

Institute for Prospective Technological Studies

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## director's foreword

In the year 2000 IPTS has been able to reap the fruits of its clearer focus on foresight activities and to provide significant input to the EU policy making process. Without risk of exaggeration, we can say that the year 2000 has been the most productive one for this young Institute.

Starting with the landmark Futures Conference in Brussels, attended by Commissioner Philippe Busquin, the Portuguese Research Minister Prof. Mariano Gago (then President in office of the Research Council), the Vice President of the European Parliament Alejo Vidal-Quadras Roca and Nobel Prize winner Prof. Robert Solow, together with leading industrialists and more than 600 delegates, the pace of the Institute's activity has been extremely lively during the rest of the year.

Among the most significant other achievements, I would particularly mention the elaboration of the working paper on "Emerging Priority Research Themes For Europe", the "Scenarios for Ambient Intelligence In 2010" report, at the request of DG Information Society in support of the Advisory Group for the IST Programme (ISTAG), and the release of the first 8 "Best Available Techniques Reference Documents", result of the hard and thorough work of the European Integrated Pollution Prevention & Control Bureau (EIPPCB) staff and technical working groups.

The Institute also provided a very significant contribution to the preparation and organisation of the Conference on "Science and Governance in a Knowledge Society: The Challenge for Europe" held in Brussels in October.

During the course of the year, IPTS was honoured to receive the visit of delegations from the European Parliament's Committee on Industry, External Trade, Research and Energy led by its Chairman, Mr. Carlos Westendorp y Cabeza, from the "Committee for the Future" of the Parliament of Finland and from the Economic and Social Committee's "Single Market, Production and Consumption" (INT) Section. Prof. Ramon Marimon Suñol, Spanish Secretary of State for Science and Technology Policy, and Prof. Carlos Américo Pacheco, Brazilian Executive Secretary of the Ministry of Science and Technology, were also among our distinguished guests in 2000.

We have also been working hard to improve the way we operate and our relationship with our institutional customers. During 2000 IPTS carried out its first Total Quality Management self assessment exercise, launched a targeted customer survey and negotiated the launch of the new European Science and Technology Observatory (ESTO), a fundamental resource and a powerful connection with some of the best research institutions in Europe.



## director's foreword

We look forward to building on these achievements in the preparation of our future work, where one of our main priorities will be the enhancement of the integration of IPTS within the newly focussed JRC strategy, in the context of the European Research Area. Particular attention will also be paid to the development of prospective activities of direct relevance to the enlargement process. Of course, we will need to address the areas for improvement that have been identified in the course of the year.

IPTS Staff worked very hard and with full dedication during this year, meeting extremely tight deadlines and delivering high quality output. They deserve full recognition for their accomplishments.

**Jean-Marie Cadiou**

## IPTS Mission Statement:

The mission of IPTS is to provide techno-economic analyses in support of the European policy-making process. IPTS' prime objectives are to monitor and analyse science and technology developments, their cross-sectoral impact, their inter-relationship with the socio-economic context and their implications for future policy development. IPTS operates international networks, pools the expertise of high level advisors, and presents information in a timely and synthetic fashion to policy makers.

The Institute for Prospective Technological Studies (IPTS) is one of the eight institutes of the European Commission's Joint Research Centre (JRC), with sites in Ispra (Italy), Geel (Belgium), Karlsruhe (Germany), Petten (the Netherlands) and Seville (Spain).

IPTS was established in Seville in September 1994 with the objective of trying to bridge the gap between S/T and Society based on the observation that technological development plays an increasingly important role in the policy-making process. In fact, most of the work undertaken by IPTS is in response to specific requests for assistance from the European Union Institutions (mainly the European Commission services and the European Parliament), as well as to third party public or private organisations, within the framework of the competitive mandate given to the Joint Research Centre.

IPTS' research activity is carried out within the framework of the JRC institutional work programme, but the Institute also participates in "competitive activities" (particularly in the form of shared-cost actions funded by the European Union's 5th RTD Framework Programme).

Our institutional research is project-based and structured around the following areas:

- The "Futures" Project

- Enlargement: Building Linkages On Prospective Activities
- Life Sciences And Impact On Society
- Electronic Business
- Building The Information Society
- Environment And Society
- European Integrated Pollution Prevention And Control (Eippc) Bureau
- Energy & Climate Change
- Sustainability In Transport And Mobility
- Mediterranean And Regional Perspectives
- Knowledge And Skills: Perspectives For Europe

IPTS operates a series of networks such as the European Science and Technology Observatory (ESTO), providing real-time information on the socio-economic significance of scientific and technological advances. It draws on resources and competencies of experts in 35 major 'think tanks' and other institutions across Europe and it functions as a virtual network-based "European office of technology assessment".

IPTS publishes a monthly peer-reviewed magazine, the IPTS Report, in four languages (English, French, German and Spanish).

The IPTS Report, together with many other IPTS studies and publications, is freely available in full on IPTS' Website: [www.jrc.es](http://www.jrc.es)

# highlights of IPTS' work in 2000



## Futures

The Futures Conference at the start of the year provided a high profile launch for IPTS into 2000. The Conference was attended by Commissioner Philippe Busquin, the Portuguese Research Minister Prof. Mariano Gago (then President in office of the Research Council), the Vice President of the European Parliament Alejo Vidal-Quadras Roca and Nobel Prize winner Prof. Robert Solow, together with leading industrialists and more than 600 delegates. The conference also had a wide media cover. As a consequence of the final reporting of the Futures project considerable interest was generated both in the results of the project itself and more widely in the work of the JRC and IPTS. Aside from a number of official delegations' visits to IPTS and invited speeches to prominent events, several important new projects were requested of the Institute including two projects in support of the preparations for the sixth EU RTD Framework Programme. The first concerned an exercise based on national foresight analyses and an expert group to identify emerging priority themes for research in Europe. The second, concerned work for the Advisory Group for the IST Programme on technologies and research implications of Ambient Intelligence.

The Futures project has catalysed the energies of the Institute in a collective collaborative effort to which all the different sectorial teams actively contributed.

One of the major findings of this exercise concerned the cross-impact of very fast technological change at a time when Europe's workforce is growing older. Pure demographic trends show that from 2007, if no corrective action is taken, the workforce will shift into negative balance. From this date the number of people leaving the working population would rise by around 100 thousand each year, meaning that in just one year from 2019 to 2020 the workforce could decline by nearly one million people. Already in the next few years, with the average age of the workforce rising, a programme of investment in skills of older workers is one of the most important issues facing European enterprises and governments. With new technologies coming on stream all the time - biotechnologies, new materials, nanotechnologies as well as information and communication technologies - there will be a high obsolescence of knowledge. This requires more than just extending traditional forms of training to older citizens. Indeed, rather than a simple extension of up-front education to the elderly, a systematic effort on life long learning is required that combines new forms of learning and the design of career paths that keep the workers motivated all the way up the age profile.



## Life Sciences

IPTS had started in 1998 to provide support to EC's position in the WTO-hormone case. The research performed by the Life Sciences Project, in collaboration with the Environment Institute

## highlights of IPTS' Work in 2000

of the JRC and DG RTD, not only concluded that there are potential risks for human health but that the environmental impact of these anabolic agents used in cattle raising is more important than previously thought. In the same line, IPTS provided technical support to the Committee on Environment, Public Health and Consumer Policy (EP) in the preparation of an EP Hearing on Endocrine Disrupters held on 18 April 2000.

The Life Sciences project has launched a new prospective activity to identify key research areas in the field of food technology and food safety, and it has contributed to the IPTS-wide study on emerging priority themes for research in Europe.

IPTS alert function was evident in the organisation of a workshop on "Genetic Testing Services – Quality Assurance and Need for Harmonisation in the EU?". Indeed there is no quality assurance or harmonisation of the services, neither at the European level nor at the National level, while quality and reliability problems of genetic tests are demonstrated.



### Information and Communication Technologies

The year 2000 saw the first full year of operation of the ICT Unit.

The main highlights of the year were:

- the establishment for DG Enterprise and the European Parliament's Committee on Economic and Monetary Affairs of an Observatory on Electronic Payment Systems in Europe (ePSO);
- the provision of support to ISTAG<sup>1</sup> and DG Information Society in developing scenarios of a future ambient intelligent environment as a prelude to the definition of relevant research lines in the Sixth Framework Programme (a joint activity led by the Futures Group);
- a study for DG Enterprise on the impact of sectoral convergence on the competitiveness of the European Consumer Electronics Industry (ConCom);
- the start of a project aimed at assessing the sectoral economic impact of electronic business, in which IPTS is working with the OECD and ESTO partner TNO (EBIP – Electronic Business Impact Project).



### Environment and Society

IPTS has actively supported the work of the Group of Commissioners responsible for the preparation of the EU Strategy on Sustainable Development to be presented by the Commission at the Goteborg Summit in June 2001, in response to the mandate from the Helsinki Summit. IPTS

<sup>1</sup> ISTAG - Information Society Technologies Advisory Group, composed of representatives of industry and academia.

## highlights of IPTS' Work in 2000

has, in particular, reviewed the national Sustainable Development Strategies of the EU member States and of ten third countries.

The Environment and Society project has supported the policy making process of the EU in environment related issues at different stages, such as the Green Paper on Integrated Product Policy, The White Paper on the Chemical sector, or the proposed regulations on waste from electric and electronic equipment. With this aim, on request of the Parliament and of different services of the Commission, reports were published in 2000 on the management of waste of electric and electronic equipment, on the impact of regulation in the European chemical industry and on Eco-design. These reports have provided relevant background information and ex-ante assessment of alternative regulatory approaches.

Collaboration with the European Environment Agency has intensified in 2000. IPTS has participated in the work programme of the European Topic Center on Waste created to assist the EEA to fulfil its mandate



### Sustainability in Transport and Mobility

The ENIGMATIC<sup>2</sup> Thematic Network was launched – IPTS being among the main partners together with Intema, VITO and TNO – providing solutions for the smooth market introduction of innovative clean transport solutions.

<sup>2</sup> European Network on Integration of new Generation Mobility And Transport Innovative Concepts.

The IPTS Report dedicated its September 2000 Special Issue to 'Quality of Air in European Cities: Urban Transport Challenges', with contributions from some of the best EU transport experts in the field.

IPTS started providing its scientific expertise to the Common Indicators Initiative supported by DG Environment and focusing on monitoring progress towards sustainability in European urban areas.



### European Integrated Pollution Prevention and Control Bureau

By the end of year 2000, 8 "best available techniques reference documents" (BREFs) stood completed and work had commenced in a further 12 sectors. From a total foreseen first round BREF program of 32 sectors, nearly two thirds of the program has got under way and one quarter finished. The 8 completed BREFs include the production of Iron & Steel; the manufacture of Cement & Lime; the manufacture of Pulp & Paper; the production of Non-Ferrous Metals; manufacture of Glass; Chlor-Alkali production; Ferrous Metal Processing; and the first horizontal subject of Industrial Cooling Systems.

In April, the German Federal Environmental Agency organised in Stuttgart a European conference entitled "The Sevilla Process: A Driver for Environmental Performance in Industry", jointly sponsored by the European Commission, the German Ministry for the

Environment, Nature Conservation and Nuclear Safety and the Ministry of the Environment and Transport of the State of Baden-Württemberg and attended by more than 450 participants from 25 European countries representing authorities as well as industry, technical development institutions and environmental NGOs.

A special workshop entitled "The Sevilla process for new players - An introduction to the BAT information exchange under the IPPC Directive", took place on 14-15 December in Seville. This drew attention from a large number of participants both from future European partner countries as well as from industry sectors yet to be addressed in the work program.



### Energy and Sustainability

The recent price outburst in oil markets has shocked OECD economies after a relatively long period of low oil prices. This has brought back the issue of security of supply as a crucial aspect of the EU Energy policy and triggered the Commission's Green Paper on Security of Supply. In addition, the year 2000 has witnessed the failure of the United Nations Framework Convention in Climate Change (UNFCCC) Conference of Parties held in The Hague. This was basically due to the difficulties to find satisfactory agreements aiming at curbing down carbon emissions, directly linked to fossil fuel energy consumption. Technology changes and the redirection of research priorities can open the

way for a less costly adaptation process to the new reality within the energy system. IPTS activities during the year 2000 have been organized to contribute to the response of these challenges, giving input to several working groups of the European Climate Change Program, coordinated by DG Environment.

The crucial issue determining trends not only in energy markets but also in energy technologies is the climate-protecting policy, currently implemented in many countries. A cluster of activities around those issues are carried out within the Energy and Climate Change project, aiming at evaluating the potential threat of global warming as well as at identifying and understanding the most effective countermeasures to cope with this problem.



### Knowledge and Skills

In 2000 IPTS worked on the project "Gateway to the European Learning Area" and took part in presentations of mock-up versions of the future web site on learning resources. One preliminary version of the Gateway was presented in March 2000 to Commissioner Reding at the conference for European ministers in the field education, training and culture in Lisbon. IPTS completed its involvement in the first phase of the Gateway project by delivering the results of a 9-months feasibility study to the main customer DG Education and Culture.

## highlights of IPTS' Work in 2000

Corporate Spin-Offs are important drivers for knowledge transfer, knowledge relationships and collaboration, and knowledge-based entrepreneurship. In 2000, IPTS invited selected experts from private and public institutions and companies to a workshop with the objective to assess the possible role of public policies in promoting Spin-Offs, making best use of their positive impact in job creation and competitiveness. As input, IPTS has set up a theoretical model and investigated the empirical evidence of the success factors of Corporate Spin-Offs.

In 2000, IPTS set up a thematic network on "Socio-Economic Evaluation of Public Research and Technology Policies (EPUB)". This network aims at improving science and technology policy definition and understanding by providing an assessment of rationales, methodologies and indicators used in RTD evaluation and to analyse the implications for evaluation of new S&T policy approaches. IPTS is acting as scientific coordinator of the network, which is constituted by 13 partner institutions from 10 countries.



### Enlargement

The "Prospective Dialogue on EU Enlargement", initiated in 1999, focused on exchanging "best practices" in foresight and promoting the development of national foresight initiatives in Pre-Accession Countries (PAC). In this context, three workshops and a High-Level Meeting underpinned the further development of the Network on Foresight in 2000. They brought together experts from 12 Candidate Countries and from EU Member States.

In April, a meeting in Nicosia/Cyprus discussed the complex issue of awareness building on foresight themes and the process of communication of results to policy makers. A workshop in Warsaw/Poland (June 2000) discussed different national experiences and best practice in methodological questions. In Tallinn/Estonia (September 2000) the network focused on a specific region: the Baltic Sea, and conducted in depth discussions on concrete issues of common regional importance like environment, transport and energy.

As one of the main conclusions in 2000, high-level experts agreed at a Meeting in Tallinn (September 2000) that a major prospective project should be started for Candidate Countries, led by IPTS and with strong participation by PAC experts.

# the futures project

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The Futures Project completed its first two-year cycle in February 2000 with a large and successful conference in Brussels. The conference was preceded by the publication of the final wave of seven reports: the Technology Map, the Employment Map, the Competitiveness Map, the Knowledge and Learning Report, the Enlargement Report, the Societal Bill and a Synthesis Report. As a follow-up a complete set of proceedings was also published.

In addition to the conference the team was highly active in presenting the results of the work at conferences and seminars and to the large number of official delegations and unofficial visitors (see list below).

As a result of the rising profile of the Futures Project two important new short-term projects were requested. The first was a cross-institute project led by the Futures Team drawing on national foresight analyses and an expert group to identify emerging priority themes for research in Europe. The expert group included leaders of recent national foresight programmes, technology strategists from industry and other leading area specialists. In addition, the work was supported by a series of background papers based extensively on the large body of recent national

foresight exercises were drafted by sectoral experts in IPTS and its partners, mainly from the ESTO network of national institutes engaged in technology analysis and foresight<sup>3</sup>.

This project was undertaken in support of DG Research in their preparation of the European Research Area. The project ran from mid-September to mid-December through a cycle of three interactive workshops, finalising with presentations to the CREST and to the Committee of Personal Representatives of Pre-Accession Countries in December 2000. The report identified a series of five 'Megachallenges' for Europe in the coming years: A Knowledgeable Europe to compete in the digital economy, Sustainable development, Lifelong Health and a Healthy Society, Mobility and Energy, Building Europe. In addition a set of ten key research areas were described, four of which were related directly to the Mega Challenges: Knowledge Sciences & Technologies, Health Sciences & Technologies, Technologies for a Sustainable Economy, Social Sciences in support of Building Europe. The other six were more generic: Gene Technologies, Information and Communication Technologies, Advanced Materials, Nanoscience, Nano & Precision technologies, Complexity and Complex Systems, Fundamental Sciences.

<sup>3</sup> These are available in draft form as downloadable working papers on the project web-site <http://prioritis.jrc.es/>

## the futures project

The second short-term project was undertaken at the request of DG Information Society in support of the Advisory Group for the IST Programme (ISTAG). This project aimed to build scenarios to elaborate the ISTAG vision statement for Framework Programme 5 that laid down a challenge to:

*“Start creating an ambient intelligence landscape (for seamless delivery of services and applications) in Europe”<sup>4</sup>.*

Ambient Intelligence (AmI) stems from the convergence of three key technologies: Ubiquitous Computing, Ubiquitous Communication, and Intelligent User Friendly Interfaces. According to this visionary concept, humans will eventually be surrounded by intelligent interfaces supported by computing and networking technology which is everywhere, embedded in everyday objects such as furniture, clothes, vehicles, roads and smart materials, even particles of decorative substances like paint.

Following the ISTAG vision statement in 1999, Ambient Intelligence became broadly embedded in the IST work programme for 2000 and 2001 and is one of the key concepts being used to develop the Information Society aspects of Framework Programme 6. To help develop the new Framework Programme a scenario development exercise was launched as a joint project between DG Information Society and the Joint Institute for Prospective Technological Studies (the Futures Team and the ICT and Life Sciences Unit). The project was steered by a working group of the ISTAG chaired by Dr Martin Schuurmans (CEO of Philips Industrial Research). The scenarios were developed and tested in two interactive workshops with over 25 external experts<sup>5</sup>.

The results were presented through four scenarios used to identify key “drivers” (technological, socio-economic and political), baselines, uncertainties, constraints, opportunities and potential points of bifurcation or convergence surrounding AmI in Europe. Time horizons are proposed for technologies, applications, services and products to arrive on the market around 2010.

The work had a strong impact on the work of the ISTAG and provided a main intellectual underpinning for its inputs to DG Information Society in the run up to the Framework 6 development.

