

REGIONAL ACTIVITY CENTRE FOR CLEANER PRODUCTION


RAC/CP

[6]

ANNUAL
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PUBLICATION

MEDITERRANEAN ENTERPRISES AND SUSTAINABILITY

DECEMBER 2006



Environmentally Sound Chemicals Management



UNEP



Regional Activity Centre
for Cleaner Production



Ministry of the Environment
Spain



Generalitat de Catalunya
Government of Catalonia
Department of the Environment
and Housing

Wastewater Minimization in a Vegetable Canning Process - a Case Study | From Fossil Islands to Renewable Islands. A Practical Case: El Hierro 100% RES | Development of Corporate Social Responsibility (CSR) in Croatia | Capacity Building in Integrated Pollution Prevention and Control (IPPC) in Bosnia and Herzegovina (B&H) (An EC Life Third Countries Project) | Second Pollution Abatement Project (SPAP) 2006-2012 | What District Heating and Cooling Offers | Infrastructures et directive-cadre sur l'eau: modernisation des terrains irrigués en Espagne



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Presentation

Virginia Alzina

Director

Regional Activity Centre
for Cleaner Production

This, the sixth issue of *RAC/CP Annual Technical Publication - Mediterranean Enterprises and Sustainability*, is presented in a different manner from previous publications. The aim of this issue is a more dynamic approach, giving greater prominence to new elements. Firstly, the journal has changed format in order to offer a monograph on a highly topical subject: persistent organic pollutants (POPs). Secondly, there are new sections, which provide a broader view extending the theme of the issue. And lastly, as in previous issues, there are articles dealing with innovations in the area of clean production implemented by businesses in the Mediterranean countries.

Persistent organic pollutants (POPs) are becoming increasingly important due to the long periods of time it takes for them to break down in the environment. For this reason, mention must be made of the current state of these pollutants in the Mediterranean context, and action taken. In fact, the RAC/CP already has a number of years of experience in the field of persistent organic pollutants. More specifically, the Centre has actively participated in the process of drawing up national action plans for applying the world agreement on persistent organic pollutants: the Stockholm Convention. The topics that have been worked on include inventories on unintentional POP's emissions, proposals for replacements for these compounds, as well as best available techniques and best environmental practices. During 2006, the RAC/CP has continued to work along these lines, expanding the scope of the study to economic questions related to the execution of these national plans for the application of the Stockholm Agreement.

Similarly, with regard to sound chemicals management, the RAC/CP supports the Mediterranean countries in the application of the Protocol on Land Sources and Activities from the Barcelona Convention, especially with regard to Annex I, which is aimed at all those categories of substances which must be studied and dealt with in the implementation of any action plans, programmes or measures that may be created. On the other hand, the centre has had the honour of actively participating in the putting into practice, at an international level, of the existing political framework for strategic chemicals management: SAICM (Strategic Approach to International Chemicals Management). Firstly, on 20, 21 and 22 November, the RAC/CP organised the regional meeting in Barcelona with the countries of the European Union, as well as with those making up JUSSCANNZ (Japan, USA, Switzerland, Canada, Australia, Norway and New Zealand). The aim of this meeting was to facilitate the implementation of agreements in the aforementioned political framework on the part of the contracting countries, to develop strategies for the future, coordinate the application of this agreement at a regional level, and promote the participation of the remaining regional organisations. Secondly, the RAC/CP took part in a regional meeting held in Riga (Latvia) on 4, 5 and 6 December, which was attended by representatives of Central and Eastern European countries, as well as non-governmental and inter-governmental organisations. In this meeting the same basis was put forward as in the previous meeting, from the unfavourable situation that not belonging to the EU supposes for certain countries in the region, and the need to search for terms of reference for them was agreed upon.

Henceforth, as a centre for cleaner production, one task of the RAC/CP will be to give extensive coverage to the chemicals sector, specifically in terms of per-

sistent organic pollutants: studying pollution sources, disseminating eco-efficient options and techniques for their eradication, and providing support and technical assistance for Mediterranean countries to facilitate their action in this field. The dynamic reduction of persistent chemical pollutants in the Mediterranean basin is a matter that cannot be postponed, as they pose serious health and environmental risks. The recognition of this need, along with the experience that the RAC/CP already has concerning the eco-management of chemicals, means that the Centre will be able to make further progress with regard to these highly toxic, bio-accumulable and degradation-resistant pollutants. RAC/CP will participate in a Global Environmental Facility (GEF) project on Environmentally Sound Management (ESM) of equipment, stocks and wastes containing or contaminated by Polychlorinated Biphenyl (PCBs) in national electricity companies of Mediterranean countries. The Center's activities in Albania, Egypt, Lebanon, Libya and Syria will encompass the following actions: technical capacity of PCBs equipment, awareness of the importance of ESM and national capacity to implement PCBs phase-out.

The principal objective of the RAC/CP is to put into practice an integrated environmental prevention strategy for production processes, products and services, with the aim of improving overall efficiency and reducing risks to humans and the environment. For this reason, and with the aim of integrating the idea of cleaner production into the industrial sector, we are pleased to be able to publish this journal, with the intention of exchanging experiences and theoretical knowledge.

Finally, we would like to express our most sincere thanks to our national focal points, which have made the exchange of information between the countries that are party to the Barcelona Convention possible, without forgetting all the other authors in this issue, for their loyalty and valuable contributions to this publication. We would also like to take this opportunity to encourage individuals, institutions, organisations and businesses to take part in this project, the aim of which is to continue working towards a better Mediterranean region for this and future generations. ■

Présentation

Virginia Alzina

La sixième édition de la publication *RAC/CP Annual Technical Publication - Mediterranean Enterprises and Sustainability* est différente des précédentes en cela qu'elle propose une approche plus dynamique et met en avant de nouveaux éléments. Tout d'abord, la revue change de format et présente une monographie sur un thème particulièrement d'actualité : les polluants organiques persistants (POPs). Ensuite, vous y trouverez de nouvelles sections qui offrent une vision plus large que celle proposée par la thématique de la monographie. Enfin, nous avons conservé, comme lors des éditions précédentes, les articles qui traitent de sujets relatifs aux nouveautés de la production plus propre développées par les entreprises des pays du bassin méditerranéen.

Les polluants organiques persistants (POPs) jouant un rôle de plus en plus important en raison de leur durabilité dans l'environnement, il faut rendre compte de l'état actuel de ces polluants dans le contexte méditerranéen et passer à l'action. Le CAR/PP bénéficie en effet de quelques années d'expérience dans le domaine des polluants organiques persistants. Concrètement, le Centre a activement participé au processus d'élaboration de plans d'action nationaux d'application de la convention mondiale sur les polluants organiques persistants, à savoir la convention de Stockholm. Parmi les thèmes traités à cette occasion, citons les inventaires sur les émissions accidentelles de POPs, les propositions de substitution de ces composés ainsi que les meilleures techniques disponibles et les meilleures pratiques environnementales. Au cours de l'année 2006, le CAR/PP a travaillé dans ce sens et a étendu sa thématique d'étude aux questions économiques liées à l'exécution de ces plans nationaux d'application de la convention de Stockholm.

En outre, pour ce qui est de la gestion rationnelle des substances chimiques (SCM ou Sound Chemicals Management), le CAR/PP propose son assistance aux pays méditerranéens dans le cadre de l'application du protocole « tellurique » de la convention de Barcelone, notamment en ce qui concerne l'annexe I, destinée à toutes les catégories de substances à examiner et à traiter lors de la mise en place des plans d'action, des programmes et des mesures. Par ailleurs, le Centre a eu l'honneur de participer activement à la mise en pratique du cadre politique en vigueur sur le plan international, dans le domaine de la gestion stratégique des substances chimiques : l'approche stratégique de la gestion internationale des produits chimiques (ASGIPC). D'une part, le CAR/PP a organisé les 20, 21 et 22 novembre derniers à Barcelone une réunion régionale avec les pays de l'Union européenne et les pays du JUSSCANNZ (Japon, États-Unis, Suisse, Canada, Australie, Norvège et Nouvelle-Zélande). L'objectif de cette réunion était de faciliter l'exécution des accords du cadre politique précité par les parties contractantes, de développer des stratégies pour l'avenir, de coordonner l'application de la convention au niveau régional et de promouvoir la participation des autres organisations régionales. D'autre part, le CAR/PP était présent à la réunion régionale organisée à Riga (Lettonie) les 4, 5 et 6 décembre derniers, à laquelle ont participé des représentants des pays de l'Europe Centrale et de l'Est ainsi que des organisations non gouvernementales et intergouvernementales. L'objectif de cette réunion était le même que celui de la réunion qui a eu lieu au mois de novembre, le problème étant dans ce cas que certains pays de la région n'appartiennent pas à l'UE ; par conséquent, la nécessité de trouver des termes de référence spécifiques à ces pays a été décidée.

À l'avenir, le CAR/PP, en tant que centre de production propre, prévoit de couvrir largement le secteur des produits chimiques,

Presentación

Virginia Alzina

La sexta edición de *RAC/CP Annual Technical Publication - Mediterranean Enterprises and Sustainability* se presenta de manera diferente a las anteriores publicaciones. Esta edición pretende aportar un enfoque más dinámico, al aportar mayor protagonismo a nuevos elementos. En primer lugar, la revista cambia de formato para ofrecer un monográfico sobre un tema de destacada actualidad: los contaminantes orgánicos persistentes (COP). En segundo lugar, se incluyen nuevas secciones que aportan una visión más amplia más allá de la temática del monográfico. Y, por último, se sigue tratando en diversos artículos, como en las anteriores ediciones, las novedades en el área de producción limpia desarrolladas por empresas de los países del Mediterráneo.

Los contaminantes orgánicos persistentes (COP), o POPs, como se los conoce en inglés, están cobrando cada vez más importancia por sus características de permanencia en el medio. Por este motivo, debe dejarse constancia del estado actual de estos contaminantes en el contexto mediterráneo y pasar a la acción. De hecho, el CAR/PL cuenta ya con algunos años de experiencia trabajando en el campo de los contaminantes orgánicos persistentes. Concretamente, el Centro ha participado activamente en el proceso de elaboración de planes de acción nacionales para aplicar el convenio mundial sobre contaminantes orgánicos persistentes: el Convenio de Estocolmo. Entre los temas sobre los que ha trabajado se encuentran los inventarios sobre emisiones no intencionadas de COP, propuestas de sustitutos de estos compuestos, así como mejores técnicas disponibles y mejores prácticas ambientales. Durante el año 2006, el CAR/PL ha seguido trabajando en esta línea, ampliando la temática de estudio a las cuestiones económicas relacionadas con la ejecución de estos planes nacionales para aplicar el Convenio de Estocolmo.

Asimismo, en relación con la gestión racional de las sustancias químicas (S.C.M., Sound Chemicals Management), el CAR/PL proporciona apoyo a los países del Mediterráneo en la aplicación del Protocolo sobre Fuentes y Actividades Terrestres del Convenio de Barcelona, especialmente en relación con el Anexo I, que se destina a todas aquellas categorías de sustancias que deben estudiarse y tratarse en la ejecución de planes de acción, programas y medidas que se creen. Por otra parte, el Centro ha tenido el honor de participar activamente en la puesta en práctica del marco político existente, a nivel internacional, para la gestión estratégica de las sustancias químicas: el SAICM (Strategic Approach to International Chemicals Management, o Enfoque Estratégico para la Gestión de los Productos Químicos a Nivel Internacional). Primeramente, los pasados 20, 21 y 22 de noviembre, el CAR/PL organizó una reunión regional con los países de la Unión Europea, así como con los que integran el JUSSCANNZ (Japón, EE. UU., Suiza, Canadá, Australia, Noruega y Nueva Zelanda), en Barcelona. En esta reunión se pretendía facilitar la ejecución de los acuerdos del mencionado marco político por parte de los países contratantes, desarrollar estrategias para el futuro, coordinar la aplicación de dicho convenio a nivel regional y promover la participación del resto de organizaciones regionales. En segundo lugar, el CAR/PL participó en la reunión regional que tuvo lugar en Riga (Letonia) el 4, 5 y 6 de diciembre, a la que asistieron representantes de países del centro y este de Europa, así como organizaciones no gubernamentales e intergubernamentales. En ésta se expuso la misma base que en la anterior reunión, desde la realidad desventajosa que supone para algunos países de la región el hecho de no pertenecer a la UE, y se acordó la necesidad de buscar términos de referencia para ellos.

notamment en termes de polluants organiques persistants, d'étudier les foyers de la pollution, de diffuser des options et des techniques éco-efficaces en vue d'éliminer ces polluants et de proposer une assistance technique aux pays méditerranéens afin de leur faciliter la tâche dans ce domaine. La réduction draconienne des polluants organiques persistants dans le bassin méditerranéen ne peut être repoussée car ceux-ci sont dangereux pour la santé humaine et l'environnement. La reconnaissance de cette nécessité associée à l'expérience du CAR/PP en matière de gestion environnementale des produits chimiques permet au Centre d'intensifier ses recherches sur ces produits hautement toxiques, bioaccumulables et résistants à la dégradation. Le CAR/PP participera à un projet du Fonds pour l'environnement mondial (FEM) relatif à la gestion environnementale rationnelle des équipements, des stocks ainsi que des déchets contenant ou pollués par les biphénols polychlorés (BPC) au sein des compagnies nationales d'électricité dans les pays de la Méditerranée. Les activités du Centre en Albanie, en Égypte, au Liban, en Libye ainsi qu'en Syrie engloberont les actions suivantes : capacité technique des équipements contenant des BPC, sensibilisation à l'importance de la gestion environnementale rationnelle et capacité nationale à mettre en place un arrêt progressif de l'utilisation des BPC.

