The Ecodesign Directive and other product-related directives (e.g. RoHS, Toy Safety Directive) could therefore be supplemented by substance-related requirements in order to facilitate the dismantling of products after use. The mere increase of ‘recycling quotas’ will not result in additional material recovery if information is not enhanced and the separation of waste fractions is not enforced. Internationally approved ‘types of used material’, like those for scrap metals and waste paper, would be a major step forward, if the recommended recycling route and a specific spectrum of minor constituents would be introduced to characterise types of used material.

The recycling of materials from waste is challenging in cases where certain pollutants cannot be separated from the waste stream. In many cases, these products/waste streams have to be incinerated (with energy recovery, if possible) or otherwise disposed of safely. Even if there are no toxic but only interfering substances in the secondary material present this usually leads to ‘downcycling’: Products made of secondary material can then only be used for less demanding applications; their further “recyclability” is limited or no longer possible. Under certain conditions, this can take place in the same way for secondary materials containing hazardous substances, i.e. if there is no relevant risk of carryover of the contaminant into other mass flows and safe disposal of the recycled material in question after further use is possible.

Considering the interfaces and intersections of the regulations mentioned, we conclude:

- We need clear requirements for the recyclability of products in product legislation. The present delimitation of ‘ecodesign’ to the energy consumption requirement in the use phase must be complemented by “design for repair” and ‘design for recycling’.
- Research and development of processes to separate substances of concern from product waste for subsequent recycling should be encouraged.
- Substitution of substances in products which interfere technically with recycling processes should be encouraged, too.
- In the case of substances that have previously been used but are now banned due to their harmful properties, it must be checked whether corresponding materials are acceptable for lower-quality products (downcycling) and, if necessary, whether exceptions can be granted under REACH. Safe disposal of such products that cannot be re-used after their ‘second use’ should be mandatory. This should be encouraged by corresponding labelling.
- The information system for SVHC in products initiated by the new WFD has a too narrow scope and is therefore not sufficient. This must be supplemented because the recycling of materials depends not only on the presence of SVHC but also of other hazardous substances and compounds that cause technical problems.

The development of guiding principles to clarify these interfaces, based on a challenging mission statement, is an appropriate way forward.

Imprint

Editors: Martin Führ, Andreas Hermann, Gerhard Roller, Claudia Schreider, Julian Schenten

Editors in charge of the current issue:
Martin Führ, Claudia Schreider and Julian Schenten

Editor in charge of the forthcoming issue:
Gerhard Roller (Gerhard_Roller@t-online.de)

The Editors would like to thank **Michelle Monteforte** (Öko-Institut) for proofreading the *elni Review*.

We invite authors to submit manuscripts to the Editors.

The *elni Review* is the double-blind peer reviewed journal of the Environmental Law Network International. It is distributed once or twice a year at the following prices: commercial users (consultants, law firms, government administrations): € 52; private users, students, libraries: € 30. Non-members can order single issues at a fee of € 20 incl. packaging. The Environmental Law Network International also welcomes an exchange of articles as a way of payment.

The *elni Review* is published with financial and organisational support from Öko-Institut e.V. and the Universities of Applied Sciences in Darmstadt and Bingen.

The views expressed in the articles are those of the authors and do not necessarily reflect those of elni.

Authors of this issue

Attracta Uí Bhroin, Environmental Law Officer, Irish Environmental Network, Vice President of the European Environmental Bureau, EEB, Dublin, Ireland;
attracta@ien.ie.

Thomas Bunge, Honorary Professor at Technische Universität Berlin, Germany, specializing in environmental and planning law;
thomas_bunge@arcor.de

Henning Friege, Honorary Professor for sustainability sciences (University of Lüneburg, Germany) and lecturer for waste management (TU Dresden, Germany), www.n-hoch-drei.de;
Friege@N-hoch-drei.de.

Silke Kleihauer, Senior Researcher specialising in ecosystems, transformation processes and governance (thereof), Society for institutional Analysis (sofia), University of Applied Sciences in Darmstadt, Germany;
kleihauer@sofia-darmstadt.de.

Beate Kummer, Toxicologist and Chemist, Kummer umwelt:kommunikation (www.beate-kummer.de), Rheinbreitbach, Germany;
buero@beate-kummer.de.

Leonie Lennartz, Research Assistant at the Society for institutional Analysis (sofia), University of Applied Sciences in Darmstadt, Germany;
leonie.lennartz@h-da.de.

Ulrike Weiland, Professor of Geography at University of Leipzig, Germany, specialising in

Urban Ecology and Environmental Planning;
uweiland@uni-leipzig.de.

Klaus-Günter Steinhäuser, acted for about 15 years as Director of the Division for Chemical Safety of the Umweltbundesamt in Dessau-Roßlau, Germany;
klaus-g.steinhaeuser@posteo.de.

Martin Wimmer, Mag. Dr., Federal Ministry for Sustainability and Tourism, Unit 'Chemicals Policy and Biocides', Vienna, Austria;
martin.wimmer@bmnt.gv.at.