In addition to these projects highlights, further exploitation of Futures work resulted in the following meetings:

- FOREN Workshop ‘Reconciling Foresight with policy making at regional level’ (Seville, 19-20 June 2000)
- Workshop ‘Mobile Europe’ (Barcelona, 30 June 2000). A report is being prepared for publication.
- Workshop ‘Quantitative modelling of Europe’s social expenditure’ (Brussels, 25-26 September 2000) with the intention of producing a special issue of the journal ‘Futures’ to be published in the second half of 2001.



<sup>3</sup> ISTAG Orientations for WP2000 document (July 1999) <ftp://ftp.cordis.lu/pub/ist/docs/istag-99-final.pdf>

<sup>4</sup> Additional support was being provided by Professor Ronan Sleep of the University of East Anglia and a European Science and Technology Observatory team led by PREST, University of Manchester.

## Publications and meetings (1999-2000)

### Refereed Journals:

- ▼
- Ducatel, K.J. (2000) Sustainable Information Societies: Prospectives towards 2010, *Foresight* 2 (5): (forthcoming autumn)
- Ducatel, K.J., Burgelman, J-C and Bogdanowicz, M. (2000) 'The Media Industry in the Digital Age: Five Scenarios on Changing Industries, Employment Trends and Occupational Change, *Info*, Vol. 2(4): 339-360
- Ducatel, K.J. and Burgelman, J-C (2000) ICTs and employment in Europe: Outlooks to 2010, *Communications and Strategies*, 38 (2nd Quarter): 309-332
- Ducatel, K.J. (1999) Information and Communication Technologies: Future Perspectives on ICTs, *Foresight*, 1 (6) December: 519-535.
- Ducatel, K.J. (1999) Ubiquitous Computing: A New Convergence Debate? *Communications and Strategies*, 36 (4th Quarter): 185-205.
- Ducatel, K.J. (1999) Ubiquitous Computing - Industrial and Employment Challenges, *IPTS Report Futures Special Issue* 38: 16-21 (I edited this special issue).

### Contributions to books

- ▼
- Ducatel, K.J. (2001) The IPTS Futures Project: Between Research and Policy, Contribution of the Social Sciences to Knowledge and Decision-Making, OECD, Paris
- Ducatel, K.J. (2000) "Sustainable Information Societies in Europe", pp: 97-100 in Bohlin, E. (ed.) *Towards a Sustainable Information Society: Conference Proceedings*, 21-22 February, European Commission, DG Information Society, Brussels.
- Ducatel, K.J. (2000) "Selected Sustainability Findings from a Major Pan-European Futures Study", pp: 38-39 in Bohlin, E. (ed.) *Towards a Sustainable Information Society: Conference Proceedings*, 21-22 February, European Commission, DG Information Society, Brussels.
- Ducatel, K.J. and Burgelman, J-C (2000) *Towards 2010: Employment Trends in the Service Economy, The Future of Service Industries: Challenges Faced by the European Statistical System*, Eurostat, Luxembourg (ISBN: 972-673-424-x)

### Recent Published Research Reports:

- ▼
- Futures Team (2000) The IPTS Futures Project: Synthesis Report: Futures Report Series, EUR 19038, IPTS-JRC, European Commission, Seville.
- Weber, M., Meske, W. and Ducatel, K. (1999) The Wider Picture: Enlargement and Cohesion in Europe, Futures Report Series 15, EUR 19035, IPTS-JRC, European Commission, Seville.
- Ducatel, K.J. and Burgelman, J-C. (1999) Employment Map: Jobs, Skill and Working Life on the Road to 2010, Futures Report Series 13, EUR 19033, IPTS-JRC, European Commission, Seville.
- Cahill, E & Scapolo, F. with Ducatel, K.J., Münker, T, Aguado, M., Eder, P., Leone, F. and Hernandez, H. (1999) Technology Map, Futures Report Series 11, EUR 19031, IPTS-JRC, European Commission, Seville.

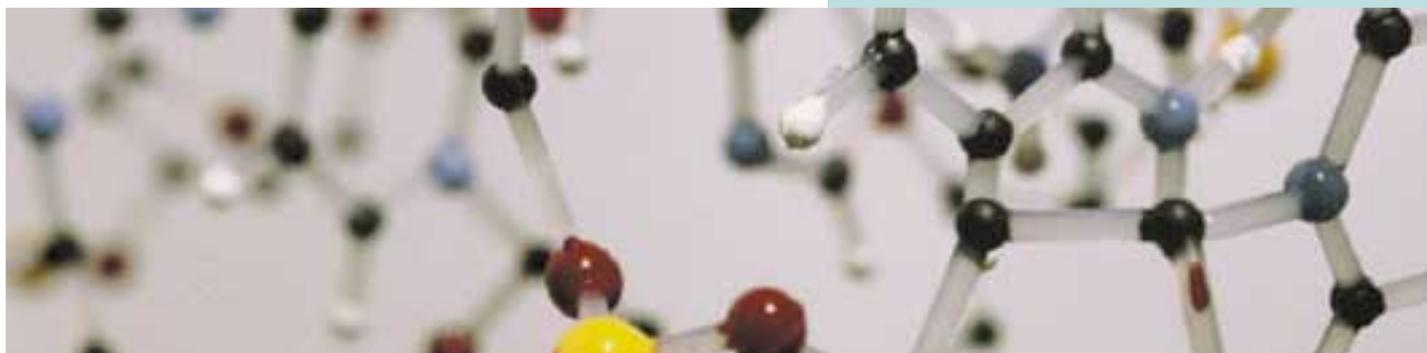
# the futures project

## Post Futures Conference Formal Visits and Invited Presentations

1. March	European Network on Communications and Policy Annual Conference, Venice, Italy
2. March	The Future of Service Industries, Eurostat Seminar, Lisbon
3. March	Presentation to Alliance for Sustainable Information Society, Brussels
4. April	EUREKA High Level Committee, Berlin
5. May	Dr. Tarmo Lemola, Director VTT – Group for technology Studies & Mr. Timo Toivonen, President Fingrid Oyj, Finland.
6. June	Presentation and chairing of plenary session at the OECD Conference on Rethinking the Social Sciences, Brugges, Belgium
7. July	Cumbre del Empleo, Madrid (participants included the Spanish Secretary of State for Telecommunications and Steve Ballmer, CEO of Microsoft)
8. July	El Escorial Summer School
9. September	Visit of Prof. Carlos Americo Pacheco, Secretary of State for Science and Technology, Brazil
10. September	JRC Directoire
11. September	ITRE Committee of the European Parliament: Chaired by Mr. Carlos Westendorp y Cabeza
12. November	Visit of Prof. Marimón Suñol, Spanish Secretary of State for S&T
13. November	Socio-economic Foresight Conference, European Foundation, Dublin
14. November	ISTAG plenary, IST Conference, Nice
15. November	College of Engineers of Catalunya, Barcelona
16. November	JRC- Board of Govenors

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The Life Sciences project, initiated in 1999, has two major objectives: health care and food production & safety and its activities are channelled along five lines:

1. Contribution to the identification of research priorities for the European Research Area
2. Contribution to the Science and Governance Conference
3. Biotechnology
4. Hormones-in-meat
5. Agri-food and food safety

## 1. Contribution to the identification of research priorities

The Life Sciences project contributed to the identification of research priorities for the European Research Area and, in particular, was responsible for the background document dedicated to Life Sciences. The main findings are:

### • Societal/Citizen concerns & Socio-economic problems

The crises related to food that occurred over the past five years in the EU and the introduction of modern biotechnology in food production not only raises concern for the safety of human health and environment but also ethical problems. Some advances in the field of medicine, especially in genetics, are also raising deep ethical concerns among the society. Confidence in science and confidence in governance should therefore play a decisive role in the decision-taking process. The demographic changes of the EU population (ageing) and the technical progress within the health care sector also raise a major concern: what will be the future health care systems and who will pay?

### • S&T opportunities

#### Human health applications:

**Postgenomic research** will exploit the data on human genes created by the Human Genome Project, which ends in 2003.

**Pharmacogenomical** research will try to correlate the genetic makeup of individuals with their response to different medicines.

# life sciences

**Stem cells** promise a huge potential to treatment for diseases caused by cellular malfunctions (diabetes, Alzheimer disease, Parkinson's disease etc).

**New Antibiotics** could be required to counter the threat of emerging and re-emerging diseases (like tuberculosis).

**Other important areas:** food with medical properties, nanotechnology / bio-implants and new transplants organs techniques.

## **Agro-food applications:**

Quality control systems, functional foods, new packaging materials (form/material), preservation processes, advanced production and distribution logistics.

## 2. Contribution to the Science & Governance Conference

The aim of the activity was to identify and typify the various structures through which



scientific advice is incorporated into the policy process in the Member states, at EU level and in the US and Japan. The work was carried in collaboration with the sister Institute for Systems, Informatics and Safety (ISIS).

The project was launched at the end of August 2000, a preliminary report which served as a background document for the JRC Conference "Science and Governance" (October 2000, Brussels) was presented at the end of September 2000. The final report, expected early in 2001, will include two issues (the use of embryonic stem cells for research and electromagnetic radiation) that were identified as case studies for closer scrutiny across the Member States to allow for comparative analysis.

## 3. Biotechnology

### • Development and use of Genetically Modified Organisms (GMOs)

IPTS, in close collaboration with the sister Institute for Health and Consumer Protection (IHCP), works on three main issues connected to GMOs (i) Risk Assessment, (ii) Management of GM Crop Production and (iii) Public Communication.

(i) **Risk Assessment:** the activities are here partly completed. The first one concentrates on GMO regulations applied in Member States and Third Countries. It aims at reviewing the state-of-the-art on both the regulations and the risk evaluation process requested by national authorities. The final report demonstrates difficult access to information, lack of harmonization in risk assessment between Member States, absence

of standard methodology and differences in risk evaluation processes performed in the EU and in the US.

The second activity aims at providing a state-of-the-art report on the scientific research and the evaluation of risk related to the release and consumption of genetically modified organisms and derived products, in a short- and a long-term perspective, and will draw a "Mapping of risks". The study started in March 2000. Preliminary results identify additional risks that should be considered systematically in the risk assessment and fields where more research is needed (methodologies).

### (ii) Management of GM crop

**production:** the possible development of GM crops in the EU will pose the problem of their coexistence with conventional and organic crops considering the possibility of transfer of a characteristic resulting from the genetic modification between the plants. Within the context of the implementation of Directive 90/220/EEC, DG AGRI requested IPTS to analyse the causes for potential contamination of conventional and organic crops by genetically modified crops and the probabilities of contamination to happen. Appropriate measures at the farm production level to minimise contamination will also be evaluated and the economic consequences will be analysed. A specific part of the study is dedicated to the monitoring of the system and includes a major task on the detection and quantification of GMOs that is performed by the Institute for Health and Consumer Protection (IHCP) of the JRC. The study started in July 2000 and the final results will be available in September 2001.

Preliminary results indicate that for each crop studied (grain maize, oilseed rape and potatoes) potential risks of contamination with genetically modified varieties to happen during cultivation and post harvest handling depends highly on the characteristics of the crop, the geographical area (topography, climate), the respective farm structures and equipment as well as the training and knowledge of the farmer himself. The only legal regulations concerning segregation of different crop varieties (not necessarily GM crops) can be found in the seed production area. Other methods are based on legally not binding Codes of Practice or are part of identity preservation schemes with private contracts between farmers and companies as a basis.

(iii) **Public Communication:** IPTS is a partner of the thematic network GMP-NET (Genetically Modified Plants Network) funded by the Fifth Research & Development Framework Programme under the Thematic programme "Improving the Human Research Potential and the Socio-Economic Knowledge Base". GMP-NET will create an active communication network (shared cost action within FP5) to investigate how to better inform public, media, decision-makers, and positively contribute to the debate on genetically modified plants by providing concise and objective information. The activity concentrates on Member States and three accession candidate countries: Poland, Hungary and the Czech Republic. The activity started in April 2000 and will finish in March 2003.

### • Genetic testing

The use of clinically meaningful genetic tests for humans – for diagnostic, confirmatory

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and predictive purposes – is expanding in all European countries. A few different national regulatory frameworks already exist but there is no harmonisation on a European level to ensure a sufficient level of quality, safety and efficacy of genetic testing services in Europe, which is required by society. On recommendation of representatives of the biopharmaceutical industry and of the European Society of Human Genetics, in July



2000 IPTS - assisted by its sister Institute for Reference Materials and Measurements (IRMM) - organised a workshop to review the situation and to analyse the need for initiatives at EU level. All participants agreed on such a definite need and proposed three options to ensure quality:

- a. Codes of Good Practices (academia/industry)
- b. European standards combined with an accreditation system
- c. European legal framework

#### 4. Hormones-in-meat/ endocrine disruptors:

The project started its work in relation to the EU/US dispute on hormones in beef on request by the Commission's Secretariat General to join the ad-hoc inter-service group working on the preparation of the WTO so-called Hormone case. IPTS, in collaboration with DG RTD, was instrumental in enlarging the scientific scope of attention of the group and in steering the ensuing research initiatives. Preliminary results of this research together with other studies launched in 1998, funded by the Commission in response to the WTO dispute, were presented in a workshop in January 2000, which was coordinated by IPTS and DG RTD. The conclusions of this research firmly support the potential risks of these hormones. The Scientific Committee of Veterinary measures relating to Public Health (SCVPH) restated the previous concerns about the possible health risks from these hormones used as growth promoters in cattle, in an opinion released on 3 May 2000.

In addition to the risks to human health, there is an increasing realization that the environmental impact of these anabolic agents used in cattle raising is more important than previously thought – an idea promoted by IPTS in relation to the WTO Hormone case. Following this line, the institute launched at the end of 2000 a new activity to gather all available information on the endocrine disrupting activity of cattle raising with or without anabolic treatment for growth promotion purposes.

Given the involvement of IPTS in the issue of endocrine disrupters (ED), the Committee on Environment, Public Health and Consumer Policy requested technical support from the institute in the preparation of an EP Hearing on the matter. IPTS proposed topics for the agenda and several scientific experts and, in close collaboration with DG RTD and the Environment Institute of the JRC (ED cluster coordinator), prepared a background document (PE 286.284) for the hearing that took place on 18 April 2000.

### 5. Agri-food and food safety

- **Research priorities in food technology and food safety**

In order to identify future scenarios as to where European research priorities should be oriented, DG RTD has requested from IPTS a prospective study on food science, food technology and food safety. The focus is set on advanced technology developments in the food sector, but also on socio-economic factors, which will have a future impact on the food industry. The activity tries to identify core areas, which will be affected through technological changes in the mid-term

future. Additionally the socio-economic environment of the food processing industry shall be looked at, as this may have an indirect but strong impact on future technologies in the food sector.

The final result will be an overview of the main directions and future trends within the area of food science, food technology and food safety which enables policy makers at the European level to identify research priorities to meet the future needs of the European food industry.

As a first step in the activity that started in September 2000, an expert group was invited for a two-day workshop in order to identify the most important issues in European food technology and food safety. This included a brainstorming exercise and a consolidating discussion, resulting in a working paper, which forms the basis for further research to be carried out in 2001. The final results are expected in June 2001.

- **Options for Agriculture in the New Member States – The Case of Poland**

The aim of the study is to develop strategies for mid- and long-term perspectives for the Polish agriculture and agri-food system, leading to a high degree of sustainability and preparing its incorporation into the European agricultural system.

Two workshops were held in Warsaw to gather first hand information from Polish stakeholders. The first workshop addressed the decision-makers at the governmental level, the second workshop involved agricultural experts from all over Poland. The main aim was to develop

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and identify the key limiting factors to sustainable development, identify suitable indicators to major progress in these areas, discuss the current state of Polish agriculture and to suggest strategies to overcome the limiting factors.

The activity started in March 2000 and will be finished in February 2001, with the presentation of the results to the Commission services on the occasion of the final workshop.

### Publications:

#### Publications:

Muenker T. and Sorup P., *The IPTS Futures Project - Future Trends in Life Sciences*, in "Towards an Agenda for Agricultural Research in Europe", Wageningen Pers, Wageningen, The Netherlands, 2000, ISBN 90-74134-80-7

Ibarreta D., Daxenberger A., Meyer H.H.D., *Possible Health Impact of Phytoestrogens and Xenoestrogens in Food*. APMIS, submitted (2000).

Ibarreta D., Daxenberger A., Meyer H.H.D., *Possible Health Impact of Animal Estrogens in Food. Human Reproduction*, in press (2001).

Ibarreta D. and Bock A. K., *Medical Uses of Gene Technology: Ethical and Social Concerns*. IPTS Report 50 (2000)

Ibarreta D. and Swam S., *The DES Story: Long Term Consequences of Pre-Natal Exposure* in "Late Lessons from Early Warnings", a European Environment Agency publication on the Precautionary Principle (2000). [http://www.eionet.eu.int/Issues/Precautionary\\_principle](http://www.eionet.eu.int/Issues/Precautionary_principle)

### Workshops/Presentations/Events:

International Workshop on Hormones and Endocrine Disrupters in Food and Water: Possible Impact on Human Health, Copenhagen, Denmark, May 2000. "Possible Health Impacts of Estrogens in Food". A. Daxenberger, D. Ibarreta, H.H.D. Meyer.