Le principal objectif du CAR/PP est de mettre en pratique une stratégie intégrée en matière de prévention environnementale dans le cadre du processus de production, des produits et des services, afin d'augmenter l'efficacité globale et de réduire les risques pour les humains et l'environnement. Pour cette raison, et en vue de diffuser le concept de la production plus propre dans le secteur industriel, nous avons le plaisir de publier un nouvel exemplaire de cette revue, dans le but d'échanger nos expériences et nos connaissances théoriques.

Enfin, nous souhaitons adresser nos remerciements les plus sincères à nos points focaux nationaux, qui rendent possible les échanges d'informations entre les pays contractants de la convention de Barcelone, ainsi qu'aux autres auteurs de cette revue, pour leur fidélité et leur précieuse contribution à cette publication. D'autre part, nous souhaitons encourager les personnes, les institutions, les organisations et les entreprises à participer à ce projet qui a pour objectif final d'œuvrer en faveur d'une région méditerranéenne meilleure, dès à présent mais également pour les générations futures. ■

En adelante, el centro CAR/PL, como centro de producción limpia, se plantea como tarea abarcar ampliamente el sector de las sustancias químicas, específicamente en términos de contaminantes orgánicos persistentes: estudiar los focos de contaminación, difundir opciones y técnicas ecoeficientes para conseguir su erradicación y proporcionar soporte y ayuda técnica a los países mediterráneos para facilitarles la acción en este campo. La enérgica reducción de contaminantes orgánicos persistentes en la cuenca mediterránea resulta inaplazable, puesto que suponen un peligro para la salud humana y el medio ambiente. El reconocimiento de esta necesidad, acompañado de la experiencia de que ya dispone el CAR/PL en lo referente a gestión ambiental de productos químicos, permite que el Centro sea capaz de profundizar en relación con estos productos tan altamente tóxicos, bioacumulables y resistentes a la degradación. El CAR/PL participará en un proyecto del Fondo Mundial para el Medio Ambiente (FMAM) sobre gestión ambientalmente racional de aparatos, stocks y residuos que contengan o estén contaminados por policlorobifenilos (PCB) en compañías eléctricas nacionales de los países del Mediterráneo. Las actividades del Centro en Albania, Egipto, el Líbano, Libia y Siria abarcarán las acciones siguientes: capacidad técnica de los aparatos que contengan PCB, sensibilización sobre la importancia de la gestión ambientalmente racional y capacidad nacional para implantar la eliminación de los PCB.

El máximo objetivo del CAR/PL es poner en práctica una estrategia integrada de prevención medioambiental para el proceso de producción, los productos y los servicios, con el fin de aumentar la eficiencia global y reducir el riesgo para los humanos y el medio ambiente. Por este motivo, con el ánimo de integrar la idea de producción limpia en el sector industrial, tenemos el placer de publicar esta revista un año más, con el propósito de intercambiar experiencias y conocimientos teóricos.

En última instancia, nos gustaría expresar nuestro más sincero agradecimiento a nuestros puntos focales nacionales, quienes hacen posible el intercambio de información entre los países contratantes del Convenio de Barcelona, así como al resto de autores de este número, por su fidelidad y sus valiosas contribuciones a esta publicación. Por otra parte, queremos animar a las personas, instituciones, organizaciones y empresas a participar en este proyecto que tiene como objetivo último seguir trabajando en favor de una región mediterránea mejor para el presente y las generaciones futuras. ■

Sustainable chemicals management

Mr. Víctor Escobar Paredes

Chief of Institutional
Coordination Area

Ministry of Environment
(Spain)

The sustainable management of chemical substances and their compounds is proving to be a priority within the setting of environmental protection and the improvement of the competitiveness of the chemical industry.

As the industry itself forecasted, the value of production in the Spanish chemical sector reached 38,151 million euros in 2006, a 6% increase on the previous year; the provisions for 2007 are also highly favourable, with an estimated growth of around 4.9%. According to the chairman of the FEIQUE (Spanish Federation of Chemical Industries), "the key to guaranteeing future growth in the medium and long term lies in increasing investment in R&D&I to continue endowing Spanish chemical production with greater added value". This highly necessary investment must be aimed at the environmental improvement of the industry, among other aspects.

If the industry is to make progress toward sustainability, the first great objective lies in separating economic growth from environmental degradation, in terms of both supply and demand; i.e., ensuring that the growth rate of environmental pressures (including the consumption of energy and material) is lower than that of its economic driving force. Competitiveness will necessarily involve increasing eco-efficiency and endowing products with greater added value. Innovation within a setting of sustainability is the only viable option if there is a shift towards cleaner and more efficient processes to improve the quality of life of us all.

One of the principles that must determine sustainable chemicals management is the precautionary principle. Its implementation in this context requires the application of suitable measures for reducing risks associated with production, use and trade, and generally in all those activities included in their life cycle.

With regard to this principle, both prevention and substitution are fundamental tools that must not be overlooked. These concepts should not be considered in connection with the drawing up of proposals for developing their content generally, but in a case- or substance-specific manner. The lack of certainty and gaps in our scientific knowledge are handicaps in sound chemicals management; providing mechanisms by means of which it is possible to make the information required for their management available is a *sine qua non* that the pertinent governments and actors must tackle seriously.

Precaution-based decision making must be included into a transparent process that guarantees the participation of the relevant actors, thus guaranteeing the quality of the decisions that are made.

Policies on chemicals in any EU country are structured on three levels: national, European and multilateral ones. The regulation and management of chemicals in Spain derives fundamentally from commitments with the European Union; there are a number of European directives that deal partially with different aspects related to chemicals, and the REACH regulations, which guarantee the coherence of policies in the medium and long term, have already been passed.

In Spain, the responsibility for negotiation and monitoring of initiatives related to chemicals is highly compartmentalised: besides authority regarding the implementation of actions derived from the application of the Directives, which is fundamentally at a regional level, a number of departments from the General state Administration are involved. The future Chemical Sustainability Agency will be an institutional instrument of a basic technical nature.

One of the principles that must determine sustainable chemicals management is the precautionary principle

On a multilateral level, the sound management of chemical industries is a priority that is both regional and global. Spain is party to the OSPAR, Barcelona, London, Stockholm, Rotterdam, Basel, Aarhus, and Geneva Conventions, and particularly to SAICM (Strategic Approach to International Chemicals Management), and actively participates in the UN initiatives, including the programme on mercury.

The difficulty of complying with all these international obligations entails the need for strong institutional mechanisms which, through a strategic approach agreed by consensus, should include actions such as the coordination of administrations, promoting the participation of the relevant actors, and the development of instruments of a legislative or non-legislative nature.

If actions of this type are not put into practice, instead of agreeing on and strengthening the country's environmental and technological progress in this field, they could result in erratic, ill-advised action.

This strategic approach must establish those policies that are required to avoid health and environmental damage due to exposure, either directly or through the environment, to all types of chemical substances, their compounds, products and articles, covering the entire life cycle of these substances.

The objectives could be as follows:

- Make information on the risks of chemicals available to the public.*
- Continually reduce the risks of chemicals for health and environment.*
- Progressively eliminate those chemicals that represent an unacceptable risk to health and the environment.*

Conceptually, the basic responsibility of providing data on risks associated with chemical substances lies with the agents that manufacture or use them, on the basis of the corporate responsibility of these sectors. These organisations must supply sufficient information to allow any health and environmental risks to be assessed.

On the other hand, the development and dissemination of Best Available Techniques, Best Environmental Practices, and Clean Technologies is a requirement and obligation of the State. This will help to reduce exposure to chemicals and to replace them with safer alternatives, as well as to promote the country's technological development.

This approach should guarantee the participation of all agents involved; through the required consultations a better understanding between agents will be promoted, thus obtaining more precise knowledge on the specific concerns that arise in decision making and in the development of policies. In particular, this participation:

- will act as a barometer for the perspectives and opinions of the agents involved.*
- will advise on the selection criteria for the identification of substances that require priority attention, and on the risk management strategies that are required.*
- will inform on these substances, suggesting precautionary controls and restrictions, as well as on schedules for actions.*
- will advise on the development of indicators of environmental exposure to dangerous substances, including objectives to reduce the general exposure of people or the environment.*

Chemicals management is particularly relevant in the specific setting of the Barcelona Convention. In this context, it is important to mention the amendments to the Syracuse 1996 Protocol for the Protection of the Mediterranean Sea

The difficulty of complying with all these international obligations entails the need for strong institutional mechanisms

against Pollution caused by Land-Based Sources which, unfortunately, has still to come into force.

As mentioned in the Amended Protocol of 1996, the contracting parties are committed to drawing up plans of action and national and regional programmes to combat pollution arising from land sources (Articles 5 and 8 of the Agreement, and 5 and 15 of the Protocol). Similarly, Article 15 of the Protocol establishes that the measures contained in the regional plans (Mediterranean basin) shall be binding once the protocol comes into force.

As an application of the 1980 Land-based Sources Protocol, and as an initial draft of the regional plan referred to in Articles 5 and 15 of the amended Protocol, the Strategic Action Plan (SAP) was adopted in 1997 to combat contamination as a result of land-based activities. An update of the SAP is planned for the near future, and will be an opportunity to revise it with a strategic approach of the type described above.

The Strategic Action Plan currently includes:

- a. Persistent and bio-accumulative toxic substances (POPs and PAHs, heavy metals [such as Hg, Cd, Pb] and organo-metallic compounds).
- b. Other heavy metals (Zn, Cu, Cr).
- c. Organic halogenated compounds.
- d. Radioactive substances.
- e. Nutrients and dissolved solids.
- f. Other dangerous wastes (obsolete chemical products, lubricating oils, and batteries).

The implementation of the SAP requires a diagnosis; a basic inventory of quantities, uses, discharges and emissions; and the preparation of national reduction and monitoring programmes. Currently all parties to the agreement have drawn up these documents, some with the help of the GEF (Global Environmental Facility), and thus the current priority is the implementation of national plans. For its application it will be essential to muster the necessary resources of the GEF and other international financial institutions, as well as the European Union itself. Within the context of the EU, funding from the Horizon 2020 Initiative and other funds from the European Neighbourhood Policy are highly relevant. The technical cooperation of International institutions as well as bilateral cooperation will be of prime importance.

In conclusion, I would like to point out the importance of regional sea agreements, in particular the Barcelona Convention, as platforms for the application of chemical policies. The search for and use of synergies between different international processes, in this case those related with sustainable chemicals management, has been highlighted in different settings. The challenge now is to progress from the conceptual plane to the specific one of action. Through the development and application of the strategic approach at a Mediterranean level, we could make progress, inclusively and transparently, towards sustainability, acting in the interests of this and future generations. ■

La gestion durable des produits chimiques

Víctor Escobar Paredes

La gestion durable des produits chimiques et de leurs préparations devient une priorité en matière de protection de l'environnement et d'amélioration de la compétitivité de l'industrie chimique.

Selon l'industrie chimique elle-même, la valeur de la production du secteur chimique espagnol atteindra 38 151 millions d'euros en 2006, soit 6 % de plus qu'en 2005 ; les prévisions pour 2007 sont également très optimistes avec une estimation d'expansion de l'ordre de 4,9 %. Pour le président de la FEIQUE (Fédération des entreprises de l'industrie chimique espagnole), « les clés de la croissance à moyen et long termes consistent à augmenter les investissements dans la RDI afin de donner une valeur ajoutée toujours plus importante à la production chimique espagnole ». Ces investissements nécessaires doivent être destinés, entre autres, à l'amélioration environnementale de l'industrie.

Le premier grand objectif à atteindre afin que l'industrie progresse en termes de durabilité consiste à séparer la croissance économique de la dégradation de l'environnement, tant au niveau de l'offre que de la demande ; le taux de croissance des pressions environnementales (y compris la consommation d'énergie et des matériaux) doit être inférieur à la croissance de leur force économique conductrice. La compétitivité passe forcément par l'augmentation de l'éco-efficacité et des produits à la valeur ajoutée plus importante. L'innovation dans un cadre de durabilité est l'unique solution, elle permettra l'adoption de systèmes et de procédés plus propres et efficaces en vue d'améliorer la qualité de vie de tous.

