STOA-NEWS

Before the Parliamentary summer holidays ETAG was able to complete a range of projects carried out on behalf of the European Parliament by presenting final reports, and decisions on four new projects have been prepared. Subjects of new projects are "Animal Welfare", "Direct to Consumer Genetic Testing", "Food Issues and Human Health" and "ICT and Media Industry – Technological and Market Developments". The project on "Animal Welfare" was started in August 2007, the others are scheduled to be started before the end of the year. Brief information on the objectives and design of the projects will be made available on the ETAG webpage.

Subsequently, five completed projects are presented; the final project reports are available for download on STOA's (http://www.europarl.europa.eu/stoa/default_en.htm) as well as ETAG's (http://www.itas.fzk.de/etag) webpages.

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Alternative Options for Road and Air Transport

The report (authors: Jens Schippl, Christian Dieckhoff, Torsten Fleischer, ITAS) presents a catalogue that offers a sound and concise overview of 'Alternative Technology Options for Road and Air Transport'. Its objective is to contribute to improved transparency and governance of this highly complex and often controversial field. Relevant options are described technically and assessed with regard to their economic perspectives, their contribution to substitute fossil fuels in transport and their potential to reduce greenhouse gas emissions as well as other pollutants.

The catalogue was compiled on the basis of available literature and by structured discussions with experts from science, industry and stakeholder organisations. Virtually, all experts agreed on three main factors that are responsible for the current discussion on alternative fuels:

- The prognosticated phase-out of oil and other fossil resources,
- Potential impacts of climate change,
- Competitive advantages.

The catalogue begins with an introduction to the issues: It illustrates an immense complexity because of far more than 200 possible combinations of source, fuel, drive and infrastructure. For the purpose of the catalogue, about 20 most relevant pathways were selected and clustered in five technological mainstreams: hydrogen and fuel cells, battery electric vehicles, hybrid-technology, biofuels and natural gas. In principle, it is likely that innovative technological developments will become faster implemented and established in the road sector, since in the air sector introducing new technologies means a challenge in terms of security because of tight existing standards. The technologies compiled in the catalogue are all promising but all have clearly weak points and bottlenecks. Each single technological pathway faces difficulties in terms of serving the complete future fuel demand of the EU27. Innovations will be needed in order to tackle the three central challenges in this field: climate change, energy security and competitive challenges. However, in the long run the predicted phase-out of oil would make business-as-usual impossible for all oil-based technological contexts. A phase-out of oil would, at the same time, exert pressure on European innovation regimes – "something new" has to come. Policy strategies should remain flexible and open enough to support ground-breaking innovations.

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The report is available at http://www.itas.fzk.de/eng/etag/document/2007/scua07a.pdf.

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Gene, Vaccine and Immuno-therapies against Cancer

The report (authors: Arnold Sauter, ITAS / TAB and Volker Reuck, IGES-Institute for Health and Healthcare, Berlin) gives an overview of

the state of research on cancer aetiology and therapy on the basis of available literature (especially from TA studies covering aspects of the subject) as well as an analysis of the status of cancer research in the European Framework Programme. The overall aim of this study was to provide a basis for the STOA panel to decide on more comprehensive and detailed analyses or TA studies covering the subject of cancer research and therapy.

The tremendous increase in our knowledge of the molecular biology of carcinogenesis (the mechanisms of cancer formation) has led to the development of new therapeutic approaches during the past 10-20 years. Most of the new therapies are at an early stage of development. The ones that currently are medically most relevant either follow the preventive vaccine approach (directed at "transmissible", virus-related cancers) or are "passive" immunotherapies using monoclonal antibodies such as trastuzumab (Herceptin®). An immune response, the goal of "active" immunotherapies, has a potentially long-term clinical impact on the course of the disease by stabilising the patient's condition and thus prolonging survival, rather than by destroying much or all of the tumour. The patients most likely to benefit are, therefore, those who have a minor tumour burden or who have undergone surgical tumour removal but have a high risk of relapse.