Simon Johannes Winkler-Portmann, Research Assistant at the Society for institutional Analysis (sofia), University of Applied Sciences in Darmstadt, Germany;
winkler-portmann@sofia-darmstadt.de.

Joachim Wuttke, worked for many years as Head of the Section for Municipal and Hazardous Waste Management of the Umweltbundesamt Dessau-Roßlau, Germany;
joachim.wuttke@web.de.

Barbara Zeschmar-Lahl, BZL Kommunikation und Projektsteuerung GmbH (www.bzl-gmbh.de), Oytzen, Germany;
bzl@bzl-gmbh.de.

elni membership

If you want to join the Environmental Law Network International, please use the membership form on our website: <http://www.elni.org> or send this form to the elni Coordinating Bureau, c/o IESAR, FH Bingen, Berlinstr. 109, 55411 Bingen, Germany, fax: +49-6721-409 110, mail: Roller@fh-bingen.de.

DECLARATION OF MEMBERSHIP

“Yes, I hereby wish to join the Environmental Law Network International.”

There is no membership fee. The PDF-version of elni Review is included.

If you want to receive the print version of the elni Review the fee is €52 per annum for commercial users and €21 per annum for private users and libraries.

Please indicate, whether you want to receive the elni Review as print version or PDF-version.

Please transfer the amount to our account at Nassauische Sparkasse – Account no.: 146 060 611, BLZ 510 500 15, IBAN: DE50 5105 0015 0146 0606 11; SWIFT NASSDE55.

Name: _____

Organisation: _____

Profession: _____

Street: _____

City: _____

Country: _____

Email: _____

Date: _____

The Öko-Institut (Institut für angewandte Ökologie - Institute for Applied Ecology, a registered non-profit-association) was founded in 1977. Its founding was closely connected to the conflict over the building of the nuclear power plant in Wyhl (on the Rhine near the city of Freiburg, the seat of the Institute). The objective of the Institute was and is environmental research independent of government and industry, for the benefit of society. The results of our research are made available of the public.

The institute's mission is to analyse and evaluate current and future environmental problems, to point out risks, and to develop and implement problem-solving strategies and measures. In doing so, the Öko-Institut follows the guiding principle of sustainable development.

The institute's activities are organized in Divisions - Chemistry, Energy & Climate Protection, Genetic Engineering, Sustainable Products & Material Flows, Nuclear Engineering & Plant Safety, and Environmental Law.

The Environmental Law Division of the Öko-Institut:

The Environmental Law Division covers a broad spectrum of environmental law elaborating scientific studies for public and private clients, consulting governments and public authorities, participating in law drafting processes and mediating stakeholder dialogues. Lawyers of the Division work on international, EU and national environmental law, concentrating on waste management, emission control, energy and climate protection, nuclear, aviation and planning law.

Contact

Freiburg Head Office:

P.O. Box 17 71
D-79017 Freiburg
Phone +49 (0)761-4 52 95-0
Fax +49 (0)761-4 52 95 88

Darmstadt Office:

Rheinstrasse 95
D-64295 Darmstadt
Phone +49 (0)6151-81 91-0
Fax +49 (0)6151-81 91 33

Berlin Office:

Schicklerstraße 5-7
D-10179 Berlin
Phone +49(0)30-40 50 85-0
Fax +49(0)30-40 50 85-388

www.oeko.de

The University of Applied Sciences in Bingen was founded in 1897. It is a practiceorientated academic institution and runs courses in electrical engineering, computer science for engineering, mechanical engineering, business management for engineering, process engineering, biotechnology, agriculture, international agricultural trade and in environmental engineering.

The *Institute for Environmental Studies and Applied Research* (I.E.S.A.R.) was founded in 2003 as an integrated institution of the University of Applied Sciences of Bingen. I.E.S.A.R. carries out applied research projects and advisory services mainly in the areas of environmental law and economy, environmental management and international cooperation for development at the University of Applied Sciences and presents itself as an interdisciplinary institution.

The Institute fulfils its assignments particularly by:

- Undertaking projects in developing countries
- Realization of seminars in the areas of environment and development
- Research for European Institutions
- Advisory service for companies and know-how-transfer

Main areas of research

- **European environmental policy**
 - Research on implementation of European law
 - Effectiveness of legal and economic instruments
 - European governance
- **Environmental advice in developing countries**
 - Advice for legislation and institution development
 - Know-how-transfer
- **Companies and environment**
 - Environmental management
 - Risk management

Contact

Prof. Dr. jur. Gerhard Roller
University of Applied Sciences
Berlinstrasse 109
D-55411 Bingen/Germany
Phone +49(0)6721-409-363
Fax +49(0)6721-409-110
roller@fh-bingen.de

www.fh-bingen.de

The Society for Institutional Analysis was established in 1998. It is located at the University of Applied Sciences in Darmstadt and the University of Göttingen, both Germany.