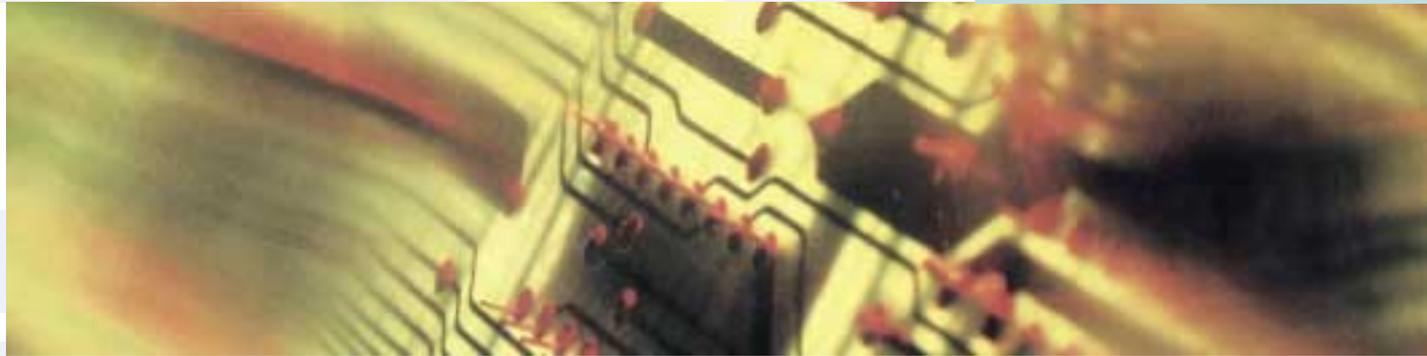
Workshop on "Genetic Testing Services - Quality Assurance and Need for Harmonisation in the EU?", Brussels, Belgium, July 2000

Two workshops on "Sustainable Agriculture Strategies for Polish Accession", Warsaw, Poland, November 2000

Workshop on "Future Issues in European Food Technology and Food Safety Research", Sevilla, Spain, December 2000

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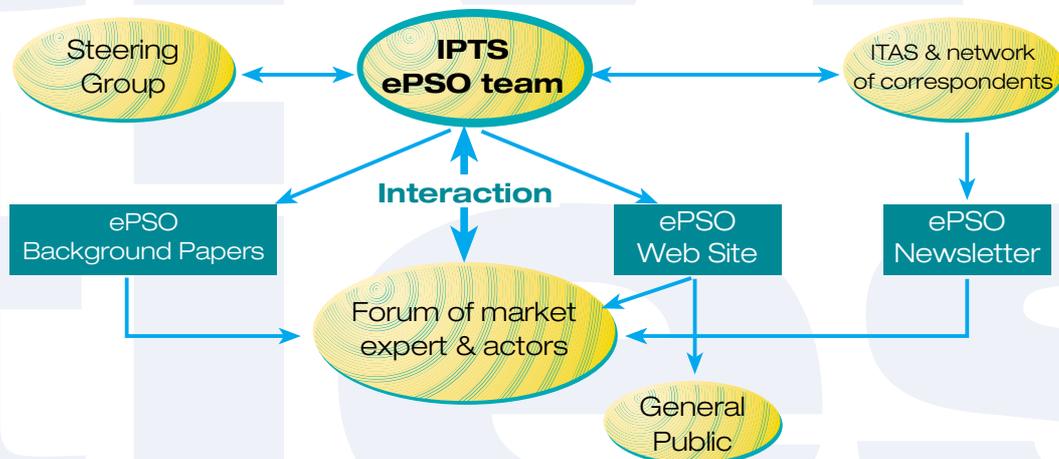


## Projects

### The ePSO Project

With funding from DG Enterprise under the Information Society Standardisation Initiative (ISIS) IPTS established a European Observatory on Electronic Payment Systems (ePSO). The Observatory, which will operate for 18 months under the current financing scheme, will host an exchange of information among the diverse stakeholders in Europe with a view to promoting consensus, commonality of approach, interoperability between payment systems and standardisation.

The Observatory is guided by a Steering Group of industry experts, consumer bodies and representatives of concerned Commission services. The Group is chaired by Mrs. Christa Randzio-Plath, Chair of the Economic and Monetary Affairs Committee of the European Parliament. At its first meeting in November 2000, the Group agreed on the strategic and technical issues that would form the basis of its operation, following detailed proposals from IPTS. The ePSO Forum, an electronic discussion Forum of market experts and actors, was subsequently launched as the main platform for the exchange of views on issues, solutions and



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future trends. The ePSO Forum is supported by a monthly newsletter, a web-based inventory of e-payment systems and a series of background papers.

### ConCom – Impact of Sectoral Convergence on the Competitiveness of the European Consumer Electronics Industry

The increasing convergence of telecommunications, computers and media is changing the landscape of traditional markets. Hitherto separate markets are merging to allow new players to threaten the incumbent positions of traditional companies. This is particular true of the consumer electronics sector, one in which European firms have been strong players. Questions arise as to how convergence in the consumer electronics business will happen, what it means for the competitiveness of European companies active in this sector, and what are the implications for industrial policy.

The Commission Service most concerned with industrial policy, DG Enterprise, asked IPTS to study these questions by projecting developments in consumer electronics over the next decade. The final report, prepared jointly by IPTS and its ESTO partners, drew conclusions on supply and demand trends, for example that:

- Consumer Electronics convergence is changing existing products and accelerating the introduction of new products and services; hardware plays a role of course, but increasingly software is more likely to constitute the effective added value.

- New types of consumers are emerging with new types of individual and collective behaviours.
- Convergence affects the whole value chain of Consumer Electronics, while making the industrial operations and structures more complex. It also offers opportunities for radically renewed business models and the emergence of new players, including smaller ones. This in turn may impact on job creation, skills and de-localisation.

Convergence thus influences the competitiveness and hence the employment potential of the European consumer electronics industry in two ways.

- Firstly, the spectrum of consumer electronics products changes, rendering existing industrial knowledge and technologies redundant whilst requiring new ones. Technologies are changing rapidly, new products and services are flooding the market, and usage is booming.
- Secondly, and related to the first, the global structure of the consumer electronics industry is shifting - the industry is in turmoil with mergers, acquisitions and alliances occurring on a global scale as business parameters shift. This may have significant effects on employment and job creation within the EU.

Finally, industrial policy lines proposed both demand- and supply-side promotional actions. On the demand side, these were aimed at encouraging an innovation-minded and educated

consumer base, and Internet usage by enterprises as well as consumers. On the supply side, emphasis was given to promoting standardisation processes, targeted collaborative R&D, high-value added manufacturing, industrial collaboration and restructuring – including that between the service, content and consumer electronics sectors, the creation of innovative start-up companies, and the transfer of consumer electronics know-how.

### EBIP: Electronic commerce Business Impacts Project

The Electronic commerce Business Impacts Project (EBIP) launched by the OECD aims to improve understanding of the impact of e-commerce on economic sectors and its policy implications. Research conducted until now in this area has produced fragmented results which could not be compared across economic sectors or countries. On the basis of a common methodology developed by the Dutch institute TNO, surveys were conducted in Year 2000 in



ten participating countries (including six EU countries) and in various economic sectors (such as, textiles, chemicals, travel, automotive, financial services, etc.). The surveys should identify obstacles and incentives affecting companies in their effort to take up electronic commerce.

IPTS has been part of the project since it was launched by OECD and will be actively involved in the preparation of the final cross-country comparative report, expected to be published by mid-2001.

The initial involvement of IPTS in this work was at the instigation of DG Enterprise, but the project has since raised the interest of EUROSTAT and DG Information Society. EUROSTAT wishes to identify suitable indicators for the new economy, and DG Information Society is interested in prospective research into socio-economic impact of electronic commerce, for which the EBIP results will form a solid knowledge base.

### Industrial Change in the media content industries

With liberalisation, new techniques, and new transmission platforms like the Internet creating new media outlets, the media sector will be subject to substantial change over the next 5 to 10 years. In an effort to follow the recommendations of the Gyllenhammer Report<sup>6</sup>, IPTS helped DG Employment launch a social dialogue between employers and union representatives on industrial change in the media content industries.

<sup>6</sup> A report issued in 1998 by the High Level Group chaired by Per Gyllenhammer (ex-CEO of Volvo), which among other things recommended that the Social Dialogue should become more anticipatory.

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This research project, carried out jointly with the IPTS Futures Group and DG Employment, sought to answer the following questions:

- How will digitisation change existing media, create new media and subsequently affect employment and occupations?
- What responses are called for on the part of social partners and policy makers in order to take advantage of the changes underway

To answer these, the implications of new digital media content trends for occupation, skills and industrial relations were discussed in a

workshop of interested parties, and descriptions of five media content scenarios were elaborated.

### Thematic Priorities for the European Research Area

The ICT Unit contributed to the development of thematic priorities for the European Research Area, in a cross-Institute activity already mentioned under the Futures Project heading. The work consisted mainly of an analysis of national foresight studies and other literature to build a structured inventory of future research challenges with regard to information and communication technologies and their consequences for society and the economy

## Publications and Conference Participation in Year 2000:

### Published Papers:

- Clements B., Maghiros I., *Technology and Policy Frameworks for E-commerce: Special Issue 42*, IPTS Report, March 2000
- Böhle K., Rader M., Riehm U., *ePSO-N: What is it good for?*, ePSO Newsletter, volume 1, July 2000.
- Ducatel K., Burgelman J.-C., Bogdanowicz M., 2000. *The Media industry in the digital age: Five scenarios on changing industries, employment trends and occupational change*. INFO, vol.2, n°4, August 2000, pp.339-360. Camford Publishing Ltd. UK.
- Krueger M., Carat G., *M-Payments and the role of telcos*, ePSO Newsletter, volume 2, October 2000.
- Maghiros I., *The e-Payment Systems Observatory FORUM opens its doors*, ePSO Newsletter, volume 2, October 2000.
- Böhle K., European smartcard industry takes a position on e-purse interoperability, ePSO Newsletter, volume 2, October 2000.
- Carat G., *Mobile Payments: Alternative Platforms and Players*. IPTS report, Issue 49, November 2000. IPTS. Sevilla, Spain.
- Burgelman J.-C., Hazewindus N., Bogdanowicz M., *The Impact of Convergence on the Competitiveness of the European Consumer Electronics Industry*. IPTS Report, Issue 49, November 2000. IPTS. Sevilla, Spain.
- Hazewindus N., Ballon P., Bogdanowicz M., Burgelman J.-C., Jorgensen U., Hansen W.K., Nauwelaerts G.J., Puissochet A., Tang P., Venables T., 2000. *The Impact of Convergence on the Competitiveness of the European Consumer Electronics Industry*. Future Mondays. Volume 5, Number 12, December 2000.
- Ducatel K., Burgelman J.-C., Bogdanowicz M., 2000. *Employment outlook and occupational change in the media content industries (2000-2005)*. IPTS Technical Report Series EUR 19658 EN. Sevilla, Spain.
- Burgelman J.-C., Hazewindus N. et al., 2000. *The Impact of Convergence on the Competitiveness of the European Consumer Electronics Industry*. IPTS Technical Report Series EUR 19659 EN. Sevilla, Spain.

## Research Reports

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- Bogdanowicz M., Leijten J., *European Research Area. Information and Communication Technologies.* Background document. IPTS. Sevilla, Spain.
- Ducatel K., Scapolo F., Leijten J., Bogdanowicz M., Burgelman J.-C., *Ambient Intelligence in 2010.* (Interim Reports - Final research report planned for February 2002). IPTS. Sevilla, Spain.
- Burgelman J.-C., Ducatel K., Bogdanowicz M. *Employment outlook and occupational change in the media content industries (2000-2005).* Final research report. IPTS. Sevilla, Spain.

## Participation in Conferences and Workshops

- ▼
- Second Workshop on Electronic Commerce: Regulatory Issues and Taxation*, hosted in Seville by IPTS jointly with the Center for Strategic International Studies, (Washington, DC), 24 January 2000. B. Clements, opening presentation and session chair.
- Towards a Sustainable Information Society*, Final Conference of the ASIS Project, Brussels, 21-22 February, 2000. E. Bohlin, organiser and panelist.
- EURO CPR Conference*, Venice, 27-29 March 2000. B. Clements, session moderator, K. Ducatel, presentation.
- The Media Content Industries: the prospect to 2005.* Scenario Validation Workshop, Seville, 11-12 May 2000. K. Ducatel, J.-C. Burgelman & M. Bogdanowicz, session moderators.
- Workshop on Convergence in the European consumer electronic industry: Impact and policy option for competitiveness.* Seville, 25-26 May 2000. J.-C. Burgelman, session chair.
- Transatlantic Dialogue on Broadcasting and the Information Society (TADoBatIS)*, Paris Meeting, 9-11 June 2000. B. Clements, presentation on cybersecurity.
- First JRC Alumni Event*, 29-30 June 2000, Ispra. B. Clements, presentation on IPTS activities.
- Three workshops on “*Developing a vision towards Ambient Intelligence*”, Scenario Building and Validation Workshops, Seville & Brussels, July, October and December, K. Ducatel, J.-C. Burgelman, Jos Leyten, Fabiana Scapolo, M. Bogdanowicz, session moderators.
- Workshop on “*Internet payment transaction security: building trust for consumers and merchants*”. Seville, 25 September 2000.
- Science & Governance Conference*, Brussels, 16-17 October 2000, B. Clements, session organiser and co-chair.
- e-business and e-work 2000 Conference (e2000)*, Madrid, 18-20 October 2000, P. Desruelle, session chair. L. Beslay, presentation: A security chain for Trust & Confidence
- Panel de expertos E-Salud*, Instituto Carlos III, Seville, 24 October 2000. B. Clements, presentation.
- Future ICT trends and their socio-economic impact.* Centrale raad voor het bedrijfsleven (Central board for the Enterprise), 25 October 2000. J.-C. Burgelman (expertise hoorzitting)
- IST Conference.* Nice, 6-8 November 2000, B. Clements, presentation on IPTS activities.
- Electronic Payments Systems Observatory*, First Meeting of the Steering Group, Brussels, 21 November 2000. B. Clements (co-chair); I. Maghiros, K. Bohle and M. Krueger, presentations on the Strategic and Technical Requirements of the Observatory.
- The media industry in the digital age: changing industries, employment trends and occupational patterns. J.-C. Burgelman, Key note, “La industria cultural y comunicativa en la era digital”, IV Ciclo de Otoño de Comunicación Fundación Alternativa (Fundación General de la UComplutense de Madrid), Madrid, 13-15 November 2000
- ICT trends and their socio-economic impact (Outlook 2010) Hungarian Technology Forecasting Program (Science Policy). J.-C. Burgelman, Budapest, 17 November 2000

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How Social Dynamics Influence Information Society Technology Lessons for innovation policy. Social Sciences and Innovation .Tokyo, 29 November – 2 December 2000. J-C. Burgelman presentation on media and employment

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Building trust in the online environment, OECD Conference on Alternative Consumer Dispute Resolution Mechanisms (co-sponsored by HCOFIL and ICC), The Hague, 8-9 December 2000.  
B. Clements, session moderator.

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# environment and society

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The main focus of IPTS's work on environmental issues and in particular of the Environment and Society (EAS) project is the integration of environmental concerns and sustainable development issues into Community policies. IPTS has also carried out prospective studies on the development, diffusion and adoption of 'clean technologies'.

The activity of the Institute is channelled along five lines:

- Clean Technologies and Barriers for Application
- Innovation, Competitiveness and Employment
- Green Assessment and Sustainability Appraisal Methodologies
- New concepts for Policy-Making
- Water Management

## Line 1: Clean Technologies and Barriers for Application

The aim of this line is to identify, characterise and provide a better understanding of what constitutes 'clean technologies' and what are the barriers to their up-take by the industry. The work

in this line of action complements the work of the IPPC Bureau in having a generally longer time-horizon in the work on available techniques.

### • Modern Biotechnology and the Greening of Industry

Biotechnical processes have an important role to play in production-integrated environmental protection. A still moderate but increasing uptake of this technology can be observed in industry. The question is if the adoption of this technology follows an optimal integration path, or if there exist obstacles which hinder an accelerated development. To contribute to answer this question IPTS is carrying out, on request of DG Enterprise, a research activity to identify the potential of biocatalysts applied in production processes, the conditions required for the optimal up-take of this technology by the industry and future research priorities in this area.

Two studies have already been published within this project. The first, "**Biocatalysis in Europe - State of the art**", (1999), gives an overview of the European situation in industrial applied biocatalysis. Its follow-up study, "**The introduction of process integrated biocatalysts**

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**in companies - effects of dynamics in internal and external networks**", (2000), identified and analysed the crucial factors within companies for the uptake of a cleaner biotechnological process. In the third study "**Conditions for the introduction of process integrated biocatalysts in industry**", which is currently in the publication process, we have examined the policy tools dedicated to support the introduction of sustainable industrial processes. The main outcome is a number of recommendations to modify and broaden the existing range of policy instruments, giving more emphasis to market based measures.

The fourth step "**The Assessment of Future Environmental and Economic Impacts of Process-Integrated Biocatalysts**", initiated in 2000, finalises the entire activity by a prospective analysis in the horizon 2030 of the economic and environmental impact of biocatalytic processes as well as the research needs at European level.

Additionally, IPTS carries out together with Industry Canada and MITI/Japan work for the OECD initiative "**Biotechnology for Sustainable Industrial Development**". Embedded into this initiative, IPTS (together with MITI/Japan) is responsible for the project "**Policy Implications**".

The development of this activity is monitored by an Inter-services group of the Commission chaired by DG Enterprise, and by an Advisory Board, with participation of Industry and Academia.

### • Eco-efficient Services

Industry is moving from traditional product sales to providing complete services around manufactured products. It is often claimed that such a shift from products to services will be a key factor for competitiveness that can bring important positive effects for the environment..

IPTS has analysed, within the project "Creating Eco-efficient Producer Services", the policy implications of such a move towards service sales in business to business relationships. The project ran from September 1998 till December 2000 and was carried out by a consortium of seven European research institutes

The main conclusion from studying more than 40 examples of innovation in business to business services is that currently they usually cannot meet the high expectations put in them as a means to radically improve the eco-efficiency of the system. Producer services that increase eco-efficiency are, however, expected to flourish in future scenarios that are characterised by strict but innovation-friendly environmental policies and higher resource prices together with policies that guarantee a high level of competition. The project report, furthermore, suggests a number of specific measures to actively stimulate the emergence of eco-efficient services. Special attention is given to the implications for product- and service-related environmental policy.

- **Collaborative agreements with European organisations**

In the framework of collaboration with the European Environment Agency (EEA) IPTS has participated in the definition of the work programme of the European Topic Centre on Waste. European Topic Centres are contracted to assist the EEA on implementation of its mandate and tasks. IPTS has also been invited to take part to the Strategic Advisory Body on Environment, 'SABE', of the European Committee for Standardisation (CEN).

### Line 2: Innovation, Competitiveness and Employment

- **The Impact of Regulation on Innovation of European Industry**

This joint project of JRC-IPTS and DG Enterprise has analysed the impact of environmental policy on the innovation potentials of the European Industries. This has been done through a series of in depth analysis of major industrial sectors influenced by environmental related regulation and norms. Four reports have been published during the year 2000 covering areas such as the European chemical notification system, the recycling industries, the Eco-Management and Audit Scheme, (EMAS regulation)<sup>7</sup> and the End-of-Life Vehicle (ELV) sector. These studies provide specific recommendations for the design of innovation-oriented regulations in each sector.

These reports were a major vehicle of information and assessment of the impact of

alternative regulatory approaches, feeding directly into the discussion leading to the adoption of the End-of-Life Directive (2000/53/EC), the revision of the EMAS regulation and the discussion for the preparation of the White Paper on the EU chemical policy.

Closing this joint project, and based on the empirical analysis of the case studies, IPTS will publish at the beginning of 2001 a report presenting a conceptual framework and empirical guidelines for future appraisals of the impact of environmental regulation on innovation of European industries.