L'un des principes devant régir la gestion durable des produits chimiques et de leurs préparations est le principe de précaution. Son introduction dans ce contexte exige l'application de mesures ad hoc pour réduire les risques associés à leur production, leur utilisation et leur commercialisation, et en général pour l'ensemble des activités menées tout au long de leur cycle de vie.

En relation avec ce principe, la prévention ainsi que la substitution sont des outils fondamentaux qui ne doivent en aucun cas être laissés de côté. Ces concepts ne doivent pas être envisagés comme des outils permettant d'élaborer des postulats en vue de développer leur contenu de manière générale mais comme des outils concrets destinés à des substances ou à des cas spécifiques. L'absence de certitudes ou les lacunes en matière de connaissances scientifiques constitue un handicap pour la gestion rationnelle des produits chimiques ; la mise en place de mécanismes permettant de disposer des informations nécessaires à leur gestion est une condition *sine qua non* que les gouvernements et les acteurs concernés doivent envisager sérieusement.

La prise de décisions fondée sur la précaution doit s'intégrer dans un processus transparent qui assure la participation des acteurs concernés, ce qui constituera une garantie de la qualité des décisions prises.

La politique sur les produits chimiques s'articule autour de trois niveaux dans l'ensemble des pays de l'Union européenne : national, européen et multilatéral. La réglementation et la gestion des produits chimiques en Espagne résultent essentiellement des engagements pris avec l'Union européenne, de nombreuses directives européennes concernent en partie divers aspects liés aux produits chimiques et le règlement REACH, qui garantit la cohérence des politiques à moyen et long termes, a été approuvé.

La gestión sostenible de las sustancias químicas

Víctor Escobar Paredes

La gestión sostenible de las sustancias químicas y sus preparados se revela como una prioridad en el marco de la protección del medio ambiente y la mejora de la competitividad de la industria química.

Según prevé la propia industria, el valor de la producción del sector químico en España alcanzará los 38.151 millones de euros en 2006, un 6% más que el año precedente. Las previsiones para el año 2007 son también muy buenas, con una estimación de la expansión de cerca del 4,9%. Según el presidente de FEIQUE (Federación Empresarial de la Industria Química Española), «para garantizar futuros crecimientos a medio y largo plazo, las claves estarán en incrementar la inversión I+D+i para seguir dotando de mayor valor añadido a la producción química española». Estas inversiones tan necesarias deberán ir dirigidas, entre otros aspectos, a la mejora medioambiental de la industria.

El primer gran objetivo para que la industria avance hacia la sostenibilidad reside en lograr que se desligue el crecimiento económico de la degradación medioambiental, tanto en el plano de la oferta como en el de la demanda; es decir, que la tasa de crecimiento de las presiones ambientales (incluidos los consumos de energía y de materiales) sea menor que la de su fuerza económica conductora. La competitividad pasa necesariamente por aumentar la ecoeficiencia y aportar un mayor valor añadido a los productos. La innovación dentro de un marco de sostenibilidad es la única salida, de manera que se produzca un cambio hacia sistemas y procesos más limpios y eficientes para conseguir mejorar la calidad de vida de todos.

Uno de los principios que debe regir la gestión sostenible de las sustancias químicas y sus preparados es el principio de precaución. Su implementación en este contexto obliga a la aplicación de medidas adecuadas para la reducción de los riesgos asociados a su producción, uso y comercio, y en general, los relacionados con todas las actividades enmarcadas en su ciclo de vida.

Tanto la prevención como la sustitución, ambas relacionadas con este principio, son herramientas fundamentales que no deben ser, en ningún caso, pasadas por alto. Estos conceptos no deberían plantearse en relación con la elaboración de postulados para desarrollar de manera general su contenido, sino más bien de manera concreta para sustancias o casos específicos. La falta de certeza o las lagunas en el conocimiento científico es un obstáculo en la gestión racional de los químicos; habilitar mecanismos que permitan hacer disponible la información necesaria para su gestión es una condición *sine qua non*, que los gobiernos y los actores relevantes deben abordar seriamente.

La toma de decisiones basada en la precaución debe integrarse en un proceso transparente que asegure la participación de los actores relevantes, lo cual será una garantía de la calidad de las decisiones tomadas.

La política sobre sustancias químicas se estructura en cualquier país de la Unión Europea en tres niveles: nacional, europeo y multilateral. La reglamentación y gestión de las sustancias químicas en España emana fundamentalmente de los compromisos con la Unión Europea. Existen múltiples directivas europeas que tratan parcialmente diferentes aspectos relacionados con las sustancias químicas. En la actualidad ya se ha aprobado el reglamento REACH, que asegura la coherencia de las políticas a medio y largo plazo.

En Espagne, la responsabilité des négociations et du suivi des interventions liées aux produits chimiques est très cloisonnée : outre les compétences relatives à la mise en place des interventions dérivées de l'application des directives, qui dépendent essentiellement des gouvernements autonomes, différents départements de l'Administration générale de l'État sont impliqués. La future création de l'agence de durabilité chimique constituera un instrument institutionnel au caractère technique primordial.

Sur le plan multilatéral, la gestion rationnelle des produits chimiques est une priorité régionale mais également mondiale. L'Espagne est signataire des conventions OSPAR, de Barcelone, de Londres, de Stockholm, de Rotterdam, de Bâle, d'Aarhus, de Genève et surtout de la SAICM (approche stratégique de la gestion internationale des produits chimiques). Par ailleurs, elle participe activement aux actions menées par les Nations unies comprenant le programme relatif au mercure.

Appliquer l'ensemble des obligations internationales n'est pas chose aisée ; il convient pour cela d'utiliser des mécanismes institutionnels forts qui, via des plans stratégiques adoptés d'un commun accord, incluent des activités telles que la coordination des administrations, la promotion de la participation des acteurs concernés et le développement d'instruments légaux ou autres.

En l'absence de ces mécanismes, les interventions, au lieu de converger et de venir renforcer les progrès environnementaux et technologiques du pays concerné, risquent de s'avérer erratiques et par conséquent inopportunes.

Les plans stratégiques doivent établir des politiques permettant d'éviter tout dommage sur la santé et l'environnement dû à l'exposition directe, ou indirecte, via l'environnement, à tout type de produits chimiques, de préparations chimiques, et enfin aux produits et articles couvrant toute la durée de vie des substances.

Les objectifs à atteindre pourraient être les suivants :

- Permettre au public d'accéder aux informations disponibles sur les risques des produits chimiques.
- Réduire de façon continue les risques que présentent les produits chimiques pour la santé et l'environnement.
- Éliminer progressivement les produits chimiques représentant des risques dangereux pour la santé et l'environnement.

En théorie et ce en raison de la responsabilité sociale de ces secteurs, les agents qui fabriquent ou utilisent des produits chimiques ont la responsabilité de fournir des données sur les risques qui leur sont associés. Ces entités doivent fournir suffisamment d'informations pour pouvoir être en mesure d'évaluer les risques encourus pour la santé et l'environnement.

Par ailleurs, les États doivent obligatoirement promouvoir le développement et la diffusion des meilleures techniques disponibles, des meilleures pratiques environnementales et des technologies propres. Ceci contribuera à réduire l'exposition aux produits chimiques et à les remplacer par des alternatives plus sûres ainsi qu'à promouvoir le développement technologique du pays concerné.

Cette approche doit garantir la participation de tous les agents impliqués ; les consultations nécessaires permettront de promouvoir un meilleur dialogue entre les agents, en vue d'arriver à une connaissance plus précise des préoccupations concrètes qui émergent dans le cadre de la prise de décisions et du développement des politiques. Plus spécifiquement, cette participation :

- agira comme un baromètre des points de vue et des opinions des agents impliqués ;
- conseillera sur les critères de sélection pour l'identification des substances exigeant une attention prioritaire ainsi que sur les stratégies nécessaires en matière de gestion des risques ;
- donnera des informations sur ces substances, en conseillant la mise en place de contrôles préventifs et de restrictions, et sur les calendriers des interventions ;

En España, la responsabilidad de la negociación y el seguimiento de las actuaciones relacionadas con las sustancias químicas está muy compartimentada. Además de las competencias relativas a la ejecución de las actuaciones derivadas de la aplicación de las directivas, que son fundamentalmente autonómicas, existen diferentes departamentos de la Administración General del Estado implicados. La futura creación de la Agencia de Sostenibilidad Química será un instrumento institucional de carácter técnico fundamental.

En el plano multilateral, la gestión racional de las sustancias químicas es una prioridad tanto regional como global. España participa en los convenios OSPAR, Barcelona, Londres, Estocolmo, Rotterdam, Basilea, Aarhus, Ginebra y, particularmente, en el SAICM (Enfoque Estratégico para la Gestión de los Productos Químicos a Nivel Internacional), e interviene activamente en actuaciones de Naciones Unidas, incluido el programa sobre el mercurio.

La dificultad de satisfacer todas estas obligaciones internacionales implica la necesidad de contar con mecanismos institucionales sólidos que, a través de un planteamiento estratégico consensuado, incluyan actividades tales como la coordinación de las administraciones, el fomento de la participación de los actores relevantes y el desarrollo de instrumentos legislativos o de otra naturaleza.

Sin un ejercicio de este tipo, las actuaciones, en lugar de confluir y reforzar el progreso medioambiental y tecnológico del país en este campo, podrían desembocar en una actuación errática poco aconsejable.

Este planteamiento estratégico debería establecer las políticas necesarias para evitar daños a la salud y al medio ambiente ocasionados por la exposición, directa o a través del medio ambiente, a todo tipo de sustancias químicas, sus preparados, los productos y los artículos, considerando todo el ciclo de vida de las sustancias.

Podrían establecerse los siguientes objetivos:

- Hacer accesible al público la información disponible sobre los riesgos de las sustancias químicas.
- Reducir continuamente los riesgos que presentan las sustancias químicas sobre la salud y el medio ambiente.
- Eliminar progresivamente aquellas sustancias químicas identificadas por representar un riesgo no asumible sobre la salud y el medio ambiente.

Conceptualmente, la responsabilidad básica de proveer datos sobre los riesgos asociados con las sustancias químicas recae sobre los agentes que manufacturan o usan sustancias químicas, de acuerdo con la responsabilidad corporativa de esos sectores. Estas entidades deben aportar información suficiente para permitir una evaluación de los riesgos sobre la salud y el medio ambiente.

Por otra parte, es una necesidad y una obligación de los Estados promover el desarrollo y divulgación de las mejores técnicas disponibles, las mejores prácticas medioambientales y las tecnologías limpias. Esto ayudará a reducir la exposición a las sustancias químicas y a sustituirlas por alternativas más seguras, así como a promover el desarrollo tecnológico del país.

Este planteamiento debería asegurar la participación de todos los agentes implicados; mediante las consultas necesarias, se promoverá una mejor comprensión entre los agentes, y se obtendrá, de esta manera, un conocimiento más preciso de las preocupaciones concretas que surjan en la toma de decisiones y en el desarrollo de las políticas. Concretamente, esta participación:

- actuará como un barómetro de los puntos de vista y opiniones de los agentes implicados ;
- aconsejará sobre los criterios de selección para la identificación de las sustancias que requieran atención prioritaria, y sobre las estrategias de gestión de riesgos requeridas ;

–conseillera sur le développement d'indicateurs d'exposition environnementale des substances dangereuses, en établissant des objectifs de réduction de l'exposition générale des personnes et de l'environnement.

Concrètement, dans le cadre de la convention de Barcelone, la gestion des produits chimiques est particulièrement importante. Dans ce contexte, il est intéressant de mentionner les amendements au protocole « tellurique » de Syracuse (1996), protocole qui, malheureusement, n'est pas encore entré en vigueur.

Conformément au protocole amendé de 1996, les parties contractantes s'engagent à élaborer des plans d'action ainsi que des programmes nationaux et régionaux pour combattre la pollution d'origine terrestre (articles 5 et 8 de la convention, 5 et 15 du protocole). De la même manière, l'article 15 du protocole établit le caractère contraignant des mesures des plans régionaux (bassin méditerranéen) dès l'entrée en vigueur du protocole.

En application du protocole « tellurique » de 1980, le programme d'action stratégique (PAS) pour la lutte contre la pollution due à des activités menées à terre a été adopté en 1997 ; il s'agit d'une première ébauche du plan régional évoqué par les articles 5 et 15 du protocole amendé. Le PAS va prochainement être remis à jour, ce qui représente une opportunité d'orienter sa révision vers une stratégie de même nature que celle décrite précédemment.

Le programme d'actions stratégiques inclut à l'heure actuelle les éléments suivants :

- Substances toxiques persistantes et bioaccumulables (POP et HPA, métaux lourds [Hg, Cd, Pb] et composés organométalliques).
- Autres métaux lourds (Zn, Cu, Cr).
- Composés organohalogénés.
- Substances radioactives.
- Substances nutritives et solides en suspension.
- Autres déchets dangereux (produits chimiques obsolètes, huiles lubrifiantes, piles et batteries).