The sofia research group aims to support regulatory choice at every level of public legislative bodies (EC, national or regional). It also analyses and improves the strategy of public and private organizations.

The sofia team is multidisciplinary: Lawyers and economists are collaborating with engineers as well as social and natural scientists. The theoretical basis is the interdisciplinary behaviour model of homo oeconomicus institutionalis, considering the formal (e.g. laws and contracts) and informal (e.g. rules of fairness) institutional context of individual behaviour.

The areas of research cover

- Product policy/REACH
- Land use strategies
- Role of standardization bodies
- Biodiversity and nature conservation
- Water and energy management
- Electronic public participation
- Economic opportunities deriving from environmental legislation
- Self responsibility

sofia is working on behalf of the

- VolkswagenStiftung
- German Federal Ministry of Education and Research
- Hessian Ministry of Economics
- German Institute for Standardization (DIN)
- German Federal Environmental Agency (UBA)
- German Federal Agency for Nature Conservation (BfN)
- Federal Ministry of Consumer Protection, Food and Agriculture

Contact

Darmstadt Office:

Prof. Dr. Martin Führ - sofia
University of Applied Sciences
Haardtring 100
D-64295 Darmstadt/Germany
Phone +49(0)6151-16-8734/35/31
Fax +49(0)6151-16-8925
fuehr@sofia-darmstadt.de

www.h-da.de

Göttingen Office:

Prof. Dr. Kilian Bizer - sofia
University of Göttingen
Platz der Göttinger Sieben 3
D-37073 Göttingen/Germany
Phone +49(0)551-39-4602
Fax +49(0)551-39-19558
bizer@sofia-darmstadt.de

www.sofia-research.com



sofia



NATUUR
& MILIEU



elni

In many countries lawyers are working on aspects of environmental law, often as part of environmental initiatives and organisations or as legislators. However, they generally have limited contact with other lawyers abroad, in spite of the fact that such contact and communication is vital for the successful and effective implementation of environmental law.

Therefore, a group of lawyers from various countries decided to initiate the Environmental Law Network International (elni) in 1990 to promote international communication and cooperation worldwide. elni is a registered non-profit association under German Law.

elni coordinates a number of different activities in order to facilitate the communication and connections of those interested in environmental law around the world.

Coordinating Bureau

Three organisations currently share the organisational work of the network: Öko-Institut, IESAR at the University of Applied Sciences in Bingen and sofia, the Society for Institutional Analysis, located at the University of Darmstadt. The person of contact is Prof. Dr. Roller at IESAR, Bingen.

elni Review

The elni Review is a bi-annual, English language law review. It publishes articles on environmental law, focusing on European and international environmental law as well as recent developments in the EU Member States. elni encourages its members to submit articles to the elni Review in order to support and further the exchange and sharing of experiences with other members.

The first issue of the elni Review was published in 2001. It replaced the elni Newsletter, which was released in 1995 for the first time.

The elni Review is published by Öko-Institut (the Institute for Applied Ecology), IESAR (the Institute for Environmental Studies and Applied Research, hosted by the University of Applied Sciences in Bingen) and sofia (the Society for Institutional Analysis, located at the University of Darmstadt).

elni Conferences and Fora

elni conferences and fora are a core element of the network. They provide scientific input and the possibility for discussion on a relevant subject of environmental law and policy for international experts. The aim is to gather together scientists, policy makers and young researchers, providing them with the opportunity to exchange views and information as well as to develop new perspectives.

The aim of the elni fora initiative is to bring together, on a convivial basis and in a seminar-sized group, environmental lawyers living or working in the Brussels area, who are interested in sharing and discussing views on specific topics related to environmental law and policies.

Publications series

elni publishes a series of books entitled "Publications of the Environmental Law Network International". Each volume contains papers by various authors on a particular theme in environmental law and in some cases is based on the proceedings of the annual conference.

elni Website: elni.org

The elni website www.elni.org contains news about the network. The members have the opportunity to submit information on interesting events and recent studies on environmental law issues. An index of articles provides an overview of the elni Review publications. Past issues are downloadable online free of charge.

elni Board of Directors

- Martin Führ - Society for Institutional Analysis (sofia), Darmstadt, Germany;
- Jerzy Jendroska - Centrum Prawa Ekologicznego (CPE), Wrocław, Poland;
- Isabelle Larmuseau - Vlaamse Vereniging voor Omgevingsrecht (VVOR), Ghent, Belgium;
- Delphine Misonne - CEDRE - Center for Environmental Law, Université Saint-Louis Bruxelles, Belgium;
- Marga Robesin - Stichting Natuur en Milieu, Utrecht, The Netherlands;
- Gerhard Roller - Institute for Environmental Studies and Applied Research (I.E.S.A.R.), Bingen, Germany.

elni, c/o Institute for Environmental Studies and Applied Research
FH Bingen, Berliner Straße 109, 55411 Bingen/Germany

www.elni.org