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- **Management of waste from electric and electronic equipment**

At the request of the Environment Committee of the European Parliament IPTS has performed a critical examine of the environmental policy options for the management of waste from electric and electronic equipment (WEEE). This report is a contribution to the current debate regarding the Directives proposed by the Commission in June 2000 for the management of waste and the treatment of hazardous substances in electrical and electronic equipment. WEEE represents a “difficult” waste category for which, despite systematic efforts, no conclusive regulation could be established until now at EU level. The main stumbling blocks are the attribution of responsibilities to polluters and the adoption of funding schemes. Stimulating competition among market forces towards more efficient take-back schemes through the guidance of “best practice” based waste management approaches is suggested to be the key issue for achieving high environmental protection standards and techno-economic benefits.



- **Best Available Techniques (BATs) and Competitiveness**

The aim of the BAT Competitiveness Project, undertaken at the request of DG Enterprise, is to develop a methodology to assess the introduction of BAT, as defined in the Integrated Pollution Prevention and Control (IPPC) Directive, on firm competitive performance. The methodology is being tested in three sectors: pulp and paper, cement and non-ferrous metals.

The approach is based on case studies (a) by matching plants in the EU which have adopted many or all of the BATs, with representative plants and vulnerable plants in the industry and (b) by comparing the performance of competitor plants outside the EU with BAT plants within the EU. Two questions are central: (a) Have BAT adopters within the EU installed best available techniques under favourable conditions, and (b) Are competitor plants outside the EU advantaged as a consequence of lower environmental costs?

The work is drawing to a conclusion and 130 plants have been visited including visits made to plants in Canada and Poland and planned in Brazil.

Data on a number of indicators of competitiveness and of factors likely to influence the competitive adoption of BAT have been identified and collated. These include productivity, profitability, growth and exports, the technical age of the plants, skills, investment expenditure and expenditure on R&D.

Findings in general indicate that BAT does not constitute a competitive disadvantage among plants which have adopted or developed BAT. Comparison of factors which may have favoured BAT adopters compared with other plants in the same industry suggest there are important characteristics of BAT plants which regulators and permit writers should take into account (e.g. opportunity, planning, timing, plant layout, age, differences in costs for the same BAT) when implementing IPPC. Taking account of the effects of these factors is permitted by the Directive and acknowledged in the BREFs.

Hence the results and the methodology are important to help the European Commission and Member States decide how best to implement IPPC at the lowest possible cost in economic terms. The report of the study will be published in 2001.

### Line 3: Green Assessment and Sustainability Appraisal Methodologies

- **Integrated Appraisal Methodology**

During the year 2000 IPTS has tested and tuned accordingly an innovative approach to integrate the environmental concerns into the definition and implementation of all community policies and initiatives. This methodology, 'IAplus', developed for DG Enterprise, is a structured "Checklist" of questions that enables the assessment of initiatives and policies in terms of environmental innovation and competitiveness issues. It is implemented in an interactive and user-friendly software tool accessible through

Internet. The software package will be fully operational into the DG Enterprise intranet in the first quarter of 2001.

- **Sustainability implication of EC initiatives**

Following the drive towards EU Strategies for sustainable development and also according to the feedbacks of the users of IAplus, a revised version of the tool is under preparation. The new tool, 'IAstar', will also include, the appraisal of economic and social factors. This will enable the assessment of initiatives and policy in terms of environmental, economic and societal concerns thus helping to understand the sustainability implications of these initiatives.

- **Measuring Environmental Performance in Industry, MEPI**

Industry produces abundant information concerning its environmental activities, but still this information is far from providing comparable, consistent and reliable data. This makes it difficult to draw a comprehensive picture of the environmental performance of the European industry. The 5th Environmental Action Plan of the EU has underlined the need to fill this statistical "data gap" concerning the environmental performance of the industry.

The project "Measuring Environmental Performance in Industry (MEPI)", co-ordinated by SPRU (UK) was started to match this need. The study focused on quantitative indicators of environmental performance at the process and firm level (materials and energy use, and waste

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emissions). Physically-based quantitative indicators can serve as the basis for the collection of 'pressure' indicators by public authorities, and as benchmarks for corporate environmental reporting and management. The project encourages the convergence between voluntary and mandated environmental performance evaluation by firms, and the needs of policy makers for comparable and comprehensive information on the sources of environmental pressures and impacts of industrial activities. The final report and a web page providing data and additional information will be available in early 2001.

### Line 4: New Concepts for Policy-making

IPTS has explored innovative approaches for environmental and sustainable policy making:

- **European Sustainable Development Strategy**

The Commission received a mandate from the Helsinki Summit to present a EU Sustainable Development Strategy to the Goteborg Summit in June 2001. In support of the work of the Group of Commissioners responsible for the preparation of this strategy, IPTS in collaboration with its ESTO partners has made a comparative analysis of national Sustainable Development Strategies from which the design of the EU strategy could benefit. The survey covered the EU countries and Norway, Israel, Switzerland, Czech Republic, Hungary, Slovenia, the Baltic 21-initiative, Canada, New Zealand and the U.S.A.

All the strategies recognize that the economic, social and environmental dimension depend on each other. Destabilizing one leads to an unsustainable situation for the society. The proposed way out of this situation is to make sectoral policies mutually compatible by integrating them. Integration can only be achieved through a long-term dynamic planning process, subject to regular reviews.

*The precautionary principle is embraced by most strategies, to overcome difficulties with respect to scientific uncertainty. Technology has a relative low profile in most strategies. In all the cases it is recognized the need to decouple economic growth from resource consumption in general and from energy in particular.*

- **Eco-design and Integrated Product Policy**

Two ESTO studies exploring how eco-design, i.e., development and design of environmentally sound products, can be addressed by product-related environmental policy have been finalised and published in 2000. They established an inventory of the current state of art of eco-design throughout the Community and developed strategies for further stimulation.

Eco-design is well implemented in some of the big international companies and R&D on eco-design methods and tools is quite well-covered by public and private research. Environmental product design in SMEs, however, is lagging behind, even if in a few front-runner countries eco-design programmes in support of SMEs have been available some 10 years now.

The studies conclude that a primary approach for public policy to encourage eco-design would be to strengthen a market environment that rewards environmentally sound products. A stable and credible environmental policy using different instruments to reduce emissions, achieve closed substance cycles and reduce resource-use is also an important factor. It can be complemented by measures such as eco-labelling schemes, environment-oriented public procurement or fiscal instruments.

Eco-design support to SMEs could be made more effective by ensuring the visibility of environmental policy and market signals to SMEs; benchmarking best practice in technical eco-design support; and enhancing the feed-back from SMEs in the policy-making process.

The ESTO activities related to eco-design supported DG Environment in formulating the *Commission Green Paper on the Contribution of Product-Related Environmental Policy to Sustainable Development – A Strategy for an Integrated Product Policy Approach in the European Union*. This approach will be a major innovative element of the 6th Environment Action Programme.

- **Priorities for RTD in Europe to meet the environmental challenges**

IPTS has reviewed the results of recent national foresight exercises and other prospective studies to identify potential priority areas for RTD in Europe in response to environmental concerns<sup>8</sup>:



First, given the strong impact of human development on the natural systems, an active role is needed in the management of natural resources and the environment. RTD needs to contribute to several elements of the management process: observation and analysis of ecosystems and their interaction with economic activities, technologies to explore resources and mitigate or restore damages as well as innovative management approaches and public policy making.

A second line of action is needed to meet the challenge of de-coupling wealth creation and environmental impact. Besides the RTD specific sectoral problems, there are important cross-cutting issues: The transformation into a loop economy based on reuse and recycling, demand-side issues of energy-efficiency, an innovation-oriented environmental policy, or questions related to sustainable consumption. Research must address both the technological and the socio-economic dimension. Europe starts from an exceptionally good position to achieve world

<sup>8</sup> This activity has provided input to the Futures projects' work on identification of emerging priority themes for research in Europe.

## environment and society

leadership in the area, which is expected to be one of the most important techno-economic issues in the medium term.

Managing the risks and preventing adverse effects of technological progress will continue to be a major citizens concern. Technologies that reduce pollution and a better understanding of its effects need to be further developed and diffused. Risk management strategies that deal with the hazards of chemicals or biological materials need to be improved and based on scientific understanding as well as on reasoned approaches of how to deal with uncertainties.

### Line 5: Water Management

IPTS is identifying trends in the use and management of water resources and analysing the social, environmental and economic impact of water related policies. To this end IPTS participates in a number of projects funded by DG Research, like METRON, on water and cities and POLAGWAT on water and agriculture.

- **Water and Agriculture**

The project **Policies and Agricultural Water Use in the Mediterranean countries**, POLAGWAT, aims to identify the policy factors that encourage farmers to use large quantities of water, and to evaluate the technical and economical feasibility of managing agricultural water demand by modifying policy in a range of sectors. In 1999-2000 the project has analysed the water management structure and the influence of sectoral policies on the use of water by agriculture in the countries represented in this



project, Italy, Portugal, Spain, Egypt, Israel, and Turkey.

Irrigated areas have more than doubled between 1950 and 1980 in the focus countries. Overall, surface irrigation methods are still prevailing in the traditional Mediterranean agriculture, except in Israel, where sprinklers and micro-irrigation are predominant. Radical changes in irrigation methods are not foreseen, except locally. Agriculture remains the major water user in all countries and the balance between sectoral water users is not expected to drastically change in the coming years.

EU countries are seeking new pathways for redistribution of responsibilities of water management throughout central, regional, sub-regional and/or basin authorities, and water users' associations WUA. In the Middle East countries, the institutional structure is highly centralised and WUA are rather recent.

The prevailing systems of water subsidies and the irrigation charges based on irrigated area and not as a function of the volume of water

actually used do not provide economic incentives to users to save or re-use water.

Middle East countries are concerned by objectives of food-security and food self-sufficiency and the associated increase in agriculture production and, as a consequence, pressure on water resources will increase. The new orientations of the CAP under Agenda 2000 for EU countries, i.e., market oriented production and diminishing agricultural surpluses, go in the opposite direction.

## • Water and Cities

The project METRON (Metropolitan Areas and Sustainable Use of Water) has evaluated alternative sustainable policies and instruments for water management in metropolitan areas. It provides an analysis of the influence EU policy on urban water management in the five case cities Amsterdam, Athens, London, Seville, and Tel Aviv. The influence of EU Water Policy, Regional Policy and the liberalisation of the European market on urban water management have been analysed.

The main outcome of the project are the guidelines developed for the sustainable use of water in metropolitan areas. They concern:

- a) The establishment of priorities (water conservation, social goals, public health, risks, protecting and restoring the

environment, allocating water resources between urban and non-urban users );

- b) An Effective Institutional Framework, comprising river basin authorities, the regulatory framework, economic and environmental regulation and effective control;
- c) Integrated planning approach including resource, urban, river basin and spatial planning

## • Review of water management issues

IPTS has reviewed, on request of DG Environment, key water management issues at world level. The review focuses on: water scarcity; competing uses of water (agriculture, industrial, and domestic sectors); transboundary issues and potential international conflicts (about 240 main river basins in the world are shared by at least two countries); water and food security; environmental impact of water use, and water and health (half of the world population is suffering from infections caused by water-related diseases). A short description of the actions taken at the international level to tackle global water issues since the International Hydrological Decade (1965-1975) and the United Nations Water Conference in Mar de Plata (1977, Argentina), is also provided, together with some suggestions for future action at international level.

## Environment and Society (EAS): Major events and publications in 2000:

### Publications:

- Wolf, O./ Sørup, P. (Ed.), *"The introduction of process-integrated biocatalysts in companies – Effect of dynamics in internal and external networks"*, IPTS Technical Report (2000), European Commission, EUR 19582 EN.
- Eder P., Sotoudeh M., *"Innovation and cleaner technologies as a key to sustainable development: the case of the chemical industry"*, IPTS Technical Report (2000), European Commission, EUR 19055 EN
- Tukker A., Haag E., Eder P., *"Eco-design: European State of the Art"*, IPTS Technical Report (2000), European Commission, EUR 19583 EN
- Tukker A., Ellen G. J., Eder P.: *"Eco-design: Strategies for Dissemination to SMEs"*, IPTS Technical Report (2000), European Commission, EUR 19740 EN
- Bradford D., Marsanich A., Gouldson A., Hemmelskamp J., Delgado L. (ed.). *"The Impact of the EU Eco-Audit Regulation (EMAS) on Innovation in Europe"* IPTS Technical Report (2000), European Commission, EUR 19722 EN
- Fleischer M., Kelm S., Palm D., Delgado L. (ed.) *"Regulation and Innovation in the Chemical Industry"* IPTS Technical Report (2000), European Commission, EUR 19735 EN
- Zoboli, Barbiroli G., Leone F. (ed.) *"Regulation and Innovation in the area of end-of-life vehicles"*. IPTS Technical Report (2000), European Commission, EUR 19598 EN
- Buchinger E., Fegerl H., Fugger E., Greaves C. (ed.), F. Leone (ed.) *"Regulation and Innovation in the recycling industry"* IPTS Technical Report (2000), European Commission, EUR 19623 EN
- Papameletiou D. *"Towards a European solution for the management of waste from electric and electronic equipment"* IPTS Technical Report (2000), European Commission, EUR 19628 EN
- Stirling A. (Calenbuhr V., ed.) *"On science and precaution - In the management of technological risk"* IPTS Technical Report (2000), European Commission, EUR 19056 EN
- Kroll, A., *Agricultural water use and sectoral policies in Mediterranean countries: Italy, Portugal, Spain, Egypt, Israel, Turkey. National Case Studies*, Polagwat Phase I. IPTS Working Paper Series 2000.
- Kroll, A., *Agricultural water use and sectoral policies in Mediterranean countries: Italy, Portugal, Spain, Egypt, Israel, Turkey. Horizontal Studies*, Polagwat Phase II. IPTS Working Paper Series 2000.

### Workshops/Presentations/Events:

- Presentation of the activity "Biotechnology for Sustainable Industrial Development" at the OECD meeting of the working party technology, Paris, 20/21 January 2000 and 3rd October 2000.
- Plenary lecture of the IPTS activity "Modern biotechnology and the greening of industry" at the conference "Biotechnology – Environmental Technology for the future", Stuttgart, 30/31 October 2000.
- Kick-off meeting for the activity "The Assessment of Future Environmental and Economic Impacts of Process-Integrated Biocatalysts", Brussels, 23 November 2000.
- Eder P.: "Eco-design in Europe: State of the Art and Policy Implications" International Summer Academy on Technology Studies - Strategies of a Sustainable Product Policy, Deutschlandsberg, Austria, 10-16 July 2000
- Eder P.: Presentation of IPTS prospective research on eco-efficient modes of manufacturing at STRATA-ETAN Expert Group on RTD related to Competitive and Sustainable Production, Brussels, 11 September 2000
- ESTO Workshop "Making environmentally sound products competitive – a focus for Integrated Product Policy", February 21, 2000, Brussels
- Workshop and project meeting "Creating Eco-efficient Producer Services", April 5-7 2000, Seville
- POLAGWAT, "Policies and Agricultural Water Use in the Mediterranean countries" Group Meeting III: Eilat, Israel, 16-18/04/00)
- Inco-Med Exchange Days: Presentation of the results of the project "Policies and Agricultural Water Use in the Mediterranean countries", Brussels, 25-26/09/00.

# europa european ippc bureau

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## Background

IPTS runs the European IPPC Bureau to organise the exchange of information, between Member States and the industries concerned, on best available techniques (BAT). This work is required by Article 16(2) of the Directive 96/61/EC concerning integrated pollution prevention and control. The Directive is being implemented across the European Union between 1999 and 2007 by which time all existing industrial activities covered by the Directive must have operating permits based on "BAT". A particular feature of BAT under IPPC is that it addresses the environmental as a whole requiring an holistic and integrated thinking to environmental protection.

BAT is determined at a European level in a number of industrial sectors by networking experts in Technical Working Groups (TWGs) comprising nominated experts from Member States, industry and environmental NGOs. These experts provide information and data into the exchange exercise and review the draft reference documents BREFs created from the exercise.

The BREFs are intended to assist the competent authorities of Member States in their determination of appropriate conditions for a permit under the Directive. The BREFs will also assist industry operators to apply for a permit as required by the Directive.

DG Environment are responsible for oversight of implementation of the Directive as a whole and they drive the project in consultation with the IPPC BAT Information Exchange Forum (IEF). Ultimately each BREF is destined to be published by the Commission in such a way that it must be taken into account when determining BAT in specific cases according to Annex IV of the Directive.

The work of the EIPPCB and the reference documents produced are shown on the internet at <http://eippcb.jrc.es>. The web page attracts attention from around the globe as interested parties follow the work. Europe is an important export market for some countries, and the focus on preventing pollution can result in a shift to greater producer responsibility.

## Technical Working Group Meetings

8 plenary meetings of Technical Working groups were held during 2000 and are listed here in chronological order :

- 1<sup>st</sup> Large Combustion Plants.
- 2<sup>nd</sup> Ferrous Metal Processing
- 2<sup>nd</sup> Chlor-Alkali production
- 1<sup>st</sup> Economic and cross media aspects
- 2<sup>nd</sup> Industrial Cooling Systems
- 1<sup>st</sup> Slaughterhouses and animal carcase disposal
- 2<sup>nd</sup> Monitoring
- 2<sup>nd</sup> Tanning of hides and skins

The agricultural and food sector became a larger part of the work program with the kick-off meeting for slaughterhouses and animal carcase disposal. Additionally the preliminary work on the food and milk processing sector was started towards the end of the year with a view to a kick-off plenary meeting early in 2001. Predictably the issue of food safety was paramount in the discussions and in particular the Commission's proposals concerning animal by-products not intended for human consumption.

Within the TWG on large combustion plants, the issue of co-combustion was of particular interest. In the TWG addressing economic and cross media issues under IPPC, the question of how to quantify the environmental advantage of emission reduction measures was addressed in order to develop a more objective way of taking account of the likely costs and advantages inherent in the definition of BAT.

Although not yet kicked off with Technical Working Groups, initial work was undertaken regarding large volume inorganic chemical manufacture. An initial study was carried out to

better inform the creation of technical working groups covering this large sector and in particular how to divide the work between the groups, if indeed two groups are created.