All three fields of innovative cancer therapy hold significant potential for the treatment of tumour patients within the next decade, whereby vaccine and antibody therapies are probably the most promising, while gene therapy will in many cases serve rather as a supporting method. Traditional hormonal and chemotherapies will not lose their relevance in the foreseeable future, but will increasingly be combined with different forms of immunotherapies. Surgery will remain important as well, firstly, because it is necessary for histological diagnosis and, secondly, because surgery will be an integral part of all those innovative treatments delivered directly to the tumour tissue.

The report discusses the representation of cancer research in the European Framework Programme, needs for additional funding of research on immunotherapies, appropriateness of existing clinical trial regulations and problems arising from company ownership rights and protective policies.

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The report is available at http://www.europarl.europa.eu/stoa/publications/studies/stoa178_en.pdf.

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RFID and Identity Management

Until recently Radio Frequency Identification (RFID) was mainly used for logistical purposes to identify cargo. Now it has entered the public space on a massive scale, being added to public transport cards, the biometric passport, micropayment systems, office ID tokens, customer loyalty cards, and others. What do these applications tell about their users and who profits from the information RFID systems generate? In order to study the societal impact of the identification of people through RFID, the project (author**:** Christian van't Hof, Rathenau Institute) applies the concept 'Identity Management'. Identity Management is understood as how a person, interacting with an information system, defines what is known and not known about him/her to others using the system and how this relates to the information known or not known to the persons maintaining the system.

The project was based on 24 case studies on a variety of RFID systems, on expert meetings and a literature review. The findings suggest that, relative to the scale of implementation, few Identity Management issues actually occur. In general, both user and maintainer of the RFID settings perceive RFID merely as an electronic key or wallet. The reason for this can be twofold. First of all, in all the cases it is clear who maintains the data and needs to comply with the guidelines on data protection. Second, many systems currently only cover a small area of a specific setting and run parallel to legacy systems. The RFID systems therefore only disclose small fragments of their users' identity, limiting the maintainers' possibilities for control.

In the near future this could be different. Once RFID systems work exclusively with RFID it will become easier to aggregate and analyse the data on the level of the whole user population. Further, once different RFID systems might become connected to each other, or to other technologies such as GSM, GPS, CCTV and the Internet, a much richer image of its users will appear. The report identifies and discusses the following challenges ahead:

1. RFID users need to know what maintainers can and are allowed to do with RFID data.
2. RFID users should play a role in developing new RFID environments.
3. If personal data from different RFID settings are merged it should remain clear who is responsible for handling these data.
4. The Privacy Guidelines and the concepts of personal data and informational self-determination need to be reconsidered in the light of an increasingly interactive environment.
5. Governments should take a clear stance on whether RFID bulk data will be mined for investigation purposes.

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The report is available at http://www.itas.fzk.de/eng/etag/document/hoco06a.pdf.

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Intellectual Property Rights

The project (author: Bjoern Bedsted, Danish Board of Technology) has been initiated in order to assess how the European patent system best fulfils its objective of defining the exclusive rights granted to inventors so as to further the goal of enhancing social and economic welfare by means of encouraging inventions and their distribution. Finding the right balance is important, since the reward offered to inventors in the form of exclusive rights provides the incentive to innovate, but if the reward is too excessive, it may hamper innovation and the distribution of knowledge.

The report is based on the results of an inter-disciplinary expert working group, consisting of both legal and economic experts including hands-on experience from the European Patent Office. The report reflects the commonly developed proposals of the group.

The report identifies that worldwide, the most important patent trends happening now relate to the number of patent applications being made. Specifically, applications received by patent offices continue to grow steeply, resulting in high numbers of granted patent rights. One potentially undesirable consequence of this development is a dampening effect of the incentive to innovate in the first place. This is mainly because costs associated with inventive activity have risen, often substantially. Rising costs reflect, among other things, overcrowded and overlapping sets of rights in specific research areas. Another effect of increased numbers of patent applications is the extra and sometimes severe pressure it puts onto examining offices and the sheer volume and complexity of the applications received.