L'introduction du PAS exige la réalisation d'un diagnostic, d'un inventaire de base sur les quantités, les utilisations, les décharges et les émissions ainsi que la mise en place de plans et de programmes nationaux de réduction et de contrôle. Actuellement, toutes les parties contractantes de la convention ayant établi ces documents, quelques-unes d'entre elles avec l'assistance du FMAM (Fonds pour l'environnement mondial), la priorité reste l'introduction des plans nationaux. Leur application demandera la mobilisation des ressources nécessaires, tant de la part du FMAM, d'autres institutions financières que de l'Union européenne elle-même. Concernant cette dernière, les fonds de l'initiative HORIZON 2020 ainsi que les autres fonds de la politique européenne de voisinage sont importants. La coopération technique des institutions internationales ainsi que la coopération bilatérale s'avèreront essentielles.

Pour terminer, je souhaiterais insister sur l'importance des accords des bassins régionaux, et plus particulièrement sur la convention de Barcelone, en tant que plateformes pour l'application de la politique sur les produits chimiques. Le caractère essentiel de la recherche et de l'utilisation des synergies entre les différents processus internationaux, ici, les processus liés à la gestion durable des produits chimiques, a déjà été mis en évidence dans divers cadres. Le défi actuel consiste à passer de la théorie à l'application pratique des interventions. Le développement et l'application des plans stratégiques en région méditerranéenne permettraient d'avancer de manière inclusive et transparente vers la durabilité ainsi que d'agir pour notre génération et les générations futures. ■

–informará sobre estas sustancias, proponiendo controles precautorios y restricciones, y sobre los calendarios para las actuaciones;

–aconsejará sobre el desarrollo de indicadores de exposición medioambiental de las sustancias peligrosas, incluyendo objetivos para reducir la exposición general sobre las personas o el medio ambiente.

En el ámbito concreto del Convenio de Barcelona, la gestión de las sustancias químicas es particularmente relevante. En ese contexto, es importante mencionar las enmiendas al Protocolo de Fuentes Terrestres de Siracusa de 1996, protocolo que, lamentablemente, aún no ha entrado en vigor.

Según recoge el Protocolo enmendado de 1996, las partes contratantes se comprometen a elaborar planes de acción y programas nacionales y regionales para combatir la contaminación ocasionada por fuentes terrestres (artículos 5 y 8 del Convenio y 5 y 15 del Protocolo). Asimismo, el artículo 15 del Protocolo establece que las medidas contenidas en los planes regionales (cuena mediterránea) tendrán carácter vinculante con la entrada en vigor del Protocolo.

Como aplicación del Protocolo de Fuentes Terrestres de 1980, y con ánimo de ser un primer esbozo del plan regional al que se refieren los artículos 5 y 15 del Protocolo enmendado, se adoptó en 1997 el Programa de Acción Estratégico (PAE) para combatir la contaminación por actividades situadas en tierra. Se prevé una próxima actualización del PAE, lo que representa una oportunidad para que se revise con un planteamiento estratégico de la naturaleza del descrito anteriormente.

El Programa de Acciones Estratégicas incluye, actualmente:

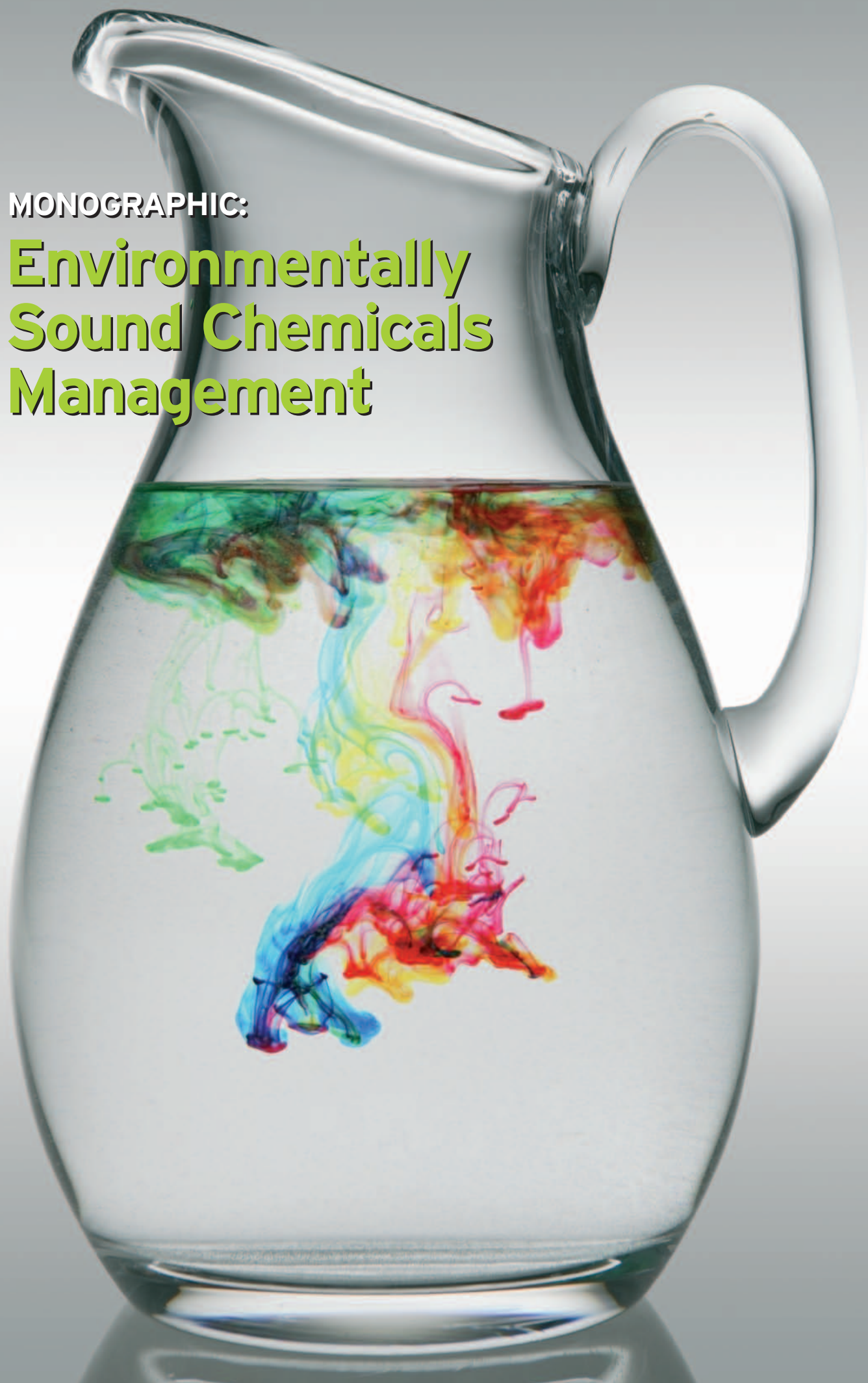
- Substancias tóxicas persistentes y bioacumulativas (COP y HAP, metales pesados, como Hg, Cd, Pb, y compuestos organometálicos).
- Otros metales pesados (Zn, Cu, Cr).
- Compuestos organohalogenados.
- Substancias radiactivas.
- Nutrientes y sólidos en suspensión.
- Otros residuos peligrosos (productos químicos obsoletos, aceites lubricantes, así como pilas y baterías).

La implementación del PAE exige la realización de un diagnóstico, un inventario base sobre las cantidades, usos, descargas y emisiones, así como la realización de planes y programas nacionales de reducción y control. En la actualidad, todas las partes contratantes del Convenio han desarrollado estos documentos, algunas de ellas con la asistencia del FMAM (Fondo Mundial para el Medio Ambiente), por lo que la prioridad actual es la implementación de los planes nacionales. Para su aplicación, será fundamental movilizar los recursos necesarios tanto del FMAM, de otras instituciones financieras internacionales, así como de la propia Unión Europea. En el contexto de la Unión Europea son muy relevantes los fondos de la Iniciativa Horizonte 2020 y otros fondos de la Política de Vecindad Europea. La cooperación técnica, tanto de las instituciones internacionales como la bilateral, será de vital importancia.

Para finalizar, quisiera señalar la importancia de los acuerdos de mares regionales, en particular el Convenio de Barcelona, como plataformas para la aplicación de la política de sustancias químicas. La búsqueda y utilización de sinergias entre los diferentes procesos internacionales, en este caso los relacionados con la gestión sostenible de las sustancias químicas, ya ha sido puesta de relieve en diferentes marcos. El reto actual sería pasar del plano conceptual al plano concreto de las actuaciones. Mediante el desarrollo y aplicación del planteamiento estratégico a nivel mediterráneo, podríamos, de manera inclusiva y transparente, avanzar en la dirección de la sostenibilidad, actuando en beneficio de ésta y de futuras generaciones. ■

MONOGRAPHIC:

Environmentally Sound Chemicals Management



Points de connexion entre les accords internationaux en matière de contrôle des produits chimiques dans le monde

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La collaboration internationale joue un rôle essentiel dans la politique développée par l'Espagne pour la gestion des problèmes liés aux substances chimiques tout au long de leur cycle de vie. Ainsi, en février 2006, l'Espagne faisait partie des États souscrivant à l'approche stratégique de la gestion internationale des produits chimiques (SAICM) ; elle a également organisé, en novembre dernier, une réunion à Barcelone afin de définir les premières étapes de l'application de ce cadre politique. L'Espagne, pont entre l'Europe, l'Amérique Latine et la Méditerranée, peut également jouer un rôle significatif dans la collaboration entre les États plus ou moins développés en matière de gestion des substances chimiques. À l'échelle européenne, le pays bénéficiera du règlement REACH récemment approuvé, qui impliquera la création d'un registre européen des substances chimiques (Helsinki) et d'un bureau de durabilité espagnol centré sur les mêmes objectifs.

Mots-clés : substances chimiques, SAICM, REACH, gestion des produits chimiques, collaboration internationale.

Points of contact between international agreements for the worldwide control of chemical products

International cooperation plays a vital role in Spain's policy for managing problems generated throughout the life cycle of chemical substances. Thus, in February 2006, Spain was one of the states that subscribed to the Strategic Approach to International Chemicals Management (SAICM), and last November it hosted a meeting in Barcelona to determine the first steps in the application of this political framework. Spain, as a link between Europe, Latin America and the Mediterranean, can play a significant role in collaboration between more and less-developed states in the matter of chemicals management. On a European level, Spain will benefit from the recently passed REACH regulation, which will result in the setting up of the European Chemical Substances Register in Helsinki, and an Office of Sustainability with a similar purpose in Spain.

Key words: chemicals, SAICM, REACH, chemicals management, international cooperation.

Puntos de conexión entre los acuerdos internacionales para el control de los productos químicos en el mundo

La colaboración internacional juega un papel crucial en la política desarrollada por España para la gestión de los problemas generados por las sustancias químicas en todo su ciclo de vida. Así, en febrero del 2006, España fue uno de los estados que suscribieron el Enfoque Estratégico para la Gestión de Productos Químicos a Nivel Internacional (SAICM), y albergó el pasado mes de noviembre una reunión en Barcelona para determinar los primeros pasos de la aplicación de este marco político. España, como enlace entre Europa, Latinoamérica y el Mediterráneo, puede asimismo desempeñar un significativo papel en la colaboración entre estados más y menos desarrollados para la gestión de sustancias químicas. A escala europea, España se beneficiará del recientemente aprobado reglamento REACH, que comportará la creación de un registro europeo de sustancias químicas en Helsinki y una Oficina de Sostenibilidad con parecidos fines en España.

Palabras clave: sustancias químicas, SAICM, REACH, gestión de productos químicos, colaboración internacional.

Les problèmes liés à la production et à l'utilisation des substances chimiques sont une priorité de la politique espagnole actuelle dans le cadre des objectifs de défense de la santé publique, de la santé au travail et de l'environnement d'un point de vue intégral, en traitant les problèmes produits par les substances chimiques tout au long de leur durée de vie.

Il est pour nous essentiel d'utiliser et d'appliquer les principes de prévention, de précaution et de substitution dans la gestion de ces substances, tout comme la consolidation des instruments juridiques internationaux contraignants. Rappelons que l'Espagne est actuellement partie contractante, entre autres, des conventions OSPAR de Barcelone (pollution maritime), de la convention de Stockholm (polluants organiques persistants) et de Rotterdam (consentement préalable en connaissance de cause), de REACH (enregistrement, évaluation et autorisation des produits chimiques) dans le cadre de l'UE ou de la SAICM (gestion internationale des produits chimiques) dans le cadre des Nations unies.

Conformément à cela, l'Espagne promeut la création d'un instrument international pour le mercure et autres métaux lourds ou encore la transformation du PNUE en organisation des Nations unies pour l'environnement.

L'importance du défi à relever pour respecter ces



engagements internationaux exige la création de solutions inventives pour optimiser l'utilisation des ressources humaines, financières et matérielles. Outre la coordination entre les différentes unités responsables de ces thèmes, condition sine qua non, la création d'un organe intégré, en

négociation cohérentes, et enfin, de stimuler la création des instruments juridiques nécessaires et de répartir les responsabilités.