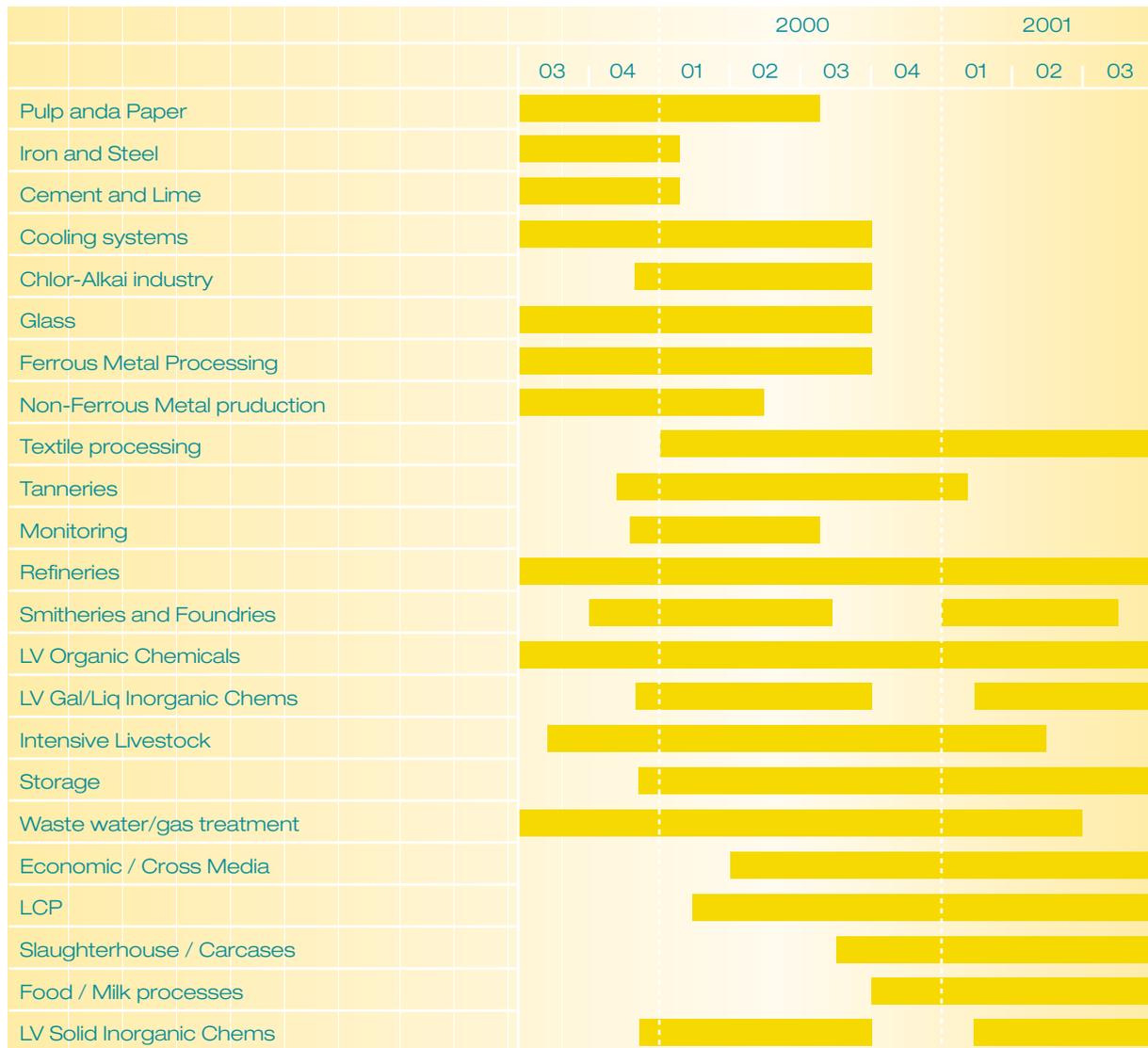
In many of the TWGs the interpretation of Annex I and in particular the threshold values given therein, continues to be a matter of major concerns for authorities and industry alike. A number of anomalies have been identified where depending on how the words of annex I are interpreted, installations with more polluting potential may be outside the scope of the Directive whilst some with less polluting potential are included.

## Draft Reference Documents on Best Available Techniques

The second plenary meeting of the chlor-alkali production TWG reached a high level of consensus in identifying BAT as membrane or asbestos-free diaphragm technology. With 55% of European chlorine capacity using mercury cell technology, the issue of improving mercury cell plants during their remaining life was a main concern, as was the future problem of some 12000 to 15000 tonnes of mercury becoming available upon final decommissioning of existing mercury cell plants.

All 8 finalised BREFs and all working draft BREFs continue to be made available on the internet site run by IPTS for the EIPPCB at <http://eippcb.jrc.es>. The site attracts attention from around the world.

An overview of how the work across the various sectors during 2000 fits into the overall multi annual work program is shown in the figure below.



## Presentations and EIPPCB at International Events

In addition to getting the various draft BREFs out to consultation and holding meetings of the IPPC BAT Technical Working Groups, EIPPCB staff participated by invitation at the following international conferences and seminars:

- February - VITO Conference on economic aspects of BAT, Brussels.
- March - Apemeta IPPC Conference, Lisbon.
- April - "The Sevilla Process - A driver for environmental performance in industry" - Stuttgart.
- November - European Ethylene Producers Conference, Rome

# energy & climate change 2000

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IPTS involvement in the FP 5 ENERGIE program is wide-ranging. Some large research projects have been launched during 2000. The project entitled “System Analysis for Progress and Innovation in Energy Technologies” (SAPIENT) aims at capturing the technology change process inside energy models and to provide support to DGs RTD and TREN for energy technologies prioritization, and preliminary results were given to the ERA-supporting activities within IPTS. IPTS has a leading role in this project, performing scenario analysis of possible technological trends. The project entitled Clean Developing Mechanisms for the Mediterranean Basin (CD-MED), built upon existing IPTS experience, will explore the potential effects of Kyoto flexible mechanisms like energy technology transfer to Southern Mediterranean countries in achieving a cost-efficient fulfillment of the European carbon target. Here again, IPTS’ participation focuses on scenario analysis.

Those projects are co-managed by DG RTD and DG TREN but will deliver results immediately usable by DG ENVIRONMENT, according to the support contract that is being signed between this Directorate General and a consortium constituted by IEPE/CNRS plus

IPTS. In addition, IPTS is participating since March 2000 in two other projects related to climate change, financed by the FP5 Environment Program of DG RTD. The first one, entitled “Greenhouse Gas Emission Control Strategies” (GECS) aims at developing global (world) scenarios in order to analyze impacts of Post-Kyoto policies under flexibility mechanisms for emission reduction including options to reduce emissions resulting from land use change and for strengthening carbon sinks. The second one entitled “Strategic Integrated Assessment of Dynamic Carbon Emission Reduction Policies” (SIADCERO) will address the strategic policies and interests of the EU in international negotiations on global change. A decision support tool will be developed to help European policymakers design the EU climate policy in the long term.

DG RTD uses the partial results of some of the analysis of our research projects to nourish the scientific debate about global warming and the economics of carbon abatement policies. For instance, under the collaboration with DG RTD, IPTS was invited to contribute to the Asian Regional Workshop entitled “Flexibility Mechanisms and Climate Change Policy in Asian

Countries: Experience and Technology Response from EC Research”, held in Bangkok in 1999. The Portuguese presidency and the International Energy Agency Climate Technology Initiative invited officials from DG RTD and IPTS to participate in the UNFCCC workshop “Transfer of Technology Consultative Process. Latin America and Caribbean Regional Workshop”, held in San Salvador. Early results have been input to the drafting of the EU Communication “Research and Innovation in the context of the Kyoto Protocol on Global Change” and to the Green Paper on “GHG Emission Trading within the EU”.

Further direct policy support was carried out in collaboration with the International Energy Agency (IEA). As a consequence of the EC/IEA series of workshops on Energy Technology and Climate Change, IPTS supports the IEA Climate Technology Initiative (CTI). A contribution was given to the CTI training course “Climate friendly Technologies for the Southern Mediterranean Countries”, held in Naples on May 2000.



The TEEM project (Energy Technology Dynamics and Advanced Energy Modeling), aiming at assessing the impact of technology change on EU/world carbon emissions was successfully completed during 2000. It delivered a better understanding of the market penetration mechanisms of new and renewable energy technologies (learning curve characterization), and the role that these new technologies may play both in terms of carbon emissions saving under different carbon regulatory hypothesis. IPTS tasks within this project concentrated basically along two lines, namely the harmonization of the technological outlook (technology database) and generation of a world energy baseline projection to identify the potential of long-term breakthrough technologies. The results of the project were published in the International Journal of Global Energy Issues.

The IRESMED project (Integration of Renewable Energy in Southern Mediterranean Countries) project was successfully completed during the year 2000, and a final workshop was held in Brussels in October 2000. The attendance of a large number of representatives from energy ministries, companies and capital equipment manufacturers from the countries within the Mediterranean basin highlighted the importance given to the methodological tools developed within this project. These aimed to foster the penetration of renewables within this area and reinforce technology transfer from the EU to Southern Mediterranean Countries, a task in which IPTS was directly involved, in collaboration with ENDESA, CIEMAT, Electricité de France and the École des Mines de Paris.

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## Main achievements and publications

### Contributions to policy papers prepared by the European Commission:

1. "The Cost of meeting CO<sub>2</sub> Emission Targets: Impacts on Energy Producers of Different Emission Trading Regimes". CNRS IEPE/JRC-IPTS Working paper submitted to DG TREN. November 2000.
2. "The impact of the Kyoto targets compared with exogenous oil shocks: an analysis for oil exporting countries" Document prepared by EC-Institute for Prospective Technology Studies –Joint Research Centre, submitted to DG ENVIRONMENT October 2000
3. European Climate Change Program Working Group "Research" Workshop. Seminar on "Climate Negotiation and Emission Trading: Economic Insight from European Models". Brussels, August 29-30 2000
4. Kouvaritakis N. "EU Latin America Clean Development Mechanism Co-operation: Exploring the Potential using the POLES model". Document submitted to DG RTD and IPTS-EUR Report (March 2000)

### Conferences and workshops dealing with energy foresight, energy economics, environmental issues and the related policy impacts:

1. Soria A. and Kouvaritakis N. "Endogenizing energy technology progress: the implications of carbon abatement policies". Presentation at the workshop "Economic Modelling of Environmental Policy and Endogenous Technological Change" organized by the Institute for Environmental Studies (IVM) at the Royal Netherlands Academy of Arts and Sciences in Amsterdam on 16-17 of November 2000.
2. Císcar J. C. and Soria A. "A Sequential Approach to Climate Change Negotiations". Report presented at the SIADCERO Meeting, Potsdam, 28-29 November 2000.
3. Císcar J.C. "Social and Macro-economic Impacts of Large Scale Wind Power Projects in Southern Mediterranean Countries". IRESMED Project. Task 2.4: Market development issues and institutional aspects. Report R 2.4/2. Presented at the IRESMED Workshop, Brussels, 23-26 October 2000.
4. "Social and Macro-economic impacts of large scale PV electrification in Southern Mediterranean Countries". IRESMED Project. Task 1.5: Identification of barriers and conditions for PV market development. Report R 1.5/2. Presented at the IRESMED Workshop, Brussels, 23-26 October 2000.
5. Císcar J.C. (with the contribution of ECyR and Sáinz A. R.) "Methodology for Cost-Benefit Assessment of Wind Projects, with Socio-economic and Environmental Aspects". IRESMED Project Report 2.3. IRESMED Project. Presented at the IRESMED Workshop, Brussels, 23-26 October 2000.
6. Císcar J.C. (with the contribution of Sáinz A. R.) "Methodology for Cost-Benefit Assessment of Photovoltaic Rural Electrification Projects, with Socio-economic and Environmental Aspects". Report D 1.4a (PV Economics). IRESMED Project. Presented at the IRESMED Workshop, Brussels, 23-26 October 2000.
7. Russ P. "Scenarios for the Analysis of the Potential for CDM projects between EU and the Mediterranean Countries. Clean Development Mechanisms in the Mediterranean Countries". Seminar Observatoire Méditerranéen de l'Énergie. Nice, April 2000.
8. Russ P. "Clean Development Mechanisms – A new chance to promote Renewable Energy in the Mediterranean". Fondazione ENI-Enrico Mattei Workshop. Milan, September 2000.
9. Russ P. "Dynamic Carbon Values – Implementation and Use". Workshop on Greenhouse Gas Emission Control Strategies, Brussels, September 2000.

## Contributions to reviewed journals and books

1. Kouvaritakis N., Criqui P. and Thonet C. "World post-Kyoto scenarios: benefits from accelerated technology progress", Int. J. of Global Energy issues, Vol. 14, Nos 1-4, 2000
2. Kouvaritakis N., Soria A. and Isoard S., "Modelling energy technology dynamics: methodology for adaptive expectations models with learning by doing and learning by searching", Int. J. of Global Energy issues, Vol. 14, Nos 1-4, 2000
3. Kouvaritakis N., Soria A., Isoard S., Thonet C. "Endogenous learning in world post-Kyoto scenarios: application of the POLES model under adaptive expectations", Int. J. of Global Energy issues, Vol. 14, Nos 1-4, 2000
4. Císcar J.C. and Soria A. "Economic Convergence and Climate Policy", Energy Policy, Vol. 28, No. 11, pages: 749-761, 2000.
5. Císcar J.C. and Soria A. Published in Velasco F. Basulto J. and M. Toro (eds.) "Some Ideas on a Sequential Game of Climate Change Negotiations", Métodos Cualitativos Aplicados a los Sistemas Socioeconómicos. Edición 2000.

# sustainability in transport and mobility

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This project aims to support the development of transport policies in the context of sustainability via the simultaneous analysis of social, environmental and economic impacts of transport-related policy measures and innovative technological solutions. The project focuses on the impacts of regulatory frameworks on the performance of the transport sector as well as on the identification, assessment and market introduction of innovative technological solutions.

Modelling activities have been launched aimed at analysing interactions between transport and land-use. This work builds on modelling expertise developed by previous research funded by the Commission and will be applied to evaluate the environmental and socio-economic impacts of transport-related policy measures. The main policies considered are pricing schemes, introduction of new technologies and organisational settings in selected urban areas.

IPTS has participated, as a core member, to the launching of the so called “ENIGMATIC” thematic network<sup>9</sup>. The objective of this network is to foster the market introduction

of vehicles based on new clean propulsion systems, which are already close to the market. ENIGMATIC works by bringing together a wide range of stakeholders with interest in the introduction of clean transport technology (e.g. fuel cell based vehicles) particularly in urban areas. The work is organised around a series of workshops on existing experience, user needs, technology for clean urban transport and policy framework conditions and scenarios. In the initial phase of ENIGMATIC, IPTS has contributed to the identification of bottlenecks and analysed solutions for the successful market introduction of new technological transport concepts. In addition, following a request from DG TREN, IPTS is involved in specific work to provide input to the forthcoming Green Paper on Clean Urban Transport.

In the frame of the progressive implementation of the EU air quality regulation, the integrated analysis of urban transport policy measures in selected case studies commissioned by DG Environment has finalised. An analytical framework using indicators has been applied to evaluate progress of urban mobility towards sustainability in five selected cities and results have been

<sup>9</sup> European Network on Integration of new Generation Mobility And Transport Innovative Concepts.

## sustainability in transport and mobility

compared, formulating recommendations to local authorities as well as identifying focal points for EU policy-making.

Additionally, new horizontal activities in support of DG Environment have started, focusing on sustainability at the local level and the monitoring of progress developing and applying a methodology for analysis using an agreed set of common indicators (Local Sustainability Profile: Common Indicators Initiative).

The existing transport expertise within IPTS has been also applied to support other IPTS activities, namely to carry out the identification of transport-related priorities for the European Research Area and to provide input to the forthcoming 6th Environmental Action Plan.



# sustainability in transport and mobility

## Main achievements in 2000:

- The first workshop of the ENIGMATIC network took place in Stockholm (June) with the active participation of IPTS. The event focused on identifying and prioritising barriers and obstacles for the introduction of innovative clean transport technology solutions. The second workshop of the ENIGMATIC network held in Brussels (December) tackled the problematic of cleaner transport concepts introduction from the perspective of examining user needs.
- Two seminars were organised at IPTS to support the quantitative analysis of the impact of transport related policies: The first seminar was devoted to the integrated land-use and transport modelling with the participation of Tomás de la Barra, one of the world's top experts in the field (May). The second seminar concerned the applications of the ASTRA project, focusing on socio-economic impacts of the transport system and the theoretical assumptions supporting that project's modelling (October).
- The study requested by DG Environment on the integrated analysis of urban transport solutions within the Car Free Cities network has been completed and reviewed by relevant services in DG TREN, DG RTD and DG ENVIRONMENT. This work included both theoretical work on the measurement methods and indicators related to sustainable mobility in urban areas and its application to the analysis of selected case studies from the network. The study is currently in the process of receiving publication approval.
- IPTS actively contributed to the first event organised within the Common Indicators Initiative supported by DG Environment by providing its support both to the preparatory phase and the follow-up of the initiative. Support consisted namely of the writing of the proceedings as well as the proposal and setting up of the methodology for monitoring progress, providing scientific input in agreement with the other partners (European Environment Agency, JRC – Space Applications Institute, and DG Environment).
- A prospective analysis on transport and related technological issues was contributed to the IPTS Futures project and activities in support of the European Research Area.

## Main publications and events in 2000

- Publication of *'Transport: the Road Ahead'*, ISSN 1463-6689 in Foresight, January 2000.
- Finalisation and approval of EU-SPIRIT Deliverable MD 4.11 'Contractual Standards', March 2000.
- Organisation of a workshop on 'Transport, Land-Use and the Environment', held on 10 May in Seville.
- Joint organisation of the first ENIGMATIC workshop on 'Available Experience in the Introduction of Clean Transport Concepts', held on 19 June in Stockholm.
- Publication of *'An Analytical Framework for Assessing Sustainable Urban Mobility'*, IPTS Report, July 2000.
- Publication of *'Deregulation and Transport in an Enlarged EU'*, EUR 19581 EN.
- Publication of a Special Issue fully dedicated to Transport and Mobility issues, IPTS Report, September 2000.
- Joint organisation of the 'Local Sustainability Profile: Common Indicators Initiative', held on 5-6 October in Seville.
- Organisation of a workshop on 'Assessment of Transport Strategies: the ASTRA project', held on 20 October in Seville.
- Publication of *'European Policy for Technology Innovation in Transport: Finding the Right Role and the Right Option'*, IPTS Report, October 2000.
- Joint organisation of the second ENIGMATIC workshop on 'User Needs Expectations and Reality', held on 7-8 December in Brussels

# knowledge and skills: perspectives for europe

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## 1 - “Gateway to the European Learning Area” and Education & Training Policy

In 2000, IPTS launched a feasibility study for a “Gateway to the European Learning Area”. The study was based on a Memorandum of Understanding between DG XXII (now DG Education and Culture) and the Joint Research Centre. The Internet based Gateway will enable user-friendly access to information on education, training and youth in Europe. It will improve the access to information that is pivotal for the employability of European citizens. While the main target group of the initiative is the general public asking questions related to their own education and training needs, researchers and policy-makers will also benefit from the project.