These sorts of trends fundamentally challenge conceived notions of the patent system. The main impact is that there may be a deteriorating effect on patent quality in terms both of the clarity and balance of individual rights given to inventors, and the effectiveness of the system as a whole to meet economic and social welfare aims.

The Working Group believes a package of interrelated options is necessary to reflect the intricacy of the policy situation and to mirror the many connected and complex fields involved. For instance, the workings of the European patent system are closely related with rules about EU competition law and policy initiatives regarding science and innovation. For these reasons, the Working Group puts forward the following six policy options that vary in scope and in method, and aim at tackling specific areas of concern:

- Insertion of the economic mission of the patent system in the European Patent Convention (EPC)
- Enhancing governance within the European patent system
- Improving quality aspects in regard to patentability standards and patent grant procedures

- Dealing with emerging technologies
- Increasing access to patented inventions
- Facilitating defensive publications.

STOA Workshop

The results of the project were discussed at a STOA Dissemination Workshop: "Policy options for the improvement of the European Patent system" in the European Parliament on June 14th 2007.

The Working Group members presented the policy options in the report and after that the audience was invited to participate in a discussion focussing on the policy options put forward.

The following Working Group members were present at the workshop:

- Peter Lotz, Head of Department of Industrial Economics and Strategy, Copenhagen Business School in Denmark presented the policy option "*Insertion of the economic mission of the patent system in the European Patent Convention*";
- Francesco Lissoni, Professor of Applied Economics, University of Brescia, Italy presented the policy option "*Enhancing governance within the European patent system*";
- Wim Van der Eijk, Principal Director International Legal Affairs and Patent Law, EPO, Munich, Germany presented the policy option "*Improving quality aspects in regard to patentability standards and patent grant procedures*";
- Jens Schovsbo, Professor, University of Copenhagen, Faculty of Law, Denmark presented the policy option "*Dealing with emerging technologies*";
- Geertrui Van Overwalle, Professor of IP Law, University of Leuven, Belgium presented the policy option "*Increasing access to patented inventions*".

The members of the Working Group pointed out four very important issues:

1. The Working Group strongly recommended the European Parliament to put an effort into the *insertion of a preamble in the EPC* and a future Community Patent. The preamble is very important because it clearly sets the perspective through which the patent system will be looked at when developing policies on patent issues. The adoption of a preamble would also introduce a dialogue about the competition issues in relation to collective rights management models and in specific emerging technologies. With regard to emerging technologies, the preamble would guide the decision on whether the adoption of a specific technology within the European patent system is suitable from the point of view of the purpose of the patent system.
2. The Working Group called for more political leadership and expressed their wish for the European Parliament to *recognise the importance of the patent system*. The patent system is an essential policy tool in modern society and the European Parliament should pay attention to the need for a fact based and open discussion about the system. The European Parliament should also consider the group's proposal to introduce a Standing Committee on patent issues and an External Advisory Body linked to such a committee.
3. The Working Group encouraged the European Parliament to *deal in more detail with issues of access to knowledge*. The European Parliament could do so by further exploring the collective rights management models and by making the competition law framework more flexible in order to promote and enhance those models. From both a civil society and users' point of view, this is of great importance.
4. European universities: The European Parliament should be aware that special incentives for universities to patent more may carry the risk of *increased litigation over who owns the patents*. Many patents are co-owned by the universities and the business community, and thus lowering fees for these co-owned patents would not be an advantage to the universities because the co-owners often in fact are big companies.

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The report will be available at STOA's (http://www.europarl.europa.eu/stoa/default_en.htm) as well as ETAG's (http://www.itas.fzk.de/etag) webpages soon.

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The Role of Nanotechnology in Chemical Substitution

The project (author: Ulrich Fiedeler, ITAS) was focused on the identification of concepts or ideas for substitution in the field of Nanotechnology (NT). The assessment of the hazardous potential of the nanotechnological substitute itself was not objective of this study, nor was the evaluation of the feasibility and efficiency of the concepts for substitution. Since most NTs are at an early stage of development there are only a few publications and only very few research projects directly addressing the substitution of hazardous substances by NT. The search for existing options to substitute hazardous chemical substances by NT was based on a review of publications in relevant scientific journals and on expert interviews. To validate the findings of the project nine experts from different fields of NT or chemistry with nanotechnological background were invited to a workshop at the European Parliament. The findings can be subdivided into seven categories.