L'importance de la SAICM

Adoptée par la conférence internationale sur la gestion des produits chimiques

La création d'un organe intégré, en mesure d'identifier les priorités et de permettre la participation des parties intéressées de la société est requise

mesure d'identifier les priorités et de permettre la participation des parties intéressées de la société (ONG environnementales, secteurs sociaux, scientifiques et industriels, etc.) est requise. De la même manière, il est fondamental d'établir des mécanismes de résolution des problèmes, d'initier le fonctionnement de l'appareil administratif pour développer des conditions de

(ICCM) le 6 février 2006, l'approche stratégique de la gestion internationale des produits chimiques (SAICM) est un cadre politique dont l'objectif général est de garantir la gestion rationnelle des produits chimiques durant toute leur durée de vie, afin qu'à l'horizon 2020, ces produits soient utilisés et produits de façon à obtenir la minimisation de leurs effets nocifs importants sur la



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de vie

santé humaine et l'environnement.

Les trois documents constituant l'approche stratégique de la gestion des produits chimiques sont : la déclaration de Dubaï, qui rassemble les engagements des pays dans la SAICM, qu'il s'agisse de leurs dirigeants politiques ou de la société civile et du secteur privé ; la stratégie politique globale, qui établit la portée de la SAICM, les besoins à couvrir par celle-ci et les objectifs à atteindre en matière de réduction des risques, de connaissances et d'informations, de gouvernance, de création de capacités, de coopération technique et de trafic illicite international ; et enfin, le plan d'action mondial, qui établit les « zones de travail et d'activités volontaires » en vue de l'introduction de la SAICM.

Ce plan devra se trans-

former en outil ou document guide et ses éventuelles sphères de travail devront couvrir au minimum, mais sans s'y limiter, les aspects environnementaux, économiques, sociaux, sanitaires et du travail de la sécurité chimique, ainsi que les produits chimiques industriels et agricoles, dans le but de promouvoir le développement durable. Ce plan s'étendra également aux produits chimiques à toutes les étapes de leur durée de vie, y compris celles des produits.

Au cours du mois de novembre dernier, une réunion sur l'application du cadre stratégique global pour la gestion des produits chimiques a été organisée à Barcelone ; celle-ci s'inscrivait dans les politiques du gouvernement espagnol destinées à promouvoir le multilatéralisme en tant que voie de résolution des pro-

blèmes de caractère global et la durabilité dans tous les secteurs économiques, comme stipulé dans les accords de Johannesburg, et plus concrètement dans leur plan d'action.

L'objectif de la réunion était de faire le premier pas vers l'application de la stratégie mondiale et plus particulièrement de procéder à un échange de points de vue sur le rôle des pays développés dans ce processus. La conférence de Barcelone a rassemblé l'Union européenne (UE), le Japon, les États-Unis, la Suisse, le Canada, l'Australie, la Norvège et la Nouvelle-Zélande, regroupés sous le sigle JUSSCANNZ.

Les engagements du monde développé en matière de gestion des substances et des préparations chimiques sont divers. D'une part, il doit garantir, au sien de ses pays, que l'activité

économique liée à ces substances se développe de manière équilibrée et dans le respect de la santé humaine et de l'environnement. D'autre part, il doit aider les pays en développement à réduire le gouffre qui existe entre eux et les pays développés en matière d'application de politiques durables liées à la production, à l'utilisation et à la commercialisation de ces substances.

Approche régionale

Dans ce sens, l'Espagne, pont entre l'Amérique Latine, l'Europe et la région méditerranéenne, joue un rôle évident dans la promotion de création de capacités pour une gestion responsable des substances chimiques dans les pays en développement ou les économies de transition. Elle garantit la mobilisation de ressources en vue de permettre le développement et la mise à jour des profils chimiques nationaux et de renforcer les institutions nationales dans le cadre de la gestion des produits chimiques ; l'objectif final est ici de faciliter l'introduction de la SAICM en intégrant la gestion responsable des produits chimiques dans les stratégies nationales.

Parallèlement à l'approbation de la SAICM, l'établissement d'un programme de lancement rapide en vue d'introduire les objectifs de la SAICM a été décidé. Ce programme comprend un fonds fiduciaire de contri-

bution volontaire administré par le PNUE et auquel l'Espagne a déjà contribué à hauteur de 100 000 euros.

La stratégie politique globale souligne l'importance des réunions régionales. La région méditerranéenne est un environnement régional très spécifique qui permet de travailler et d'établir des synergies entre la SAICM, la convention de Bâle (mouvements de déchets) et la convention de Barcelone. Il existe des liens évidents entre la gestion des déchets, leur transport et leur intégration dans les programmes nationaux de gestion responsable des produits chimiques.

Ainsi, par exemple, la modification, en mai 1996, du protocole pour la protection de la mer Méditerranée de la convention de Barcelone contre la pollution due à des sources et à des activités menées à terre, a étendu sa portée géo-

graphique à l'ensemble du bassin méditerranéen ; le nouveau protocole inclut l'engagement des parties à éliminer, dans la mesure du possible, la pollution due à des sources et à des activités terrestres, et surtout, à éliminer progressivement l'utilisation d'une série de substances toxiques, persistantes et bioaccumulables, parmi lesquelles on trouve les douze substances POP mentionnées dans la convention de Stockholm.

Synergies

La séparation des produits chimiques et des déchets dans l'Agenda 21 et la négociation parallèle des divers accords internationaux peut donner l'impression que l'on distingue la gestion des substances chimiques et celle des déchets et qu'elle nécessite des approches distinctes. Cependant, on se rend compte en analysant



les politiques et les cadres internationaux qu'il existe des liens très étroits entre les deux. Après tout, l'approche de la durée de vie appliquée à la gestion des

Une approche intégrale de la gestion des substances chimiques est essentielle pour renforcer la coordination

produits chimiques comprend l'élimination et par conséquent les déchets. Le plan d'introduction du sommet de Johannesburg propose certes des recommandations en matière de gestion des produits chimiques mais également en matière de déchets.

Afin d'établir ces synergies entre les diverses conventions, il est indispensable de procéder à une approche multilatérale et multisectorielle à laquelle participe l'ensemble des secteurs concernés, de l'industrie aux gouvernements. Il est évident qu'au sein de ce processus, les États doivent mener la phase d'identification et d'évaluation de leurs besoins de gestion de produits chimiques et de déchets et les rattacher à des objectifs environnementaux et de développement nationaux. De la même manière, une approche intégrale de la gestion des substances chimiques est essentielle pour renforcer la coordination et par conséquent l'efficacité des efforts pour s'intéresser à la gestion responsable des

produits chimiques tout au long de leur durée de vie.

Approbation du règlement REACH

L'approbation, le 13 décembre dernier, soit tout récemment, du règlement REACH sur les produits chimiques, qui entrera progressivement en vigueur à compter de juin 2007, a marqué une avancée très significative dans le cadre du contrôle des produits chimiques. Toutes les substances chimiques produites ou importées en quantités supérieures à une tonne devront être enregistrées auprès d'une agence européenne récemment créée, dont le siège se trouve à Helsinki ; ceci concernera 30 000 substances et demandera pour plus de 3 000 substances dangereuses une autorisation préalable. Le texte approuvé par le Parlement européen, qui réglera l'utilisation de produits chimiques au sein de l'Union européenne, remplace les quelques 40 textes législatifs qui régissent ce domaine.

Suivant la même ligne que l'agence européenne d'Helsinki, l'Espagne se trouve actuellement en phase de création d'un bureau de durabilité chimique centralisant l'enregistrement des produits chimiques en vue de leur contrôle et de leur suivi. Ceci permettra de mettre en place des actions cohérentes en matière de protection de la santé publique et de l'environnement et stimulera l'avancée en-

vironnementale et technologique du pays dans ce domaine. Concrètement, la création de ce bureau est soutenue par un important programme d'aides de RDI d'une valeur de plus de 50 millions d'euros.

En définitive, l'Espagne relève le défi de la durabilité dans le secteur chimique via des décisions politiques et affirme que cette expérience est applicable à d'autres pays, en particulier aux pays d'Amérique Latine, en vue de garantir un développement intelligent et conforme aux valeurs ainsi qu'à l'équilibre écologique fragile du monde dans lequel nous vivons. ■

Systèmes de conformité avec les accords multilatéraux sur l'environnement. Perspective de la Convention de Stockholm sur les polluants organiques persistants

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L'inefficacité des systèmes juridiques en matière d'environnement a été réduite ces dernières années grâce à une série de directives visant à garantir l'observation et l'application des accords multilatéraux sur l'environnement (AME). Ces directives, basées sur les principes fondamentaux d'information et de réponse, sont développées via des accords tels que les protocoles de Montréal, de Kyoto ou la Convention de Stockholm. Les mécanismes et procédures d'observation établissent des facteurs tels que l'objectif et la nature du mécanisme de non-observation, l'organe responsable, l'invocation des procédures, les mesures pour éviter la non-observation, etc. Parallèlement une réflexion sur le problème de la responsabilité en cas de non-respect des engagements des AME est menée, ce qui permet d'envisager l'émergence d'un système juridique complet et international.

Mots-clés : observation, non-observation, Convention de Stockholm, POP, AME.

Compliance systems for multilateral environmental agreements. A vision from the Stockholm Convention on persistent organic pollutants

In recent years the inefficiency of legal systems in environmental matters has been mitigated by means of a set of directives for ensuring the compliance with and application of multilateral environmental agreements (MEA). These directives are based on fundamental principles of information and response, and are being developed for agreements such as the Montreal and Kyoto Protocols or the Stockholm Convention. Compliance mechanisms and procedures establish factors such as the objective and nature of the non-compliance mechanism, the organisation responsible, implementation of procedures, measures for avoiding non-compliance, etc. Parallel to this, work is being carried out on the problem of responsibility should the MEA obligations not be met, and now the appearance of a comprehensive international legal system can be discerned.

Key words: compliance, non-compliance, Stockholm Convention, POP, MEA.

Sistemas de cumplimiento de acuerdos multilaterales sobre medio ambiente. Una visión desde el Convenio de Estocolmo sobre contaminantes orgánicos persistentes

La ineficacia de los sistemas jurídicos en cuestiones medioambientales ha sido paliada en los últimos años con una serie de directrices para asegurar el cumplimiento y la aplicación de los acuerdos multilaterales sobre medio ambiente (AMUMA). Estas directrices se basan en los principios fundamentales de información y respuesta, y están siendo desarrolladas para acuerdos tales como los Protocolos de Montreal y de Kioto, o el Convenio de Estocolmo. Los mecanismos y procedimientos de cumplimiento establecen factores como el objeto y la naturaleza del mecanismo de incumplimiento, el órgano encargado, la invocación de procedimiento, las medidas para evitar el incumplimiento, etc. Paralelamente se están desarrollando trabajos sobre la responsabilidad si no se atienden las obligaciones de los AMUMA, lo que permite vislumbrar un sistema jurídico completo e internacional.

Palabras clave: cumplimiento, incumplimiento, Convenio de Estocolmo, COP, AMUMA.

Il existe dans les systèmes juridiques nationaux des mécanismes et des procédures chargés de garantir l'exécution du droit et d'administrer la justice. En droit international, ces mesures de garantie sont rares, lentes et fragiles ; leur observation dépend donc du bon vouloir des États. Cette tendance évo-

Le système de conformité d'un AME repose sur deux aspects fondamentaux, les informations et les réponses

lue progressivement car de nombreux accords internationaux indiquent la nécessité du respect des engagements mentionnés et de l'établissement de mécanismes le facilitant.

Voici un exemple de ce changement de tendance : en 2002, le conseil d'administration du programme des Nations unies pour l'environnement (PNUE) a approuvé une série de direc-

tives relatives au respect et à l'application des accords multilatéraux sur l'environnement¹ (AME), en vue de prêter assistance aux gouvernements, aux secrétaires de ces accords, aux organisations internationales, régionales et sous-régionales compétentes, aux organisations non gouvernementales, au secteur privé et à tous les acteurs souhaitant améliorer et soutenir la conformité avec les AME.

Ces directives définissent la conformité telle que l'observation par les parties contractantes des engagements souscrits en vertu d'un AME et de tout amendement à cet accord ; l'organe compétent d'un AME est l'organe en mesure d'examiner périodiquement le strict respect des engagements dans le cadre de cet accord multilatéral et de passer en revue les difficultés spécifiques empêchant son observation, en établissant des méthodes d'amélioration de la conformité ainsi que des mécanismes visant à désigner la non-observation.

