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elni REVIEW

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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
Thomas Bunge

Strategic Environmental Assessment in Air Quality Planning in Germany 10
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 18
Attracta Uí Bhroin

Compliance Challenges of the Automotive Industry Concerning Obligations of Article 33 REACH 26
Simon Johannes Winkler-Portmann

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 Uí 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 Tourisms 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

International Conference on Green Chemistry on 5th /6th November 2018 in Vienna

Martin Wimmer

Under the Austrian EU presidency, the Austrian Ministry for Sustainability and Tourism (BMNT) organised a conference on Green Chemistry on 5th/6th November 2018 in Vienna. The present chemical policy in Europe focuses on risk management measures for substances, which are manufactured or imported in volumes over one tonne per year. Depending on the properties, specific uses and the resulting risk for health and/or environment caused by these substances, the European legislation, especially the REACH and CLP regulation, offers a number of optional instruments which aim to delimit or even cease exposure, and thus help to control the risks.

Green chemistry has a strikingly different approach in that it focuses on the pre-market stage of substance design and development. Back in the 1990s two American scientists, John Warner and Paul Anastas, introduced twelve principles, which, while never been formally established, are generally recognised as the guiding principles of green chemistry. These principles can be summarised in five fundamentally different elements which independently form the objectives of green chemistry (see figure).

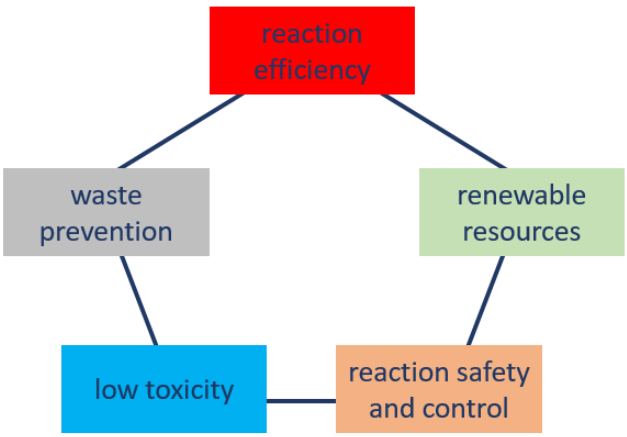

Figure 1: Principles of Green Chemistry (source: the author)

The conference aimed to gather chemical as well as policy experts, stakeholders and various practitioners of green chemistry to discuss the current scientific status in this field, but also the need and opportunities for integrating the principles of green chemistry in European chemicals legislation.

A study[1] in support of the conference presented by Martin Führ (Research Group sofia), identified the extent to which existing EU policies on chemicals already reflect the elements of green chemistry, and proposed ways for how these policies may put more emphasis on the concept. The study's authors suggested to take into account not only the principles of green chemistry, but also the institutional framework, fostering learning for all actors involved in the innovation process.

The conference's first session set the scene by focusing on the eminent role and impact of chemistry in the global world. The speakers, emphasizing the enormous relevance of chemistry for the manufacturing of consumer goods – over 95% of goods being directly linked to chemicals or chemical processes –, referred to the global UN Sustainable Development Goals as the prime political basis for risk reduction management. They called for an urgent shift from current business models, which dominate the chemicals industry and which rely on non-renewable sources and the paradigm of unlimited growth of production and consumption, towards alternative approaches.

The 12 principles of green chemistry
(according to Anastas and Warner)

1. waste prevention
2. atom economy
3. less hazardous synthesis
4. designing safer chemicals
5. use of safer solvents and auxiliaries
6. increase of energy efficiency
7. use of renewable resources
8. reduce derivatives
9. use of catalysts
10. design for degradation
11. real-time pollution prevention
12. minimization of accident potential

Hans Bruyninckx from the European Environment Agency referred to the simple formula Risk = Hazard x Exposure, and argued that if mankind wanted to reduce the risks from chemicals in a world set to increase its production in mere response to the

[1] Published at Führ, M., Schenten J., Kleihauer, S., Integrating "Green Chemistry" into the Regulatory Framework of European Chemicals Policy, Study on behalf of the Austrian Federal Ministry for Sustainability and Tourism, sofia-Studien zur Institutionenanalyse 19-2, Darmstadt 2019.

increase of population, it needs to reduce sharply the hazard by shifting to safe-by-design chemicals.

The second session of the conference was devoted to the science of green chemistry and key research areas such as the development of green solvents, catalysis or the use of waste biomass like lignocellulose or carbon dioxide as renewable chemical resources. John Warner emphasized that to change the minds of chemical academia towards sustainability, fundamental changes in the education system would be necessary, e.g. by inclusion of the subject of green chemistry in chemistry curricula. Thomas Rosenau from BOKU University Vienna reasoned that for the transition of the global chemical industries from fossil to renewable resources, basic research and the development of reliable analytics as well as the physicochemical characterization of new materials would be required. He focused on examples of ligno-cellulosics as feedstock in chemical material production. Liang-Nian He, from Nankai University, China, and Matthias Beller, from Rostock University, Germany, provided fascinating insight into the use of renewable resources, particularly carbon dioxide, for the sustainable manufacturing of carbon organic chemicals. Apart from the use of renewable energy, the development of suitable catalysts is key for making the vision of circularity a reality. Philip Jessop, from Queen's University in Canada, suggested that the term "green" does not have an absolute meaning, but makes sense only by comparing two different approaches of which one might be measured as "greener" than the other, bringing the subject of green metrics into the discussion.

The final session emphasised the political response to developments in green chemistry. Kestutis Sadauskas from the European Commission and Bjorn Hansen from the European Chemicals Agency in Helsinki, Finland emphasised the concept of circular production and consumption, which currently comprises a key issue in European policy. One important challenge in this context, which is to be implemented through REACH legislation, is the progressive substitution of chemicals of concern by less problematic substances. Martin Führ demonstrated how this brings green chemistry into play, and presented a "delta analysis" between the current chemicals' legislation and the innovative approaches by green chemistry. Jochem van der Waals from the Dutch Ministry of Infrastructure and Water Management convinced the audience of the key importance of research and development and presented the "Safe Chemicals Innovation Agenda", which aims to incorporate green chemistry concepts into European research programmes.

Each session was rounded by a plenary discussion and a question-and-answer round with the audience. As a final event, eight start-ups in the field of green chemistry introduced themselves and presented their products. Werner Wutscher from Vienna-based New Venture Scouting in his introductory keynote compared start-ups with speed-boats which, due to their high flexibility, fast product development and close proximity to customers, would be significantly more innovative than the chemical companies cruising like 'supertankers'. A pitching session by several invited start-ups showed the broad variety of products, ranging from green bulk materials and cellulose-based fibres to fabrics for the textile industry and wood-based construction materials, again proving the huge relevance of chemistry in many areas of consumption.

The conference clearly highlighted the need for making green chemistry a key element of chemicals policy in Europe in order to direct this policy towards a fully efficient, circular and fully sustainable economy.

The presentations and conclusions of this conference are available on Internet:

http://www.greenchemistryvienna2018.com/

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.

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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 Tourisms, 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), Oyten, 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.

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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 develop-ing 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 conversation
- Water and energy management
- Electronic public participation
- Economic opportunities deriving from environmental legislation
- Self responsibility

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- German Institute for Standardization (DIN)
- German Federal Environmental Agency (UBA)
- German Federal Agency for Na-ture 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

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, focussing 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 researches, 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.

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

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