Coatings

Most examples for substitution which have been found belong to the field of surface treatments like coatings, paints, and texturing surface, as e.g. self cleaning surfaces or coatings with reduced adhesion as substitution of antifouling agents like TBT. In addition with these coatings the use of cleaning agents could be reduced or even made superfluous.

Flame retardants

Several approaches to replace bromine flame retardants with products using NT have been identified. Bromine is used as a reaction inhibitant by absorbing oxygen. A similar effect could be realised by using nanoparticles. If appropriate nanoparticles are added to the coatings, oxygen is accumulated in case of burning and builds up an oxide layer stopping further reaction.

Flexibilisers

Flexibilisers lead to elastic bindings between the polymer chains. It is known from tires that the addition of nanoparticles can enhance the flexibility of the rubber mixture. A similar effect is conceivable with plastics.

Substitution or reduction of solvents

Organic solvents or volatile organic compounds (VOC) in general are one group of chemicals which are often toxic, bio-accumulative and, due to their volatility, difficult to control. Solvents can not be directly substituted by NT. But NT may change processes in a way that in some cases solvents can be reduced or will even become dispensable in future.

Catalysts

Research in this field was already in the dimension of nanometers, therefore it is not clear to which extent further developments in this field may be attributed to NT. The development of new catalysts is seldom directly aimed at substituting hazardous substances. Instead, in the development of new catalysts several objectives are pursued at the same time. Therefore, substitution of hazardous substances in this field is often very indirect.

Drug targeting

Within NT there exist several attempts to improve the efficiency of pharmaceuticals by bringing them directly to the cells where they are needed. The main goal is to reduce the side effects, hence making the therapy compatible. But these developments have also positive effects on the environment: they are able to reduce chemotherapeutics which are detrimental for the environment as well as the release of antibiotics which causes severe problems due to resistance of bacteria.

Remediation

A lot of the literature concerning nanotechnology and environmental issues deals with the potential of NT for cleaning up polluted air, water, and soil. Most of the research activities concerning the development and use of catalysts in respect to hazardous substances are not in order to avoid them but to decompose them after they have been released into the environment. These examples are not within the scope of the project. Nevertheless, it should be mentioned that most articles on environmental benefits attributed to NT are of this nature.

Considering these findings the report concludes that at present times NT cannot contribute in an exceptional manner to a large increase of substitution of hazardous substances. Instead it revealed that the contribution of NT with respect to the reduction of hazardous substances is manifold but incremental. However, most of the interviewed or invited experts assign NT a considerable potential for substitution in the future.

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Als federführende Institution einer Gruppe von fünf europäischen Einrichtungen, der European Technology Assessment Group (ETAG; http://www.itas.fzk.de/etag), berät ITAS das Europäische Parlament in Fragen der sozialen, ökonomischen und ökologischen Bedeutung neuer wissenschaftlich-technischer Entwicklungen. Der im Oktober 2005 unterzeichnete Vertrag hat eine Laufzeit von zunächst drei Jahren. Direkter Adressat der Arbeiten von ITAS ist das so genannte STOA-Panel („Scientific and Technological Options Assessment"), – ein aus Mitgliedern verschiedener ständiger Ausschüsse des Parlamentes zusammengesetztes parlamentarisches Gremium zur Technikfolgenabschätzung (http://www.europarl.eu.int/stoa/default_en.htm). ITAS (als federführende Einrichtung) kooperiert mit folgenden Partnern:

- Rathenau-Institut, Niederlande,
- Parliamentary Office of Science and Technology (POST), Großbritannien,
- Danish Board of Technology (Teknologirådet), Dänemark,
- Flemish Institute for Science and Technology Assessment (viWTA), Belgien.

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