Aspects fondamentaux d'un système de conformité

Le système de conformité d'un AME repose sur deux aspects fondamentaux, les *informations* et les *réponses*. Le premier implique la nécessité pour les parties contractantes d'un accord de fournir des informations sur le respect de celui-ci ; ces informations sont alors passées en revue par les institutions de l'AME et d'autres institutions d'intérêt. Il est possible, lors de la révision, de poser des questions directement aux parties, d'accéder à des informations supplémentaires via d'autres sources ou de mettre en place des inspections dans les pays concernés. La fonction principale des informations dans un système de conformité est la *maximisation de la transparence*². Une plus grande transparence facilite l'examen de la conformité des parties contractantes avec leurs engagements et permet aux institutions d'un accord, à d'autres parties ou à la société civile en général de passer en revue et d'évaluer leurs interventions, ce qui entraîne une corresponsabilité en matière de respect des engagements établis par les AME.

Le deuxième aspect de ce système de conformité est celui de la *réponse* face



TOXIC

¹ PNUE (DEPI) MEA/WG.1/3

² « Systèmes de conformité dans le cadre des accords multilatéraux ». Clenn M. Wiser.

à un éventuel manquement. Cette réponse prend forme via les procédures et les mécanismes de non-observation qui commencent à être négociés et convenus au sein de nombreux AME. Tous se basent sur une structure similaire à celle des directives du conseil d'administration du PNUE précédemment citées.

Les AME suivants élaborent actuellement des mécanismes et des procédures de conformité : le protocole de Montréal sur les substances qui appauvrissent la couche d'ozone, la convention sur le commerce international des espèces de faune et de flore sauvages menacées d'extinction (CITES), le protocole de Carthagène sur la prévention des risques biotechnologiques, le protocole de Kyoto de la convention-cadre des Nations unies sur les changements climatiques, la convention des Nations unies sur la lutte contre la désertification (UNCCD), la convention de Bâle sur le contrôle des mouvements transfrontières de déchets dangereux et de leur élimination, la convention d'Aarhus sur l'accès à l'information, la participation du public au processus décisionnel et l'accès à la justice en matière d'environnement, la convention de Barcelone sur la protection de la mer Méditerranée ou encore la convention de Stockholm sur les polluants organiques persistants³.

Bon nombre des procédures et des mécanismes



de conformité qui permettent cette *réponse* présentant une structure similaire, la différence étant les particularités propres à chaque processus, nous vous présentons ci-dessous la structure de l'un des AME précités, celle de la convention de Stockholm, qui nous servira d'exemple pour comprendre le fonctionnement et les caractéristiques d'une procédure et d'un mécanisme de conformité. Seuls les aspects ayant fait l'objet d'un accord entre les parties contractantes apparaissent ici.

Mécanisme et procédure de conformité de la convention de Stockholm

L'article 17 de la convention de Stockholm sur les polluants organiques persistants stipule que la conférence des parties à l'occasion de la convention élaborera et approuvera, le plus tôt possible, des procédures et des mécanismes institutionnels en vue de définir le non-respect des dispositions de la convention et le traitement

à appliquer aux parties n'ayant pas observé ces dispositions.

Lors de la première conférence des parties de la convention de Stockholm, organisée en mai 2005 à Punta del Este (Uruguay), la décision SC-1/14, qui invitait les parties à présenter des propositions et des points de vue sur un mécanisme de conformité en accord

³ La convention de Stockholm réglemente les polluants organiques persistants (soit actuellement 12 substances) en vue de les éliminer totalement ; ces polluants comprennent les pesticides, les substances à usage industriel et les substances produites de façon non délibérée dans le cadre de divers processus industriels ou non industriels.

Les polluants organiques persistants (POP) sont des composés chimiques qui résistent à la dégradation ; hautement toxiques, ils se bioaccumulent dans les tissus des êtres vivants et peuvent être transportés très loin de leur lieu d'origine, ce qui implique des risques graves pour la santé humaine et l'environnement de l'ensemble de la planète.

Pour en savoir plus : <http://www.pops.int/>.



avec l'article 17 de la convention, a été adoptée. Par ailleurs, l'organisation d'une réunion d'un groupe de travail spécial à composition ouverte chargé d'examiner les procédures et les mécanismes relatifs à la non-observation a été décidée. Les membres du groupe se sont réunis les 28 et 29 avril 2006 à Genève et se sont mis d'accord sur un projet de procédure de conformité, projet ratifié à l'occasion de la deuxième conférence des parties, organisée le mois suivant dans la même ville. Certains aspects du projet restent à confirmer et devront faire l'objet d'autres négociations et accords.

Le projet de procédure convenu permettra, d'une part, de résoudre des questions spécifiques de non-observation, c'est-à-dire des problèmes spécifiques à une partie et, d'autre part, de s'intéresser à des questions systémiques générales relatives à la conformité et concernant l'ensemble

des parties (par exemple des questions liées à l'interprétation juridique du texte de la convention).

En ce qui concerne la réglementation des questions spécifiques de conformité apparaissant dans le projet de procédure, il convient d'évoquer les aspects suivants :

Objectif et nature du mécanisme de non-observation

L'objectif de la procédure est d'aider les parties à respecter leurs engagements en vertu de la convention et de faciliter, promouvoir, superviser, s'efforcer de garantir l'application et l'observation des engagements émanant de la convention, et enfin, de prêter assistance et conseil dans ce domaine. Ce mécanisme est de type non litigieux, il est conciliatoire, juste, inclusif, transparent, efficace, flexible et à même de prêter différents types d'assistance aux parties.

Organe responsable de la conformité

L'organe responsable de la conformité sera le comité de conformité, dont les membres seront proposés par les parties et choisis par la conférence des parties, dans le respect de l'équilibre géographique et de l'égalité des sexes.

Son régime de fonctionnement est encore en cours de négociation. Certains aspects restent à déterminer, par exemple le nombre de membres du comité⁴, la périodicité des réunions ainsi que le caractère ouvert ou fermé de celles-ci, soit la participation d'observateurs et du public au processus.

⁴ Dans ce sens, par exemple, l'UE prescrit un comité constitué d'un nombre de membres réduit, en vue de garantir son bon fonctionnement. L'UE propose un comité constitué de 10 membres ainsi que l'élimination de la possibilité de désigner trois vice-présidents. D'autres pays, notamment la Chine ou l'Inde, penchent pour un comité plus étendu, constitué de 15 à 20 membres.

La fonction principale du comité consistera à analyser l'ensemble des documents faisant référence aux cas de non-observation soumis et la décision des mesures à appliquer. Les décisions du comité sur les questions de fond devront être consensuelles.

Invocation des procédures

Qui peut initier la procédure de conformité ? Pour le moment, le seul accord atteint par les parties de la convention de Stockholm est qu'une partie peut mettre en route la procédure de non-observation la concernant seulement si elle estime que, en dépit de tous ses efforts, elle n'est ou ne sera pas en mesure de respecter un engagement établi par la convention. Il faudra, lors de futures négociations, déterminer si une autre partie, le greffe de la convention ou le comité pourront d'office initier la procédure de non-observation contre la partie contrevenante.

Processus

Les documents indiquant l'éventuelle non-observation seront présentés par écrit, par l'intermédiaire du greffe ; ils devront contenir des éléments tels que les engagements spécifiques concernés et l'exposition des motifs pour lesquels la partie contrevenante n'est pas en mesure de les observer. Chaque fois que possible, des justificatifs ou une indication des sources contenant ces justificatifs seront

fournis. Ces documents fourniront également présenter les solutions considérées par la partie concernée comme les mieux adaptées à ses besoins concrets.

Le greffe remettra ces documents aux membres du comité dans un délai de 15 jours à compter de leur réception afin que le comité les examine lors de sa prochaine réunion. Le comité passera en revue l'ensemble des documents présentés ainsi que toute autre information pertinente afin de déterminer les faits, les circonstances concrètes, les éventuelles causes du problème ainsi que la solution à mettre en place. Le comité pourra solliciter des informations supplémentaires auprès de la partie concernée et utiliser les connaissances spécialisées appropriées.

Le comité fera part de son projet de conclusions et de recommandations à la partie concernée afin que celle-ci puisse l'examiner et éventuellement formuler des observations dans un délai de 90 jours à compter de la date de réception du projet. Les observations faites pourront être incluses dans le rapport du comité. Par ailleurs, la partie concernée pourra fournir des informations supplémentaires tout au long du processus.

Le comité pourra rejeter toute demande qu'il considèrera :

- a) de *minimis* ;
- b) manifestement non fondée.

L'objectif de la procédure est d'aider les parties à respecter leurs engagements

Mesures pour éviter la non-observation

Une fois le cas d'une partie analysé par le comité, celui-ci pourra adopter des mesures permettant de faciliter la mise en conformité de la partie concernée. Voici quelques-unes de ces mesures :

- a. Émettre des recommandations ;
- b. Proposer des consultations d'orientation ;
- c. Faciliter la prestation et l'obtention d'une assistance technique et financière, y compris le transfert des technologies, le renforcement des capacités et d'autres mesures de création de capacité ;
- d. Demander à la partie concernée l'élaboration d'un plan d'action en vue de garantir sa conformité. Ce plan devra présenter des délais, des objectifs et des indicateurs ainsi que des comptes rendus sur les progrès des travaux ; il devra être remis dans un délai à convenir entre le comité et la partie concernée.
- e. Conformément au point d) *supra*, prêter assistance à la partie concernée, si celle-ci le sollicite, dans le cadre de l'examen de l'application du plan d'action et inviter la partie à présenter des comptes rendus des progrès des travaux dans le cadre des ac-

- tivités réalisées pour une mise en conformité avec les engagements contractés en vertu de la convention ;
- f. Conformément au point d) *supra*, faire part à la conférence des parties des activi-

Envisager une responsabilité pour non-observation nous permet de rêver d'un système juridique complet du droit environnemental international établissant le principe du pollueur-payeur

tés réalisées par la partie concernée en vue d'être à nouveau en conformité, y compris la présentation de comptes rendus nationaux en vertu des dispositions de l'article 15 (présentation de comptes rendus) de la convention et suivre l'évolution de la partie concernée jusqu'à ce que le problème soit résolu.

Si la non-observation persistait en dépit de ces mesures, des mesures supplémentaires pourraient être adoptées (pas encore d'accord définitif à ce sujet) : émission de mises en garde, demande de publication des cas de non-observation au secrétaire exécutif de la convention ou même, si la non-observation

était répétée et durable, suspension des droits et des privilèges en vertu de la convention.

Relation avec les autres dispositions de la convention de Stockholm

La procédure de non-observation devra être appliquée sans préjudice de la procédure de résolution des différends (article 18) et du mécanisme de présentation des comptes rendus en vertu de la convention (article 15), aspect faisant partie intégrante des éléments dits *d'information*.

Relation avec les autres accords

Le régime de non-observation prévoit la possibilité de partager avec d'autres accords des informations et des connaissances sur la non-observation et les procédures de non-observation ainsi que des solutions en cas de duplication.

Création d'un système de garantie complet

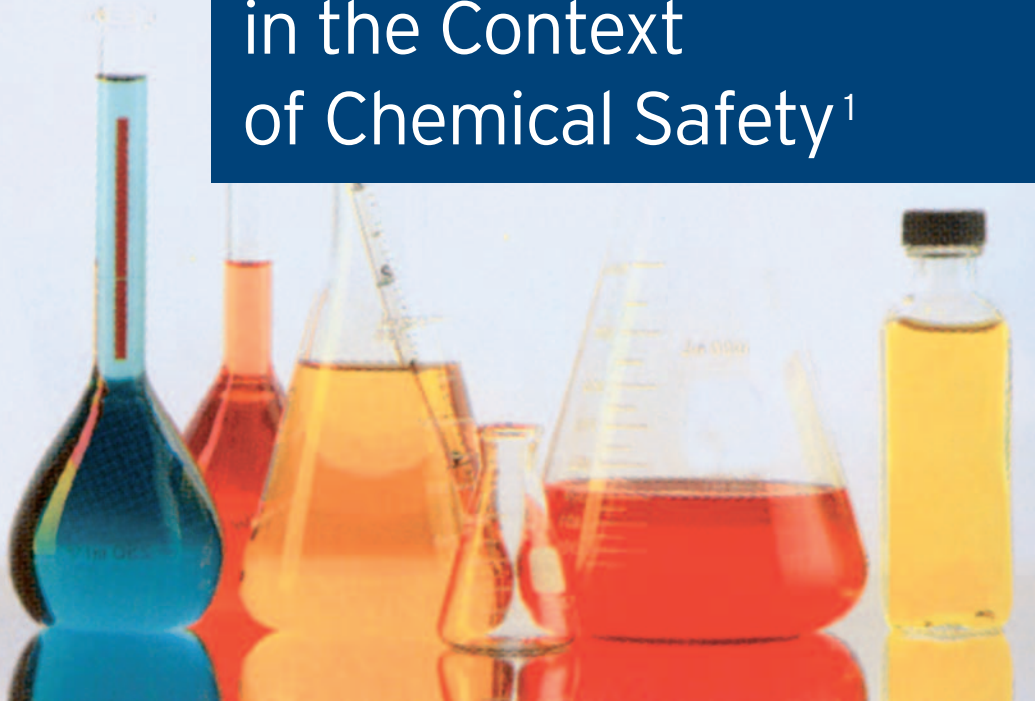
Parallèlement aux mécanismes et aux procédures de conformité, des travaux de réflexion sur le problème de la responsabilité en cas de non-respect des engagements contractés dans les AME sont actuellement développés.