A 9-month feasibility study was handed over to DG Education and Culture and identifies as a major obstacle the lack of interoperability between Education & Training resources. The future Gateway team should encourage the use of metadata standards for improving the communication between

existing information sources. IPTS has one PhD student working on standardisation of metadata.

DG Education and culture will be in charge of the implementation of the future web site.

In order to support the Gateway project IPTS launched background studies on “Citizens’ digital learning for employability” and on a “Skills Needs Analysis in High Technology Sectors”, underpinning the prospective work of IPTS in the field of knowledge and skills.

In addition IPTS organised an expert workshop on European virtual Universities as an input to the higher education dimension of the future Gateway.

In the Gateway project IPTS collaborated with ISIS, another Institute of the Joint Research Centre, that particularly will assist DG Education and culture on the technical aspects of the implementation of the future web site.

# knowledge and skills: perspectives for europe

## 2 - Innovation and Competitiveness of European Enterprises, Science and Technology Policy

The objective of this activity is to investigate knowledge and skills among the factors which are important for changes in the European economic system. They are the essential assets of the European Union to improve its position in terms of Research and Development, Innovation and Competitiveness.

In order to contribute to the preparation of the 6th Framework Programme and the formulation of a European Innovation Policy, the activities covered in this area are threefold. First, the identification of factors that support the creation of new firms and foster innovation and second, the development and diffusion of innovative approaches and tools to early evaluate and manage the transfer of new technologies. The third is the synthesis of methods and practices used in RTD evaluation aiming at improving the design and efficiency of science and technology policy.

### Analysis of practices that facilitate new firms creation and their success factors

Corporate Spin-offs are one of the most interesting tools to create new firms, because of their potential to foster competitiveness. Special emphasis in the investigation at IPTS is set on small and medium size enterprises. Furthermore, IPTS is focusing on the role of governments in fostering firm creation, and driving factors within the innovation system. Knowledge transfer, the analysis of knowledge relationships and

collaboration, as well as the drivers for knowledge-based entrepreneurship are crucial within this approach.

Based on an original request by DG-Enterprise, a qualitative investigation of "The impact of Corporate Spin-Offs on Competitiveness and Employment in the EU" has been undertaken. Based upon the results of this study, IPTS organised a workshop that gave selected experts from companies, private and public institutions, and policymakers from the Commission and the OECD the opportunity to exchange views, share experiences, and assess the possible role of public policies in promoting Spin-Off phenomena. The experts participating in this highly successful event pointed out a number of policy options:

- The different experiences with various types of Spin-Offs have revealed that there is more investigation needed in order to establish a common terminology and a constant monitoring;
- Those factors that make Spin-Offs highly successful could be transferred to other types of new and existing firms, creating benefits for innovation and new firm creation;
- Public and private Spin-Offs often face obstacles, like the lack of information or funding problems;
- Entrepreneurship, innovation, competitiveness and job creation are the possible direct and indirect effects of Spin-Offs.

As an input to the workshop, the IPTS had established a comprehensive framework of the success factors of Corporate Spin-Offs. This framework of factors was translated into a scientific

## knowledge and skills: perspectives for europe

model that allows investigating the single factors as well as their interplay. In a European-wide questionnaire survey, data had been raised from 209 companies. This investigation revealed sound evidence that the success of Corporate Spin-Offs is subject to a number of specific success factors, like the motivation of the heads and the embodied skills involved, high networking and innovation activities, and the conditions of the business environment.

Please visit our Web Site at:

<http://www.jrc.es/projects/corporate/welcome.html>  
for further information.

### Identification and evaluation of Innovative Technologies

The IPTS-TIM© v1.1 software, a fully operational prototype completed in late 1999, is a tool which facilitates the characterization of technology objectives, incorporating socio-economic considerations and risk evaluation criteria.

The effort in 2000 concentrated in implementing a diffusion and validation strategy with the additional objective of compiling relevant information to develop an updated version of the software. IPTS received requests for copies of the software from all over the world, especially from the EU but also from countries such as USA, Israel, Australia.

The activities included:

- Software User Manual and Tutorial
- Help desk service
- Fine tuning and bugs elimination
- Creation of a User Group (120 RTD, services and industrial organizations)

- Questionnaire survey among the users
- Presentation of and Introduction to the software in 4 seminars
- Planning and starting of the development of a second revised version (which will be available in spring 2001).

### Science and Technology Policy

The main outcome during the initial phase of the thematic network "Socio-Economic Evaluation of public RTD policies" stems from the three EPUB workshops held during 2000 where experts discussed widely on issues related to the field of RTD evaluation.

Some key issues addressed during the workshop discussions are

- Evaluation practices should be closely connected to the process of policy definition and implementation to improve efficiency, since changing rationales in policy definition directly affect evaluation practices;
- The advances in the understanding and formalisation on how the innovation process takes place bring new challenges to evaluation.



## knowledge and skills: perspectives for europe

In particular, the concepts used in the knowledge based economy and in the national systems of innovation such as knowledge transfer, human capital and skills, technological spillovers, networks and clustering, cannot be easily captured with the use of traditional R&D indicators.

– The improvement of quantitative techniques benefit evaluation practices, allowing for a better perception of the impact of technology and innovation policy on economic performance.

For further information: <http://epub.jrc.es>.

### Main achievements in 2000:

- Completion of the feasibility study for the future web site “GATEWAY to the European Learning Area” and presentation to DG Education & Culture, November 2000.
- Working paper on the GATEWAY project for the international conference “Education-ICT”, Vienna, December 2000.
- Recommendations for a portal and a label “European virtual Universities” discussed at the university conference “Wiring the ivory tower”, Paris September 2000.
- Launch of a study on Lifelong learning and employability to support LLL initiatives in DG Education & Culture and DG Employment.
- Launch of a survey on skills in high tech sectors, i.a. to provide input to a study for the European Parliament on Technology and Employment, October 2000.
- Note on thematic research priorities for the European Research Area in the field of knowledge and skills.
- “The Impact of Corporate Spin-Offs on Competitiveness and Employment in the European Union- A First Study”, IPTS Technical Report Series, EUR 19040 EN, Seville, 2000.  
The report presents evidence that Corporate Spin-Offs combine above-average growth with very low failure rates, are frequent phenomena that produce positive effects on competitiveness and employment, and stimulate innovation and new firm creation. They represent a possible aim for policy, namely for the transfer of S&T and business knowledge and the stimulation of new firm creation.
- “Networks of Knowledge and Learning for the Development”, Paper published in the proceedings of the 4th ICTPI-International Conference of Technological Politics and Innovation: August 28-31 2000, Curitiba, Brazil.
- Elaboration of a theoretical model, which investigates the single success factors of Corporate Spin-Offs as well as their interplay, inquiry of 209 industrial organization and using the model for the analysis of the results.
- Preparation of the expert workshop: “Corporate and Research-based Spin-Offs: Drivers for Knowledge-based Innovation and Entrepreneurship” Brussels on 18 January 2001”  
The participants of the workshop, organised by JRC-IPTS, underlined the success of different Spin-Off types in terms of competitiveness, innovation (including the transfer of RTD-results), growth, and positive effects on the socio-economic environment, including job creation. Other types of start-ups and also existing companies would benefit from a knowledge transfer of the success factors of Spin-Offs, which could be an important policy objective.
- “IPTS-TIM software v.1.1 User’s Group – Technology Identification Methodology -User’s Manual and Tutorial” - EUR 19037EN - February 2000
- Set-up an IPTS-TIM software v.1.1 User Group (120 organizations), and launching of a questionnaire survey to properly address the planned development of the software new version (v.2).

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- In the context of the Socio-Economic Evaluation of Public RTD policies the thematic network members are conducting six exploratory studies covering the following aspects:
  - Rationales and evolution of public RTD policies and evaluation, comparison of policy instruments
  - Methodologies for RTD policy evaluation and impact assessment at micro/meso level of analysis
  - Methodologies for RTD policy evaluation and impact assessment at the macro level of analysis
  - The use of S&T Indicators in RTD evaluation
  - Comparison of theoretical and empirical aspects of the socio-economic impacts of RTD policies
  - New ways of designing public RTD policies.

## Other Publications TECS-Unit

### Nikolaus Thumm

#### *IPTS-report articles:*

Mogensen, J., Thumm, N.: Outsourcing of Business Services, The IPTS Report, No. 49, November 2000, pp 32-39

Thumm, N.: Patenting as a Protection Tool: A Reassessment, The IPTS Report, No. 43 April, 2000, pp 26-31

#### *External publications:*

Thumm, N.: Intellectual Property Rights. National Systems and Harmonisation in Europe, Physica-Verlag (Springer), Contributions to Economics, New York, Heidelberg, 2000, ISBN 3-7908-1329-X

Thumm, N.: Breveter pour protéger: Un bilan s'impose, Technologies Internationales N°67, Septembre 2000, pp 39-44

# enlargement

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**E**nlargement is among the most important and ambitious challenges on the European Agenda. Negotiations with Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia, are progressing. EU Policies and EU governance structures will have to be prepared for Enlargement. The development of foresight in the Accession Candidate Countries and for an enlarged EU in the fields of technology, employment and competitiveness is important for the development of RTD policy, structural policy, employment and industrial policy.

In 1999, IPTS launched its Enlargement Project prospective activity and set up a Network on Foresight in Enlargement Countries. In 2000 a series of meetings with active participation of experts from 12 Pre-Accession Countries and EU Member States were held. The meetings dealt with the following subjects:

- Raising awareness of foresight and stimulating the policy debate (Nicosia/Cyprus);
- Best practices in national foresight and foresight methodologies (Warsaw/Poland);

- Foresight on regional issues (Tallinn/Estonia), focusing on Baltic Sea as European Sea and three challenges which it faces: energy, transport and environment.

The three meetings contributed to create a better understanding of the different problems European nations will be dealing with in the coming decades and of the ways to analyse them. Furthermore these exchanges provided some impulse to the development of national foresight activities in several countries since the Workshops were attended by high-level policy makers and researchers.

At a Prospective Dialogue on EU-Enlargement in Tallinn/Estonia in September 2000 the participants encouraged IPTS to continue supporting national foresight activities. However it was also observed that although many countries have started foresight studies of their own there are issues common to all Accession Candidate Countries. The meeting participants suggested that in view of the work already done by IPTS in this field the Institute should launch a "Futures" type of initiative for all Accession Candidate Countries.

The aim of this project will be to examine the major contemporary technological, economic, political and social drivers in PACs and their impact on technology/science, competitiveness and employment until the year 2010. It should look at consequences of those challenges for policy in future Member States and of course for European Union policy in those fields.

The project engages experts and policy

makers both, from Candidate and EU countries. They work together in an interactive process based on thematic expert panels, supported by background research.

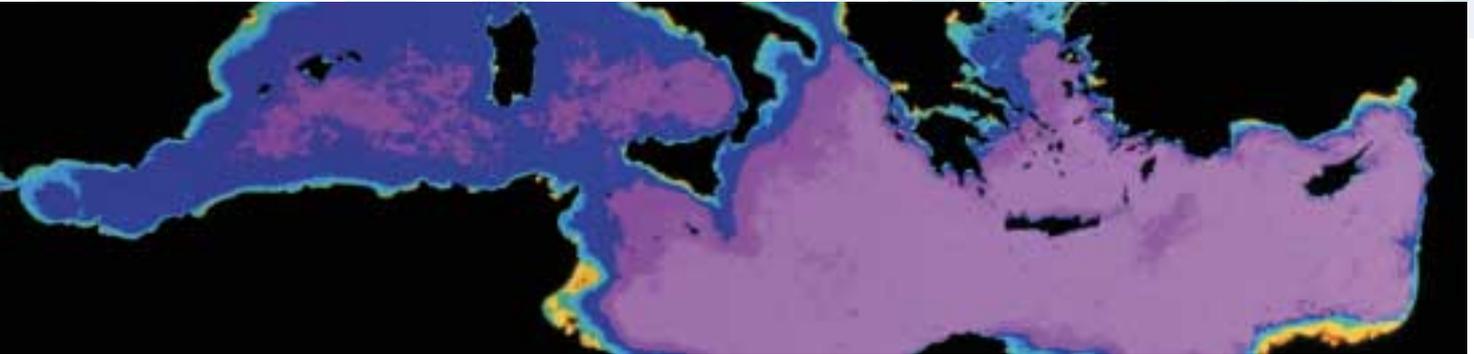
For easily reachable current information, since May 2000 a user-friendly Web-site <http://www.jrc.es/enlargement> provides background information and materials of all activities within the Enlargement Project.

## Main achievements and publications:

- Presentation of the IPTS Futures Report, Volume on Enlargement: "The Wider Picture - Enlargement and Cohesion in Europe" (M. Weber, W. Meske, K. Ducatel et.al.) at the Futures Conference of IPTS in Brussels, February 10/11, 2000.
- Thematic Network on Foresight in Enlargement Countries: "Awareness of and deepened knowledge on Foresight issues and results", Meeting in Nicosia/Cyprus, April 7-9, 2000, jointly organised with the University of Cyprus.
- "Awareness of and deepened knowledge on Foresight issues and results", background papers to the meeting in Nicosia/Cyprus, Doc. No. ORA/PRO 61253, May 2000, S. Ertel (editor).
- "Best practice in national Foresight methodology and its practical application", Meeting in Warsaw/Poland, June 28-30, 2000, jointly organised with the KBN Poland.
- "Best practice in national Foresight methodology and its practical application", Proceedings to the meeting in Warsaw/Poland, December 2000, S. Ertel (editor).
- "Foresight on Regional Issues: Baltic Sea as European Sea", Meeting in Tallinn/Estonia, September 14-16, 2000, jointly organised with Tallinn Technical University.
- "A prospective Dialogue on EU-Enlargement: Science, Technology and Society", Second Meeting, September 13/14, 2000.
- Web-site <http://www.jrc.es/enlargement>, since May 2000, currently updated.

# mediterranean and regional perspectives

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The challenge emphasized in the Euro-Mediterranean ministerial conference of Barcelona (November 1995), and in the Euro-Mediterranean Partnership that was inaugurated in that occasion, is to define a multilateral framework dedicated to creating a 'common space of shared prosperity.' The latter is the prerequisite for a wider political, socio-economic, human and cultural dialogue aiming to promote both sustainable growth and stability right around the Mediterranean basin.

In this framework IPTS is dealing in particular with the establishment of prospective links between Mediterranean partner countries and the European Union on techno-economic co-operation. In particular IPTS accompanies and promotes the Barcelona Process by investigating challenges and actual and future bottlenecks (e.g. in health sector, agro-food policies, and empowering measures of SMEs). Within that context, in 1998 IPTS created a forum, the **Techno-Economic Analysis Network for the Mediterranean (TEAM)**.

Participants to TEAM are experts in various S&T fields coming from different EU and Mediterranean Partner Countries. Beyond its

dialogue function, TEAM is used to pool together ideas on Mediterranean perspectives. It aims at determining the socio-economic and S&T priority issues that are of policy-relevance for the region, and analyses their policy implications. The forum seeks to involve the Mediterranean partner countries through building up networks for co-operative actions with EU Countries. Furthermore, it may identify co-operative regional projects and help look for funding sources.

TEAM members have identified a number of issues which are of relevance for the region: diabetes mellitus and the health sector, food technology and toxicity, remote sensing for land use and agriculture, human resources and industrial development. Accordingly working groups have been established that, in 2000, have made further progresses (Cf. the Achievement section infra).

Follow-up of the **Monitoring Committee for Euro-Mediterranean Co-operation in RTD (MoCo)**

This Committee was established by the Euro-Mediterranean ministerial conference of Barcelona, November 1995. IPTS took part in

## mediterranean and regional perspectives

the 7th MoCo meeting, held in Tunis, April 16-18, 2000, in particular in the plenary session and in the working group on "The Role of Bilateral S&T co-operation and Training and Mobility in the framework of the Euro-Mediterranean Partnership: Concertation Mechanisms and Tools." Furthermore, under request of the Monitoring Committee IPTS is following the setting up of the "Euro-Mediterranean Techno-Economic Analysis Information System", aiming at providing decision-makers with an accurate picture of R&D potential and economic performance in Mediterranean partner Countries (MPCs). This interactive system, to be accessible on the Internet, counts on the networking of National Poles of both MPCs and EU, who have been involved under indication of MoCo members. The analysis carried out so far has led to the development of an overall framework of data and indicators, to be finalized during a workshop, which will be held during spring 2001.

IPTS organized a "Mediterranean and Regional Perspectives" meeting that took place in Brussels, September 10-12, 2000. The meeting brought together high level personalities of the Science and Technology (S&T) communities in MPCs of the Barcelona process. It was aimed at reviewing IPTS' Mediterranean activities and proposing future course of action. Accordingly IPTS-Mediterranean Regional Perspectives Activities, including the TEAM network, were presented and discussed. Furthermore, possible synergy between the framework program for RTD and the "Mediterranean Program of the European Commission" (MEDA) were discussed, with the contribution of DG Research.

Participants welcomed the ideas presented regarding the inclusion of research in all priority sectors developed by MEDA, opening up of the European Research Area (ERA) to the MPCs, and the synergy between the different instruments, in order to increase the impact of European Commission funding.

After an extensive discussion of the above mentioned issues the participants proposed to launch a "Mediterranean region foresight" exercise under the aegis of IPTS with time horizon 2010 and identified main priority areas, some required background studies, methodology, structure and time table. Possible resources to sustain such an initiative are presently being sought.

The European Parliament, Committee on Industry, Trade, Research and Energy invited IPTS to take part in a meeting on "The Mediterranean Program (MEDA) of the European Commission. 1998 Report," March 23rd, 2000, Brussels.

Within the Mediterranean and Regional Perspectives project 2 studies under way for official publication (outsourcing) are:

- The impact of the transfer of new and advanced technology embedded in Foreign Direct Investment (FDI) on MPCs competitiveness.
- The role of Science and Technology in fostering Small and Medium Sized Enterprises cooperation in the Euro-Mediterranean Free Trade Area and overall Industrial Development

During the year 2000, as in the past, the Mediterranean Project has involved the expertise

## mediterranean and regional perspectives

of other Institutes of the Joint Research Centre, namely:

- The Space Application Institute (SAI) is involved in the TEAM project on 'Remote Sensing for land use, agriculture and water';
- The Institute for Health and Consumer Protection (IHCP) is co-operating in the TEAM project on 'Food Technology and Toxicity';
- The Institute for Systems, Informatics and Safety (ISIS) is contributing to the technical design of a Euro-Mediterranean interactive web site on S&T.