On ne note pas pour l'instant de ferme volonté de développer ces travaux ; il est possible que cette situation n'évolue pas tant que les mécanismes et les procédures de conformité ne sont pas dé-

finitivement accordés et en vigueur. Cependant, envisager une responsabilité pour non-observation nous permet de rêver d'un système juridique complet du droit environnemental international établissant le principe du pollueur-payeur.

Ainsi, le droit environnemental international serait doté d'une applicabilité directe et d'une force coercitive inhérente, s'appuierait sur des institutions disposant de la capacité de juger son observation et permettrait de réparer les dommages dus à la non-observation. ■

Applying Precaution in the Context of Chemical Safety¹



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Since the 1992 Rio Declaration, a number of countries and forums have sought to provide guidance on the application of the precautionary principle in chemicals management. Some of these efforts have raised questions as to how best to make decisions aimed at protecting health and ecosystems under conditions of uncertainty, while stimulating innovation in science, technology and policy.

Governments and other stakeholders must work towards an understanding of precaution and how it can be implemented more clearly and effectively in the context of domestic chemicals management. This article presents the results of a series of research and dialogue activities undertaken by the Intergovernmental Forum on Chemical Safety to examine tools and approaches for applying precaution in the context of chemicals safety.

Key words: precautionary principle, chemical safety, Rio Declaration, management, policy.

¹ This article is based on the material and documents prepared for the Fifth Session of the Intergovernmental Forum on Chemical Safety (FORUM V) held 24-29 September 2006 hosted by the Government of Hungary. <http://www.who.int/ifcs/forums/five/en/index.html>.



Application du principe de précaution dans le cadre de la sécurité chimique

Depuis la déclaration de Rio de 1992, un certain nombre de pays et de forums s'efforcent de proposer leur assistance dans le cadre de l'application du principe de précaution dans la gestion des substances chimiques. Les efforts mis en place ont soulevé des questions quant aux prises de décisions en matière de protection de la santé et des écosystèmes, ont stimulé les innovations scientifiques, technologiques et politiques.

Les gouvernements et les autres acteurs concernés doivent s'employer à introduire le principe de précaution dans le cadre des activités de gestion des substances chimiques ménagères. Les conclusions d'une série d'activités de recherche et de dialogue menée par le forum intergouvernemental sur la sécurité chimique permettent de passer en revue les outils et les méthodes d'application du principe de précaution dans le contexte de la sécurité chimique.

Mots-clés : principe de précaution, sécurité chimique, déclaration de Rio, gestion, politique.

Aplicar la precaución en el contexto de la seguridad química

Desde la Declaración de Río de 1992, un gran número de países y foros han intentado proporcionar directrices sobre la aplicación del principio de precaución en la gestión de los productos químicos. Algunos de estos esfuerzos han planteado cuestiones sobre cómo tomar decisiones destinadas a la protección de la salud y los ecosistemas, al tiempo que se estimula la innovación en ciencia, tecnología y políticas.

Los gobiernos y otros organismos deben trabajar para introducir el principio de precaución en el contexto de la gestión de los productos químicos domésticos. Los resultados de una serie de actividades de investigación y de diálogo emprendidas por el Foro Intergubernamental sobre Seguridad Química permiten examinar herramientas y perspectivas para aplicar la precaución en el contexto de la seguridad con productos químicos.

Palabras clave: principio de precaución, seguridad química, Declaración de Río, gestión, política.

Introduction

In some countries, precaution – or taking preventive action in the face of uncertain risks – is well known and applied domestically in various approaches to chemicals management decision making. In other countries, particularly in the developing world, precaution is a relatively new concept.

forts at all levels. If we begin with the notion that precaution can be used as a tool to promote health and ecosystem protective decisions, which is a forward-looking, solutions-oriented view of precaution, then we can begin to discuss elements of approaches for addressing uncertain chemical risks. To this end, the fifth session of the Intergov-

ernments and a range of stakeholders. The goal was to understand similarities and differences in how precautionary decisions are made across countries; what tools and approaches countries use to apply precaution in chemicals management; how policy, regulatory and scientific processes support precautionary decision making in the context of chemicals management; the challenges and needs for applying precaution in the context of chemicals management; and various perceptions of its application.

This article provides an overview of the results of research undertaken for IFCS Forum V on tools and approaches for applying precaution and some of the outcomes of discussions at the meeting itself.

Similarities and Differences across Nations and Stakeholders in Tools and Approaches

From the information collected, it is evident that there is a wide range of proce-

Principle 15 of the Rio Declaration² defines precaution as “[i]n order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Since the 1992 Rio Declaration, a number of countries and forums have sought to provide guidance on approaches to decision making in the face of scientific uncertainty and application of precaution in chemicals management.³ Some of these efforts have raised questions as to how best to make decisions aimed at protecting health and ecosystems under conditions of uncertainty, while stimulating innovation in science, technology and policy.

An open discussion about how countries and other actors approach decision making in the face of uncertainty to protect health and ecosystems – in other words, how precaution is applied implicitly or explicitly in practice – and sharing of experiences can enhance chemicals management ef-

ernmental Forum on Chemical Safety (Forum V⁴) held in Budapest from 24 to 29 September 2006 included on its agenda a plenary session on applying precaution in the context of chemical safety. The aim was to understand experiences in applying precaution in chemical safety across stakeholder groups and to identify tools and approaches that may be useful and applicable to decision-makers across nations to effect more health- and ecosystem-protective decisions with regard to chemicals management.

As a scoping exercise to provide background information to facilitate the discussions at Forum V, examples of tools, approaches and frameworks for applying precaution with regard to national chemical safety efforts were solicited from

² United Nations Conference on Environment and Development, 1992 <http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=78&ArticleID=1163>.

³ Tools and Approaches for Applying Precaution in the context of Chemical Safety: An Introduction, Franz Xaver Perrez (IFCS/FORUM-V/ 7 INF) http://www.who.int/ifcs/documents/forums/forum5/mee_docs/en/index.html.

⁴ http://www.who.int/ifcs/documents/forums/forum5/precaution_plenary/en/index.html.

sses used for applying precaution within and across countries, and regions and there is some difference between developing and developed countries as to what they consider precaution. In many developed countries, precaution is often applied to prevention of risks with chronic and highly uncertain health implications. In developing countries, precaution is frequently applied to prevention of acute events and end-of-life chemicals concerns, such as pesticide poisonings, transport accidents, and chemical stockpiles. Some activities that developing countries noted as applying precaution were what some developed countries would say are routine chemicals management activities.

While most countries noted the importance of precaution in their domestic chemicals legislation, few have established legislation or policies that explicitly call for applying precaution in chemicals management. Many countries – both developed and developing – implicitly refer to precautionary approaches in their national environmental and sustainable development policies, or in their constitutions (e.g. the right to a healthy environment). A few developed countries have established processes for applying precaution in their decision making, in part to support decisions that might be subjected to trade challenges (a concern that some devel-

It is evident that there is a wide range of processes used for applying precaution within and across countries

oped countries noted). In general, the responses indicated that precaution is currently applied on a relatively *ad hoc* and inconsistent basis, even among countries with policies which explicitly incorporate precaution. This *ad hoc* application exists even where there are established procedures for undertaking the scientific assessment process, such as in developed countries.



Mr. Joel Tickner

The responses showed a wide range of tools and approaches used by countries and other stakeholders for implementing precaution either implicitly or explicitly in chemical safety activities. Some of the most widely mentioned tools are listed in Box 1.

While some countries noted that precaution is relevant only at the risk-management stage of decisions,

Box 1

Some of the most widely mentioned tools for applying precaution include:

1. Issuance of regulations to restrict an activity – such as transport of hazardous materials, waste controls, and import restrictions;
2. Development of labelling and safety data sheets, including implementation of the Globally Harmonised System of Classification and Labelling;
3. Chemical (particularly pesticide) registration processes;
4. Application of safety factors and consideration of worst case impacts, particularly on vulnerable populations. Protection of children as a vulnerable population was mentioned in many cases;
5. Restrictions/bans on chemical use (and, in some cases, on structurally similar chemicals) and marketing, including planning for chemical substitution and alternatives;
6. Placing the onus on manufacturers to provide safety data;
7. Chemical prioritisation processes;
8. Chemical monitoring and research on chemical effects;
9. Environmental impact assessments;
10. Consultation with government multi-stakeholder advisory panels and with international agencies and other countries;
11. Public education/training campaigns in schools and for particular sectors of society (e.g. workers, small businesses);
12. Chemical modelling and prediction used in risk assessment as well as development of guidance documents; and
13. Outreach to industry on chemicals of concern.

others noted that there is a need for applying precaution in the risk assessment and technology assessment phases as well. Tools used in developed countries tended to be more detailed and technical (such as detailed risk assessments, modelling, and safety factors) than those used in developing countries, which focused more on impact assessment (to the degree that resources permitted), hazard identification, and communication (often through labelling). In both developed and developing countries, stakeholder engagement on national chemicals committees or in particular decision-making processes was seen as an essential part of applying precaution. Most countries, both developed and developing, noted the importance of basic scientific

Few have established legislation or policies that explicitly call for applying precaution in chemicals management

information and understanding of risks as a prerequisite for taking precautionary action. Some developing countries noted that taking precaution is of particular importance in their countries because they do not have sufficient financial and technical resources to undertake detailed risk assessments, and thus an ability to act on the basis of uncertain information is critical.

There was also a difference between industry and public interest and labour NGO stakeholders in tools and approaches used. Industry stakeholders saw precaution as being implemented through conservative risk assessment assumptions, research on chemical effects, information to consumers on safe use of products (including responding to demands for safe products), and avoidance of liability problems as key elements of implementing precaution. NGOs viewed chemical restrictions, implementation of alternatives to dangerous chemicals through consultation with downstream chemical users, and the right to know, including the presumption that the environment should be free of dangerous chemicals, as key elements of implementing precaution.

Challenges

Both developed and developing countries noted numerous challenges with

Box 2

Some of the key challenges facing developing countries in their capacity to apply precaution include:

14. Lack of coordination nationally (for example between environment ministries and customs officers);
15. Lack of scientific and socioeconomic analysis tools;
16. Lack of support for small and medium-sized enterprises to understand chemical risks and undertake preventive actions;
17. Lack of information/scientific resources (even in universities), including training of human resources, capacity building in toxicology, and development of laboratories and research programs;
18. Lack of resources for implementation and enforcement of precautionary policies over the short and longer terms;
19. Lack of capacity of government officials and local authorities in chemicals assessment and management;
20. Lack of legal infrastructure and authority to undertake precautionary decisions or oblige those creating risks to undertake preventive actions;
21. Lack of financial resources to conduct research, provide technical support, and invest in safer technologies. This lack of financial resources means that addressing one issue may result in short changing another;
22. Lack of public awareness and public leadership.

respect to application of precaution in their chemical safety policies. These challenges differ considerably between developed and developing countries, though there are some overlaps, particularly in terms of information gaps and challenges of intra-governmental coordination. A common set of challenges was consistently noted across developing countries (Box 2). While the challenges generally affect all chemicals management activities in these countries, they are accentuated when there is scientific uncertainty. Further, they limit the ability of developing countries to characterise risks, identify preventive options, and ultimately support decision making. For developed countries, issues with respect to regional or international trade appear to be important challenges to implementation of precaution. Several developed and developing countries noted the importance of economic tensions (concerns about adverse economic impacts from precautionary actions) as a challenge to implementation. However, most respondents noted the importance of considering the socio-economic implications of precautionary decisions, in particular, their proportionality.

Many of these challenges were also reported by countries in transition, particularly those challenges related to capacity, public awareness, and resources.

Several of these challenges were noted by developed countries, particularly those related to national coordination, scientific tools and capacity (particularly for prioritisation of limited resources across activities), access to information, financial resources, public awareness, and lack of local government capacity.

While challenges to applying precaution differed somewhat between developed and developing countries, there were some common needs. In particular, information on chemical toxicity and risks, tools for decision making under uncertainty (including socio-economic assessment and assessment of alternative technologies), and case examples of applying precaution in practice were common needs across countries. Technical support for implementation of alternative technologies was also noted by developed and developing countries. Further, technical support to businesses (particularly small and medium-sized companies) and local capacity were noted across countries.