### Main achievements and publications in 2000:

**TEAM working group on Diabetes.** The working group obtained the financial support of the INCO II Programme through an Accompanying Measure on "Health Systems and Policies for Prevention and Treatment of Diabetes in the Mediterranean Region," (end: June, 2001). The group met twice during the year 2000:

- (i) Tunis, 2nd meeting of the Euro-Mediterranean Network on Diabetes Mellitus and the Health Sector, June 3-6, 2000. IPTS participated in the working session on "EU Programs for enhancing Euro-Mediterranean research in the socio-economic framework (INCO and MEDA programs);
- (ii) Athens, 3rd meeting of the Euro-Mediterranean Network on Diabetes Mellitus and the Health Sector, November 24-27, 2000.

Furthermore, project activities have been presented and discussed in a meeting between working group representatives and the Italian State under-secretary for International Relations on Health Matters (and Delegate for health matters to the Euro-Mediterranean Partnership), at the Ministry for Health Matters, in Rome, November 16, 2000.

Moreover the working group has elaborated a proposal for establishing a "Euro-Mediterranean Information Network on Diabetes and its Complications," that will be submitted for funding to the EC EUMEDIS Programme (January 2001).

**TEAM working group on Remote Sensing.** The outcome of this working group was a proposal for a thematic network on Geo-Information for Sustainable Management of Land and Water Resources in the

# mediterranean and regional perspectives

Mediterranean Region. This proposal passed the evaluation phase, and the EC framework program for RTD funded it.

**TEAM working group on Food Technology.** The outcome of this working group was a proposal submitted to INCO II in September 1999 for financing a thematic network on food technology that passed the evaluation phase, and the EC framework program for RTD funded it.

**TEAM Working Group on 'Industrial Development Strategy'.** Following conclusions of the meeting held in Sevilla, Nov. 29-30, 1999, working group members are preparing a proposal to be submitted for funding to the Mediterranean (MEDA) programme on Industrial Development. Accordingly, they took action in order to predispose UE – MPCs networking and co-operation projects and activities. Furthermore, in order to support scientifically the activities carried out by the working group, a doctoral thesis has been initiated at IPTS on "The Industrial Development in the Mediterranean Area". The doctoral project is carried out in cooperation with Essex University (UK).

## Publications

Di Pietro G. and Gomez y Paloma S., "Il Mediterraneo come crocevia economico-culturale" *Economia della Cultura*, Il Mulino, Bologna: 1 (2000).

Di Pietro G., Elshuraydeh K., Gomez y Paloma S., Zappacosta M. "Science & Technology and Governance of the Euro-Mediterranean Partnership", *The IPTS Report*, European Commission, Joint Research Centre, n. 46, July, pp. 24-28 (2000).

Gomez y Paloma S., Zappacosta M., "Economic Impacts of the Euro-Mediterranean Association Agreements", *The IPTS Report*, European Commission, Joint Research Centre, n. 43, April, pp. 18-25 (2000).

Elshuraydeh K., background paper on "Health in Mediterranean Partner Countries". Contribution to the IPTS project on Thematic Priorities for the European Research Area, October 2000.

Gomez y Paloma S., background paper on "Agriculture and Rural Development in Mediterranean Partner Countries". Contribution to the IPTS project on Thematic Priorities for the European Research Area, October 2000.

## Presentations

Khaled Elshuraydeh, "The Euro-Mediterranean Techno-Economic Analysis Information System", 7th meeting of the Monitoring Committee for Euro-Mediterranean Co-operation in RTD, April 16-18, 2000, Tunis.

Sergio Gomez y Paloma, "Mediterranean and Regional Perspectives Activities at IPTS", The European Parliament, Committee on Industry, Trade, Research and Energy, meeting on "The Mediterranean Programme (MEDA) of the European Commission. 1998 Report," March 23rd, 2000, Brussels.

# support to the european parliament

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IPTS has been supporting parliamentary bodies mainly by preparing reports and hearings.

The “Futures Project” raised much interest among Committees of the European Parliament, and led to some further requests for studies (see chart below). Several Members of the European Parliament, among whom Vice President Alejo Vidal-Quadras Roca, actively participated in the “Futures Project Conference” which took place in Brussels in February, as well as in the Conference

on “Science & Governance” IPTS organised in October, on behalf of DG JRC and RTD.

On 22 September 2000, a delegation of the Committee on Industry, External Trade, Research and Energy (ITRE), led by the Committee Chairman, Mr. Carlos WESTENDORP y CABEZA, visited IPTS and was presented its main projects and activities in support of EU policies.

The latest studies performed at the request of the European Parliament in 2000 were:

EP COMMITTEE	DATE	SUPPORT
Committee on Employment and Social Affairs (Employment)	24/2	Presentation of the <i>Employment Map of the “Futures Project”</i> .  Following this presentation, Mr. ROCARD, Chairman of the EMPL Committee asked Commissioner BUSQUIN that IPTS carry out a <i>prospective long-term study on new technologies and employment</i> .
Committee on Economic and Monetary Affairs (ECON)	28/2	Presentation of the results of the study on <i>“Electronic Payment Systems”</i> .  Following this presentation, Mrs. RANDZIO-PLATH, Committee Chairperson, accepted the chairmanship of the Steering Group of the <i>European Payment System Observatory (ePSO)</i> established by IPTS on behalf of DG ENTR.
Committee on Environment, Public Health, Consumer Policy (ENVI)	18/4	Support to the organisation of a parliamentary hearing on <i>“Endocrine Disruptors”</i> (selection of experts, background documents).
Committee on Culture, Youth, Education, the Media and Sport (CULT)	3/5	Presentation of a study on <i>“The Impact of Convergence on the Media Content Industries in Europe (2000-2005)”</i> .

The IPTS also played an active role in the JRC exhibition “JRC@EP” which took place in the European Parliament in February.

# high-level economists group

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The High-Level Economists Group is a group of eminent economists which has been brought together to support IPTS in providing long-term, techno-economic analysis for policy-makers.

The group is composed of MIT's Nobel Prize-winner, Robert Solow; Princeton University's William Branson (former Director of International Studies at the US National Bureau of Economic Research, and Senior Economist at the Council of Economic Advisers), University College London Professor David Ulph (former Chairman of the Economics Department at the University College London), Jean-Jacques Laffont (University of Toulouse, European Economist of the Year Laureate in 1995), Christian von Weizsacker (University of Köln, US Academy of Sciences, former Chairman of the German Monopolies Commission).

The group's remit is to collaborate with IPTS over the selection and implementation of projects, and to be involved in the vetting and validating of important documentation produced by IPTS. For instance the group has played an important validation role for the progress of the IPTS "Futures" project.

In the course of 2000, the group has explored the technology-economy interaction, in the context of the "Futures" project and its follow up. Robert Solow participated in the Futures conference in February 2000. His, and the group's work, provided IPTS with research on the percentage of economic growth that can be attributed to technical progress (25 to 50 %). This data was used inter alia to prepare Commissioner Busquin's interventions on the issue.



# the esto network

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**T**he European Science and Technology Observatory (ESTO) is a network of European think tanks in the field of technology assessment, technology forecasting and foresight. Many of them advise their national governments. These organizations assist, inform and alert IPTS regarding scientific or technological breakthroughs, trends and events of potential socio-economic importance, which may call for action at a European decision-making level.

ESTO members therefore have a shared responsibility to supply IPTS with high-quality scientific and technological information drawn from all over the world, facilitated by the network's international contacts. Most of the work carried out by ESTO is not scientific field work to generate original data. Instead, ESTO especially operates on available data that can be found in scientific reports, statistical offices or other sources and analyses this information to draw policy relevant conclusions. This information is then channeled by IPTS - which participates in the project implementation and often further processes the final ESTO's deliverable - to its main users, namely European policy-makers.

In order to widen ESTO, to include a greater number of competent organizations, to adapt the network's competencies to the changing societal needs and political agenda and to ensure openness of the network, several institutions have been integrated over the years. The observatory currently comprises 45 major European policy advising organizations and think tanks.

## ESTO Activities

During 2000, ESTO was engaged in the following activities:

- A series of specific prospective studies, targeted at European decision makers. These studies analyse recent developments and available data to support the ongoing policy making process. In a number of cases, ESTO has also carried out surveys in areas further upstream in the policy making process and where there is little available data. These studies often act as a trigger for in-depth work to be carried out later.
- A permanent monitoring of future oriented instruments at national level elucidating the relation between science and technology development on the one hand and societal

needs and developments on the other. This activity analyses recent trends in the technology foresight, forecasting and assessment areas and makes them available to European policy makers.

- A permanent technology watch function which alerts IPTS on recent developments
- A quick response and information retrieval procedure to respond to specific requests from users at European policy-making level.
- Authoring of articles on science and technology related issues for “The IPTS Report”, IPTS’ monthly journal targeted at European policy makers. Roughly one half of the articles are contributed by ESTO. The network also contributes by providing editorial advice to various special issues of the IPTS Report.
- Contribution to the 1999-2000 Techno-Economic Analysis Report. The aim of this report is to provide a synthesis and interpretation of recent changes and developments in society and economy, which either derive from, or are drivers of technological change and innovation.

In terms of human resources, the prospective studies are the most important contribution of the ESTO network. The following were carried out in 2000:

### The impact of Technology - Environmental Policy on the Use of Bio-catalysis in Production Processes

*Participating organizations:*

VDI-TZ, ADIT, SPRU, TNO, and IPTS

This study analyzes the current integration of biocatalysts into products and processes of the

European industry and whether the administrative and legal environment favours or hinders the implementation of this young technology.

### Risk evaluation of genetically modified organisms (GMO’s) for the environment and human Health - Regulations and Assessment Methodologies

*Participating organizations:*

VDI-TZ, CEST, VTT, EU Delegations USA and Japan, and IPTS

The study evaluates the regulations covering the release of GMOs in eight different countries (Finland, France, Germany, UK, the Netherlands, Switzerland, Japan, USA) and compares the risk assessment for 3 selected GM crops. The study highlights the need for harmonization and common methodology for the assessment, the lack of transparency in the evaluation process, and the difference in the concept of risk between USA and EU

### Ecodesign: Strategies for disseminating Ecodesign to SME’s

*Participating organizations:*

TNO, VDI-TZ, VITO, DTU + external organization Center for Sustainable Design (Farnham), TU Delft, several experts from European Countries, and IPTS.

The objective of the project is to identify strategies and mechanisms through which the diffusion of environmentally friendly integrated product design can be stimulated. These strategies and mechanisms will be derived from analysing best practices in disseminating integrated environmental protection approaches, and instruments, mechanisms and infrastructures that

## the esto network

are in place for general SME support in a number of member states.

### Convergence and Competitiveness in the European Consumer Electronic Industry

*Participating organizations:*

MERIT, TNO, DTU, SPRU, IPC + external organization IDATE, and IPTS.

This study aims at identifying the main trends in the use of consumer electronics over the next 10 to 15 years and the main opportunities and threats to the competitiveness of the European industry that can be seen from this perspective. Moreover, it identifies public policies that are critical in this context and compare the European situation to that of its main trading partners.

### National and regional programmes and strategies for Sustainable Development

*Participating organisations:*

VDI-TZ, ITAS, TNO, IPC/KWI, ITA/ZSI, CEX, ICTAF, and IPTS

This project supports a European Commission inter-service working group charged with the task of elaborating elements for a European sustainable development strategy to be presented as a Communication in Summer 2001. To this end, a comparative survey of various sustainable development strategies at national- and regional level covering a number of European countries (EU-, non-EU, enlargement- etc) as well as Israel, USA, Canada and New Zealand was conducted. A number of common issues emerging include among others the relatively low profile of technologies, a shift towards a continuous process of policy making and governance, and

commitments to avoid irreversible development paths including the use of the precautionary principle. Both, top-down and bottom-up approaches were found, with top-down approaches being the more effective ones.

### A Methodology for Appraising the Sustainability Implications of EC initiatives: The Integration of Economics, Societal and Environmental Aspects (IA<sup>Star</sup>)

*Participating organisations:*

ITAS, VDI-TZ, CUSTOM, and IPTS

This project develops a methodology and software tool to appraise and monitor the



integration of the economic, social and environmental impact of present and future EC initiatives and allows revisions of past initiatives. It supports the EC for developing long-term strategies towards sustainability in the context of the forthcoming Gothenburg European Council June 2001. The project develops further the IAPlus tool (see IPTS Ann Report 2000), which appraised environmental and innovation issues.

### Science and Governance: describing and typifying the scientific advice structure in the policy making process - a multi-national study

#### *Participating organizations:*

PREST, VDI-TZ, VINNOVA (former NUTEK), OST, Fondazione Rosselli, EU Delegations in USA and Japan, JRC-ISIS and IPTS

This project served to provide background information to the Science and Governance conference organised by IPTS in October 2000. The project's objective was to give an overview of the different scientific advice systems that are used by governments in various countries. In particular, the project focused on handling controversy, the embedding of advisory structures into wider policy communities, the identification of issues, the selection of experts and assuring their independence.

### The following studies are currently underway:

#### Skills in High Tech Sectors

##### *Participating organisations:*

PREST, TNO, + external organisation STEP, and IPTS

This study aims at identifying areas where one would expect in the future to find a mismatch between the skills offered by teaching institutions on the one hand, and the skills needed by high technology sectors on the other. Several reports in the frame of the FUTURES project have touched upon this issue which, however, needs to be further deepened. Furthermore, the project will support the GATEWAY project carried out by the JRC as well as other European Commission services such as DG Education and Culture. The GATEWAY project aims at setting up a European interactive information system providing access to high quality education and training opportunities and resources as well as to a variety of learning experiences, across the full range of formal and informal learning contexts

#### Ubiquitous Computing: Mapping Technology Timelines, Present European Capability Strengths and Weaknesses, and Future Requirements

##### *Participating organisations:*

PREST, OST, VTT, ITA, IPC, Fondazione Rosselli, + external organisation CM International, and IPTS

Two IPTS Futures reports - the Technology Map and the ICT and IS Panel Report - provide some assessments of key ICTs that will be important on the 2010 time horizon. The aim of this project is to identify in more detail the

## the esto network

current status of European strengths and weaknesses in such ICT technologies and to develop a prospective view on the necessary capabilities Europe needs if it is to become a key and leading player in the field of 'Ambient Intelligence'. This is a concept which implies the convergence of 'Ubiquitous Computing', 'Ubiquitous Communication', and 'Intelligent User-Friendly Interfaces'. It advocates a laid-back mode of dialogue and exchange with an integrated service infrastructure in which one's everyday surroundings become the interface. It necessitates the resolution of many formidable technical and standardisation problems, relying on a continuing, rapid advance in the key underlying technologies and their aggregation and materialisation as competitive products and services.

### Co-existence of Genetically Modified, Conventional and Organic Crops: Agronomic and Economic Aspects

*Participating organisations:*

CEST, ISI, +external organisations INRA, NIAB, and IPTS

The project requested by DG Agriculture analyses the causes for potential contamination of conventional and organic crops by genetically modified crops and the probabilities of contamination to happen. Recommendations for necessary changes of processes on the farm level and estimated costs associated will be analyzed and presented. Preliminary results indicate that the potential risks of contamination with genetically modified varieties (during cultivation and post harvest handling) depend highly on crop characteristics, geographical area, and agricultural practices.

### Critical review of the potential endocrine disrupting activity of hormones excreted under natural conditions and after the use of anabolic agents in farm animals

*Participating organisations:*

ADIT, ARCS, CEST, VITO, + external organisation TU Munich, and IPTS

The project arises in the context of the recent WTO hormone-treated beef issue where EU is in litigation with US and Canada. The project aims at adding valuable data to the European Commission's attempt to assess the quantities of endocrine disrupter substances in the environment, based on an examination of the material flow of each substance, as stated in Communication (COM(1999) 706 final) on a Community Strategy for Endocrine Disrupters (ED). To this end, the project aims at compiling a review of the state of the art of a) all available data on the daily production and excretion of hormones by farm animals in any published material, abstracts or proceedings from scientific meetings, government or scientific committees' reports, etc. , and b) to collect all existing knowledge on the behaviour of these substances in the environment (stability and degradation, migration processes, hormonal activity). In addition, a comparison exercise will be carried out in order to appraise the additional increment on potential endocrine disrupting activity, if any, from the use of anabolic steroids in animal production.

## The assessment of future environmental and economic impact of process integrated bio-catalysts

### *Participating organisations:*

CEST, ADIT, DTU, VDI-TZ, VTT, + an external expert and IPTS

This study addresses the question as to what extent bio-catalytic processes will be used in European industries in the future, and what impact on the environment can be expected. To this end, trends will be developed for a series of time horizons (2005/2015/2030) in order to approximate the development of the future application of bio-catalytical processes. The sub-questions in this context are in which sectors the use of bio-catalysts will increase or start in production processes, and how the environment will be affected by this. In addition, the role of public and private R&D, as well as that of intellectual property rights in the context of the investment climate will be investigated.

## The long-term monitoring projects:

The aim of these projects is to monitor recent and current technology foresight, forecasting and assessment studies at European level and to analyse them in terms of procedure, content and use. This allows to draw important conclusions on current trends of how EU countries use future oriented tools for R&D policy making and to put the results into more general European context. The three projects looking at technology development from different and partially overlapping view angles and on different time scales have linked up IPTS to the major players, users and networks in the respective areas and increased the readiness, quality and speed of canalising information on R&D trends to European policy makers.

## a) Monitoring Foresight Activities

### *Participating organisations:*

CEST, OST, VITO, TNO, VTT, VDI-TZ, ISI, ITA, NRLO, and IPTS

Emerging issues are amongst others a shift away from a technology focus to more societal foresight activities. Moreover, there is a tendency away from individual exercises to a more continuous process of carrying out foresight activities.

## b) Monitoring Technology Assessment Activities

### *Participating organisations:*

ITAS, DTU, OST, VDI-TZ, VITO, VTT, ITA, Atlantis, and IPTS

Emerging results include a shift towards approaches embracing broader participation and emerging types of modes of information sharing.

## Monitoring Technology Forecasting Activities

### *Participating organisations:*

VDI-TZ, VTT, ICTAF + external partner CEA-DTA, and IPTS

Early detection of scientific developments and forecasting their applications at technology level runs under many names in Europe. The different exercises carried out on behalf of industry or policy makers represent an unconnected and scattered community using nevertheless very similar methodologies. As such it is not surprising that a number of common issues emerge. These include e.g. trends at nano-technology level (which can be found at physics, chemistry, biology and medicine level), as well as new converging types of knowledge-generation and management tools.

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# ipts-esto 1999-2000 techno-economic analysis report

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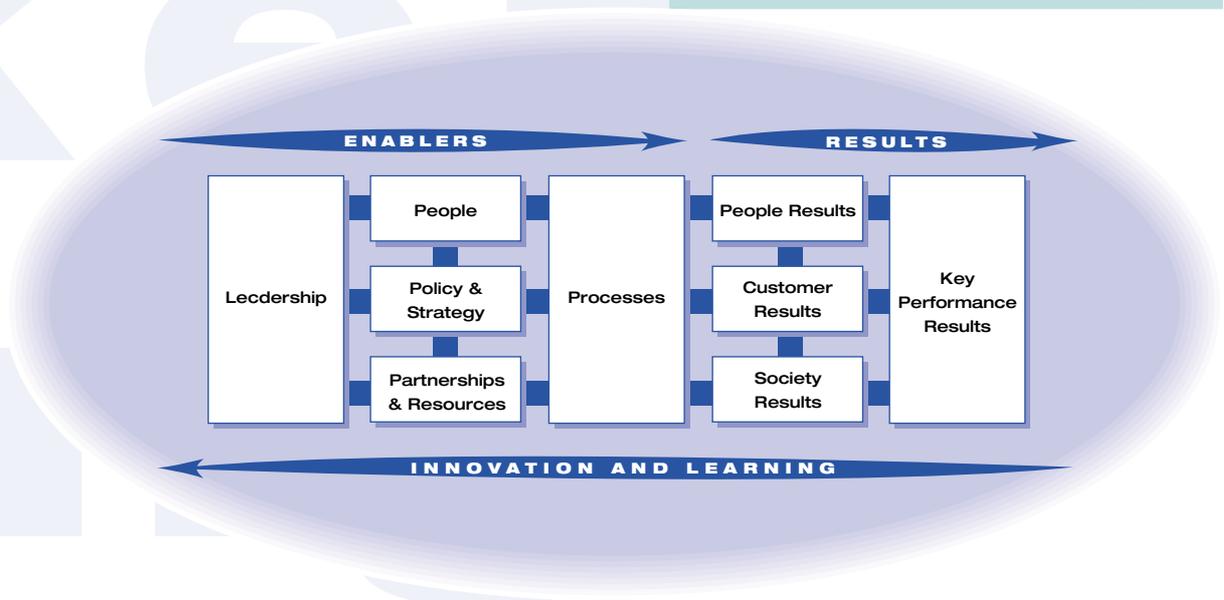
The 1999-2000 Techno-Economic Analysis Report was produced by the European Science and Technology Observatory (ESTO) network, together with IPTS and external experts. The main goal of the Report was to identify and analyse relevant prospective techno-economic information that can be useful for European decision-makers. The Report emphasised the links – in both directions – between technology and the economic environment, and assumed a policymaker's perspective.

This Techno-Economic Analysis Report covered the year 1999 as well as early 2000. The part on techno-economic developments has six chapters. The chapter on electronic commerce underlines the still largely unrealised takeoff of e-commerce in terms of total retail sales, and the bottlenecks to be overcome for its takeoff (e.g. interoperability of small scale payments systems). It also suggests that although Europe may be lagging behind in this field, the transition to mobile platforms will help close this gap. The chapter on DNA diagnostics stresses both their role in enhancing our understanding of medical conditions, as well as their gradual transformation into a powerful tool not only for hereditary but also eventually infectious diseases and cancers. It underscores the business opportunities that this field can generate.

The chapter on electricity markets and renewables indicates that the impact of liberalisation on renewables use is not straightforward and depends on the actual schemes put in place, as a survey of different countries' experience shows. The chapter on fuel cells identifies both promising steps taken as well as obstacles remaining in the uptake of fuel cells and identifies short-term and longer-term issues which recent developments have highlighted. The chapter on nanotechnology identifies as the key requirement in the field, true interdisciplinary co-operation between chemists, electronics engineers and biotechnologists. The chapter on environmental indicators takes its cue from recently increasing calls for the use of environmental indicators, and identifies the key challenges in building and adopting such indicators. The chapters on relevant developments in the US, Japan, Russia and China underscore the efforts made by key national organisations towards understanding better the key differences of their respective national systems of innovation, as well as towards learning from the experience of others.

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## Marketing Management

The aim of Marketing activities is to strengthen the Institutes' competencies to respond to its institutional mandate by adding competitive revenues. In fact, the competitive framework contracts are an important vehicle – aside from increasing resources – to enrich knowledge and skills by also being associated with international networks of S&T excellence (under a formal co-operative framework). Furthermore, the competition allows benchmarking IPTS competence and capacity against leading organisations.

In 2000, the Institute handled a second wave of proposals submitted within the RTD 5th framework programme with the objective of addressing, in particular, the opportunities related to: a) those S&T areas which represent the institute's core-competencies, b) areas in which the Institute already has competencies

but not enough human/financial resources, and c) areas of S&T activities which are both strategically relevant and relatively recent at IPTS.

Within the marketing activities, a considerable effort has been made to create a first structured IPTS contact database which contains a targeted group of people, key players in both national and EU policy decision-making processes. More than 10,000 names were collected and classified according to relevant criteria for IPTS.

In 2000, IPTS maintained a high volume of submitted competitive proposals (for a total budget of 2.6 MEUROs) while signed agreements/contracts for awarded projects made up a total of 2.2 MEUROs. Such amount represents an additional 176 % to its institutional budget for the same year.

# marketing management quality management

## Quality Management

IPTS has recently started initiatives to gradually move from an “end-of pipe quality control” (i.e. quality control of finished products) approach, to dealing with quality at the beginning of the main “enabling processes”. It is believed, in fact, that management through quality can provide IPTS with long-term stability in the development of S&T activities to achieve a recognised role as a strategic partner to the EU Institutions and their services as well as to the scientific and industrial communities.

The model of the European Foundation for Quality Management (EFQM) has been used as a framework for continuous improvement in the organisation. The following main activities were carried out in 2000:

Training of staff in EFQM and Self-Assessment process

A major self-assessment exercise was conducted at the Institute: A Self-Assessment Team representing 14% of IPTS staff (a representative cross-section of IPTS staff typology) was formed in January 2000. The Team gathered the related information, assessed the strengths and areas for improvement and scored all aspects of the Institute’s activities according to the 9 criteria of the EFQM model. An IPTS Self-Assessment Report 2000 was elaborated and distributed to all staff at a meeting where the results were introduced by the Director

Based on the result of the Self-Assessment, four improvement actions have been chosen by IPTS management and ad hoc improvement teams were selected to implement them

An institutional customer satisfaction questionnaire was launched at the end of the year.



## The IPTS Report

The IPTS' monthly journal, The IPTS Report, produced in English, French, German and Spanish, can be freely consulted via the Internet (<http://www.jrc.es/iptsreport/>). In the course of 2000 it received increasing recognition and readership continued growing steadily to include members of the European Central Bank Executive Board, and renowned intellectuals such as Prof. Noam Chomsky. Recognition has been extended through requests for articles (original and reprints) by well-known academic and non-academic journals across the world (including for instance

MIT's "Materials Technologies", "Technological Forecasting and Social Change", "Technologies Internationales", "Futures Research Quarterly" and others). Articles and editorials have been cited/used as reference documents by projects such as the UN Millenium project, and as geographically distant as the Taiwanese office for science and technology.

## LIST OF THE TECHNICAL REPORTS PUBLISHED IN 2000

TITLE	AUTHOR	REF. NUMBER	DATE
IPTS-TIM V1.1 Software. "A tool to help experts evaluate the marketability potential of new technologies". User's Manual and Tutorial	P. Moncada-Paternò, J. Rojo, F. Bellido, A. Menéndez	EUR 19037 EN	Ene-00
The Impact of Corporate Spin-Offs on Competitiveness and Employment in the European Union: A First Study"	P. Moncada-Paternò, A. Tübke, J. Howells, M. Carbone	EUR 19040 EN	Ene-00
Innovation and cleaner technologies as a key to sustainable development: the case of the chemical industry	P. Eder, M. Sotoudeh	EUR 19055 EN	Feb-00
On science and precaution - In the management of technological risk	A. Stirling (V. Calenbuhr, ed.)	EUR 19056 EN	Feb-00
Electronic Payment Systems in European Countries. Country Synthesis Report	K. Böhle, M. Rader, U. Riehm	EUR 19062 EN	Feb-00
Bioinformatics: an inventory and analysis of recent developments in bioinformatics and related areas of research and development	P. Duex, F. Moille (V. Calenbuhr (Ed.)	EUR 19524 EN	Mar-00
Study Circles in Targeted Intelligence Networks	L. Karlsson (P. Fleissner (ed.)	EUR 19568 EN	May-00
A Survey of National/Regional Prospective Technological Studies in Germany and Spain and the Exploitation of their Results in the Policy-Making Processes	By S.Korte, A. Schmitt, A. Zweck, A. Menéndez, L. Sánchez, P. Moncada (ed.)	EUR 19574 EN	May-00
Deregulation and Transport in an Enlarged European Union	D. Henstra, L. Jörg, P. Düx, M. Weber (ed.)	EUR 19581 EN	Jun-00
The Introduction of Process-integrated Biocatalysts in Companies - Effect of Dynamics in Internal and External Networks	B. Hüsing, G. Jaeckel, S. Wömer, A. Würth, O. Wolf (ed.)	EUR 19582 EN	Jun-00
Eco-Design: European State of the Art - Part I: Comparative Analysis	A. Tukker, E. Haag, P. Eder (ed.)	EUR 19583 EN	Jun-00
Regulation and Innovation in the area of end-of-life vehicles	R. Zoboli, F. Leone (ed.)	EUR 19598 EN	Jul-00
Regulation and Innovation in the recycling industr	C. Greaves, F. Leone (ed.)	EUR 19623 EN	Jul-0
IPTS-ESTO Techno-Economic Analysis Report 1999-2000	Editors: J. Lievonen, J.C. Ciscar. Project Managers: D. Kyriakou, A. Eerola	EUR 19626 EN	Aug-00
The IPTS Futures Project Conference Proceedings	E. Cahill (ed.)	EUR 19627 EN	Aug-00
Towards a European solution for the management of waste from electric and electronic equipment	D. Papameletiou	EUR 19628 EN	Aug-00
Employment outlook and occupational change in the media content industries (2000-2005)	K. Ducatel, J.C. Burgelman, M. Bogdanowicz	EUR 19658 EN	Sep-00
The impact of convergence on the competitiveness of the European Consumer Electronics Industry	N. Hazewindus, J.C. Burgelman (editors)	EUR 19659 EN	Sep-00
EU Latin America Clean Development Mechanism Co-operation. Exploring the Potential using the POLES model	N. Kouvaritakis	EUR 19672 EN	Nov-00
The Impact of the EU Eco-Audit Regulation (EMAS) on Innovation in Europe	D. Bradfor, A. Marsanich, A. Gouldson, J. Hemmelskamp, L. Delgado (ed.)	EUR 19722 EN	Nov-00
The Impact of Single Market Regulation on Innovation: Regulatory Reform and Experiences of Firms in the Medical Device Industry	H. Steg, C. Whitelegg, N. Thumm (ed.)	EUR 19734 EN	Dec-00
Regulation and Innovation in the Chemical Industry	M. Fleischer, S. Kelm, D. Palm, L. Delgado (ed.)	EUR 19735 EN	Dec-00
Eco-design: Strategies for Dissemination to SMEs - Part II: Specific Studies	A. Tukker (ed.), P. Eder (ed.)	S.P.S. 00139 EN	Dec-00
Eco-design: European State of the Art - Part II: Specific Studies	A. Tukker (ed.), P. Eder (ed.)	S.P.S. 00140 EN	Dec-00
Eco-design: Strategies for Dissemination to SMEs - Part I: Overall Analysis and Conclusions	A. Tukker, E. Gerald J., P. Eder (ed.)	EUR 19740 EN	Dec-00

# publications

## OTHER CONTRIBUTIONS IN 2000

TITLE	AUTHOR	REF. NUMBER	DATE
<b>Le istituzioni di microfinanza come strumento di sviluppo rurale: caratteristiche, potenzialità e limiti.</b> In: La Questione Agraria (I), quarterly, n° 76, 1999.	M. Zappacosta	ART 90099 EN	Feb-00
<b>Future perspective on ICTs.</b> In: Foresight - the journal of futures studies, strategic thinking and policy. Vol. 01, n° 06, dec. 99, p. 519-536. Camford Ed. U.K	K. Ducatel	ART 90118 EN	Feb-00
<b>A comparison of national foresight exercises.</b> In: Foresight - the journal of futures studies, strategic thinking and policy. Vol. 01, n° 06, dec. 99, p. 495-518. Camford Ed. U.K	J. Gavigan, F. Scapolo	ART 90119 EN	Feb-00
<b>Agro-food: food for the future.</b> In: Foresight - the journal of futures studies, strategic thinking and policy. Vol. 01, n° 06, dec. 99, p. 575-582. Camford Ed. U.K	M. Zappacosta, S. Gomez y Paloma	ART 90120 EN	Feb-00
<b>Materials in the making.</b> In: Foresight - the journal of futures studies, strategic thinking and policy. Vol. 01, n° 06, dec. 99, p. 563-574. Camford Ed. U.K.	E. Cahill, H. Hernandez, F. Bellido	ART 90121 EN	Feb-00
<b>With the benefit of foresight: a roadmap for research, technology and development.</b> In: Foresight - the journal of futures studies, strategic thinking and policy. Vol. 01, n° 06, dec. 99, p. 491-494. Camford Ed. U.K.	C. Blackman, F. Scapolo, P. Fleissner, P. Moncada	ART 90122 EN	Feb-00
<b>Economic Convergence and Climate Policy.</b> In: Energy Policy, Vol. 28, issue 11, pag. 749-761, July 2000. Ed. Elsevier Science Ltd. (U.K.)	J.C. Ciscar, A. Soria	ART 90225 EN	Jun-00
<b>Innovation-Oriented Environmental Policy.</b> In: Physica Berlin/New York. (D), June 2000.	J. Hemmelskamp, K. Rennings, F. Leone (editors)	ART 90262 EN	Jul-00
<b>Modelling energy technology dynamics: methodology for adaptive expectations models with learning by doing and learning by searching.</b> In: Int. J. Global Energy Issues, Vol. 14, Nos. 1-4, p. 104-115. 2000	N. Kouvaritakis, A. Soria, S. Isoard	ART 90263 EN	Jul-00
<b>World post-Kyoto scenarios: benefits from accelerated technology progress.</b> In: Int. J. Global Energy Issues, Vol. 14, Nos. 1-4, p. 184-203. 2000	N. Kouvaritakis, P. Criqui, C. Thonet	ART 90264 EN	Jul-00
<b>Endogenous learning in world post-Kyoto scenarios: application of the POLES model under adaptive expectations.</b> In: Int. J. Global Energy Issues, Vol. 14, Nos. 1-4, p. 222-248. 2000	N. Kouvaritakis, A. Soria, S. Isoard, C. Thonet	ART 90265 EN	Jul-00
<b>The IPTS Futures Project: Between Research and Policy.</b> In: Social Sciences for Knowledge & Decision Making. OECD	K. Ducatel	ART 90373 EN	Nov-00
<b>Technical Change Dynamics: Evidence from the Emerging Renewable Energy Technologies.</b> In: Energy Economics	S. Isoard, A. Soria	ART 90400 EN	Dec-00
<b>Ecodesign and Integrated Product Policy</b> (Conf. Making environmentally sounds products competitive - a focus for integrated product policy. IPTS-ESTO. Brussels, 21.02.00)	P. Eder	ORA 60822 EN	Ene-00
<b>Socio-economic forecasting: Influence of EU policy on water management.</b> Workshop: "Choosing the future: Water Management under uncertainty and long-term change. Org. Flood Hazard Research Centre (FHRC), Middlesex University, 11-13 Sept. 2000. UK	D. Boymanns	ORA 61254 EN	Jul-00
<b>European policy and urban water management.</b> "Workshop to present the METRON results". EMASESA, Sevilla (E), 12.12.00	D. Boymans	ORA 61561 EN	Dec-00



# publications



TITLE	AUTHOR	REF. NUMBER	DATE
<p><b>The management of “strategic niches” for promoting sustainable transport innovations.</b> (International Transdisciplinarity Conference. ETH Zurich, 27.02-01.03.00. Proceedings: Managing Complexity - an effective way to meet the challenges of the 21st. century. Published in: Häberli, Rudolf/Scholz, Roland W./Bill, Alain/Welti, Myrtha (eds.)(2000): Transdisciplinarity: Joint Problem-Solving among Science, Technology and Society. Proceedings of the International Transdisciplinarity 2000 Conference, Swiss Federal Institute of Technology Zürich, February 27, 28, 29 and March 1, 2000, Haffmans Sachbuch Verlag: Zürich, ISBN 3-251-40018-5</p>	B. Truffer, R. Kemp, M. Weber	ORA/PRO 60854 EN	Feb-00
<p><b>Education, Training and Skills in the Pre-accession Countries.</b> (Conf.: Enlargement Working Group on Education, Training and Skills in the Pre-accession Countries. IPTS, Vienna, 11-12.11.99</p>	M. Ottitsch	ORA/PRO 60855 EN	Feb-00
<p><b>IPPC Directive and the refinery industry.</b> Proceedings of the Conf. GTF Environmental. Oil &amp; Petrochemical Industries (Bruxelles, 10-12 april 2000), for Global Technology Forum.</p>	M.A. Aguado	ORA/PRO 60902 EN	Mar-00
<p><b>Estrogens in edible animal tissues.</b> Conf.: Hormones and Endocrine Disrupters in Food and Water: Possible Impact on Human Health. Righospitales (Copenhaguen University Hospital), 27-30 May 2000. In Proceedings: Human Reproduction. Niels E. Skakkebaek. DK 2000</p>	A. Daxenberger, H.H.D. Meyer, D. Ibarreta	ORA/PRO 61076 EN	May-00
<p><b>Eco-Design: European State of the Art and Policy Implications.</b> Conf.: International Summer Academy on Technology Studies. IFF/IFZ. Deutschandsberg, Austria, July 9-15, 2000. In Proc.: Strategies of a Sustainable Product Policy. IFF/IFZ.</p>	P. Eder	ORA/PRO 61077 EN	Jun-00
<p><b>Awareness of and Deepened Knowledge on Foresight Issues and Results.</b> Background Papers presented at the Meeting of the Thematic Network on Foresight in the Enlargement Countries. Nicosia/Cyprus, April 7-9, 2000</p>	S. Ertel (ed.)	ORA/PRO 61253 EN	Jul-00
<p><b>Opportunities for European Innovation Policy for Transport.</b> Proceedings of the European Transport Conference 2000; Homerton College, Cambridge, 11-13 Sept. 2000.</p>	H. van Zuylen, M. Weber	ORA/PRO 61336 EN	Sep-00
<p><b>Background papers of the Workgroup on “Innovation Systems in the Enlargement Countries”</b> presented at the Workshop in Sevilla, 13-14 Dec. 99</p>	S. Ertel	S.P.I 00.26 EN	Mar-00

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