Way Forward/Next Steps

At Forum V, participants were provided with an overview of the background and issues surrounding the application of precaution in chemicals management efforts and presentations by governments and other stakeholders on tools and ap-

proaches. The participants recognised the importance of mechanisms for sharing information and lessons learned from case examples, both positive and negative; enhancing multi-sectoral dialogue; and capacity building for the application of tools and approaches for making decisions in the face of uncertainty and/or applying precaution in the domestic context. To address identified challenges, Forum V identified a series of potential next steps to support countries that wish to utilise tools and approaches in applying precaution in domestic chemicals management activities. The steps can be categorised into two general areas: provision of information on tools and approaches for making decisions in the face of uncertainty and/or applying precaution in the domestic context, and capacity-building/skill-sharing initiatives to support application of tools and approaches for making decisions in the face of uncertainty and/or applying precaution in the domestic context. These can be supported by all working in the area of chemicals management by utilising existing mechanisms to share information on experiences and tools. ■



The OECD Safety Performance Indicators for Hazardous Installations

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OECD

The OECD has developed Safety Performance Indicators (SPI) to help stakeholders establish and implement safety programmes in hazardous installations. These apply to companies, public authorities and communities, as all three have key roles to play in chemical safety. Essentially, SPI provide suggestions for establishing and implementing a programme. Here “indicator” means an observable measure that provides insight into a concept that is difficult to measure – safety. SPI can show companies whether their safety programmes are adequate, show public authorities their contribution to improved safety, provide strategies for motivating industry to improve safety and help to identify gaps in regulations; and they allow communities to measure their own accident prevention performance.

Key words: SPI, OECD, safety, hazardous installations, accident prevention.

¹ Rob Visser is Deputy Director of the OECD Environment Directorate. Opinions expressed in this paper do not necessarily reflect those of the OECD or its member countries.

Indicateurs de performance de l'OCDE en matière de sécurité pour les installations dangereuses

L'OCDE a développé des indicateurs de performance en matière de sécurité (IPS) afin d'aider les divers acteurs concernés à établir et à introduire des programmes de sécurité dans les installations dangereuses. Ces programmes sont applicables aux entreprises, aux organismes publics ainsi qu'aux collectivités, ceux-ci ayant un rôle-clé à jouer dans la prévention des risques chimiques. Le terme « indicateur » désigne une mesure permettant d'envisager un concept difficile à évaluer, la sécurité. Les IPS permettent aux entreprises de s'assurer que leurs programmes de sécurité sont adaptés, démontrent aux organismes publics leur contribution à une sécurité optimisée, proposent des stratégies d'encouragement de l'industrie afin d'améliorer la sécurité et aident à identifier les lacunes de la réglementation ; enfin, ils peuvent permettre aux collectivités d'évaluer leurs performances en matière de prévention des accidents.

Mots-clés : IPS, OCDE, sécurité, installations dangereuses, prévention des accidents.

Los indicadores de rendimiento en materia de seguridad de la OCDE para instalaciones de riesgo

La OCDE ha desarrollado indicadores de rendimiento en materia de seguridad (Safety Performance Indicators, SPI) para ayudar a las instituciones a establecer e implementar programas de seguridad en instalaciones de riesgo. Éstos son aplicables a empresas, autoridades públicas y comunidades, puesto que todas ellas tienen papeles clave en la seguridad química. El término « indicador » se entiende como una medida que proporciona una perspectiva de un concepto difícilmente medible: la seguridad. Los SPI pueden mostrar a las empresas si sus programas de seguridad son adecuados; pueden mostrar a las autoridades públicas su contribución a la mejora de la seguridad, proporcionar estrategias para motivar a la industria a mejorar la seguridad y ayudar a identificar lagunas en las regulaciones; y pueden asistir a las comunidades en la medición de su propio rendimiento con respecto a la prevención de accidentes.

Palabras clave: SPI, OCDE, seguridad, instalaciones de riesgo, prevención de accidentes.

The OECD

The OECD is an intergovernmental organisation established in 1960 which groups 30 industrialised countries: many EU countries, some non-EU European countries, the NAFTA countries and some Asia-Pacific countries; the European Commission participates in the work. OECD members from the RAC area are: France, Greece, Italy, Spain and Turkey.

The mission of the OECD, as laid down in its Convention, is as follows:

- To achieve sustainable economic growth and employment and rising standards of living in member countries while maintaining financial stability, and thus to contribute to the development of the world economy.
- To assist sound economic expansion in member countries and other countries in the process of economic development.
- To contribute to growth in world trade on a multilateral, non-discriminatory basis.

The OECD assists member countries in addressing the economic, social and

environmental challenges of interdependence and globalisation by providing comparative data, analysis and forecasts to underpin unilateral co-operation. It does not fulfil functions that some other inter-governmental organisations carry out. What the OECD is, and what it is not, is shown in summary below:

In undertaking its work, the OECD not only relates to its member countries. More than 70 developing countries and economies in transition are engaged in working relationships with the OECD.

The OECD and safety of hazardous installations

A specific focus of OECD work is on the safety of chemicals and pesticides and on the facilities which produce these products. The objectives of the work in this field are twofold: on the one hand, protection of man and the environment from the risks of chemicals and hazardous installations by assisting countries to develop high quality instruments for ensuring their safety; and on the other, helping countries to implement safety policies in the most efficient way possible by developing mechanisms

to minimise non-tariff barriers to trade, assisting governments and industry in avoiding duplicative activities, and facilitating work sharing efforts across the OECD. In undertaking this work, experts from industry, trade unions, academia and environmental NGOs participate.

The OECD Safety Performance Indicators (SPIs)

In order to promote safety in hazardous installations, the OECD has developed Guiding Principles for accident prevention, preparedness and response. They are available as a web-based document (see http://www.oecd.org/document/61/0,2340,en_2649_34369_2789821_1_1_1_1,00.html).

To assist in the practical implementation of the Guiding Principles, the OECD has now also developed a very practical tool, which can be used by everybody concerned with hazardous installations: the Safety Performance Indicators (SPIs).

The SPIs have been designed to serve as a tool to assist all stakeholders in establishing and implementing safety programmes. This

What the OECD is	What the OECD is not
<ul style="list-style-type: none"> • Forum for policy dialogue and development • Centre for policy analysis • Facilitator to achieve harmonisation, co-operation and cost sharing 	<ul style="list-style-type: none"> • Provider of technical assistance • Supranational rule-making body • Bank

should help to determine how successful they have been in developing appropriate requirements, policies and procedures designed to improve chemical accident prevention, preparedness and response, and to assess whether actions taken to implement their safety programmes truly lead to continuously improving levels of safety over time.

The stakeholders for which the SPIs have a broad application are:

- *industrial enterprises* that produce, use, handle, store, transport (on-site) or dispose of hazardous chemicals (whether publicly or privately owned);
- *public authorities* at all levels with responsibilities related to prevention of, preparedness for, or response to chemical accidents; and
- *communities/public*, in particular communities where hazardous installa-

SPI Programme
in place,
requires a clear
commitment
by the
management
of an
enterprise/
organization

tions are located and that may be affected in the event of a chemical accident.

While enterprises have primary responsibility for the safety of the installations they operate, each of the three stakeholder groups (industry, public authorities and communities) have key roles in promoting chemical safety and implementing measures with the objective of reducing the likelihood of chemical accidents and/or improving accident preparedness and response. Although these measures are designed to improve safety, it is not simple to determine whether the desired objectives are being met. To be able to assess their success in improving safety, the first step to be taken by industry, public authorities, and communities is to establish chemical safety goals and objectives for their organisations, as well as infrastructures for imple-

menting those goals and objectives. SPIs can help to measure the effectiveness of such implementation.

It is important to emphasise that putting an effective SPI Programme in place, requires a clear commitment by the management of an enterprise/organisation, along with an allocation of financial and human resources. It will involve representatives of different parts of the enterprise/organisation. Furthermore, it is not a one-time activity; an underlying premise is that an SPI Programme needs to be applied periodically in order to measure improvements and other changes over time. It is also important to review the SPI Programme and revise/update it as experience is gained.

Industry, public authorities, and communities should work together in a co-operative and collaborative way. Industry can then achieve the trust and confidence of the public that they are operating their installations safely, public authorities can stimulate industry to carry out their responsibilities to ensure the safe operation of their installations by encouraging risk reduction, and communities can provide chemical risk and safety information to the potentially affected public thereby providing a basis for motivating industry and public authorities to improve safety.



How do the SPIs work?

The SPIs do not define a precise methodology; rather they provide guidance on how to develop and use safety performance indicators. It is not prescriptive; rather it provides suggestions related to the elements that might be included in a voluntary SPI Programme and provides general guidance on the process of establishing and implementing such a programme. Specifically, it gives the three stakeholder groups tools with which they can design their own SPI pro-

grammes by identifying key elements: targets, activities indicators and outcome indicators.

In the SPI context, the term “indicators” is used to mean observable measures that provide insights into a concept –safety– that is difficult to measure directly. Activities indicators are designed to help identify whether enterprises/organizations are taking actions believed to lower risks (e.g. the types of actions described in the OECD Guiding Principles). Outcome indicators are designed to help measure whether such ac-

The SPIs
do not
define
a precise
methodology

tions are, in fact, leading to less likelihood of an accident occurring and/or less adverse impact on human health or the environment from an accident.

These SPIs should always be used in a way which is adapted to particular circumstances. It is important to keep in mind that not all elements of the guidance will be appropriate in each situation. It is up to each user to create a programme that is appropriate for their particular organization by: (i) selecting those elements that are relevant in their circumstances; (ii)



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adapting the elements to be consistent with their organisations' vocabulary, policies and procedures; and (iii) developing metrics for measuring trends over time.

A navigable version of the SPI Guidance has been developed. It contains a research tool which allows the user to navigate around the document searching by topic, stakeholder or

<http://www2.oecd.org/safetyindicators/>.

It should be noted that the use of safety performance indicators is no substitute for checking compliance with legal obligations.

The value of an SPI Programme

Since it is difficult to measure directly the success of

improvements because it raises awareness and improves understanding of safety-related issues among staff.

- **From the perspective of industry,** safety performance indicators can be used to assess whether they are implementing appropriate chemical safety programmes and policies, and to help determine the extent to which such programmes and policies are making a difference. In addition, performance indicators can identify whether there is an appropriate emphasis on different aspects of safety management and help set priorities for future investment of resources. Safety performance indicators can even provide an "early warning" of potential safety problems.

The use of safety performance indicators can facilitate co-operation and co-ordination between industry and public authorities, as well as foster improved relationships between industry and local communities. In addition, safety performance indicators can assist industry in reviewing chemical safety goals and objectives and test whether these are realistic and are being implemented successfully.

- **From the perspective of public authorities,** safety performance indicators can provide a tool to demonstrate what our contribution to improved safety is

SPI Programme leads to improvements because it raises awareness and improves understanding of safety-related issues among staff

through the table of contents. It also contains an additional resource called "Create a Customised SPI Programme". This is a tool to assist users in adapting the general guidance to their own situation. Through a series of questions, this tool leads readers to relevant sections of the guide, allowing them to select indicators applicable to their programme.

The final result is a document containing the selected indicators and related material. The web-based SPI Guidance also includes a function to send feedback to the OECD Secretariat, either via e-mail (see "General Comment") or through a survey questionnaire (see "SPI Feedback Survey"). It is available at:

actions taken to improve safety, the SPIs were designed to help enterprises/organisations develop alternative means to measure performance. In so doing, enterprises/organisations can help identify what actions have been (or are likely to be) successful in improving safety. It can also improve understanding of whether goals established (by law/regulation, corporate policies, or community objectives) are being met.

Thus, the guidance provides a tool for prioritisation and a basis for improving effectiveness of spending on safety-related expenditures and allocation of human and other resources. In addition, experience has shown that just implementing an SPI Programme leads to



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exactly, or in other words, to assess whether our activities are leading to overall improvements in terms of, for example, safer facilities, improved response capabilities, and a better-informed public.

The use of safety performance indicators can facilitate public authorities' relationship with industry by, for example, providing a basis for motivating industry to improve safety, helping to establish priorities for inspections, and identifying the areas that should be considered dur-

ing inspections and reviews. In addition, safety performance indicators might provide a basis for facilitating communication with communities/public and other stakeholders concerning safety and help to identify gaps in regulations and policies.

● **From the perspective of the community in the vicinity of hazardous installations,** safety performance indicators provide tools for the community to measure their own performance with respect to

accident prevention, preparedness, and response. The objective of the community indicators is not to measure the performance of public authorities or the industry, but to measure the performance of the communities themselves.

It is based on the premise that there is a role for community-based organisations or committees in providing a liaison between the public and other stakeholders, in establishing conduits of information, in educating the public, and in stimulating public participation in relevant fora.

The use of safety performance indicators can facilitate communities' relationship with industry and public authorities by, for example, providing a basis for motivating industry and public authorities to improve safety. In addition, safety performance indicators might provide a basis for facilitating communication with other stakeholders concerning safety and can help to identify weaknesses. ■



On the Integration of Science and Policy in the Design of Strategies to Protect Public Health and the Environment

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This paper gives an outline of the structure of science, and explains how scientific activity has a political dimension, given that it is related to the drawing up and implementation of environmental policy. A résumé is given of how environmental policy has been developed over the last two centuries, dealing with problems ranging from early industrial pollution, nuclear radiation, and more recently persistent organic pollutants, which, due to their moving differently from other pollutants in the environment, have been the object of many environmental issues in recent decades. Hence the need for strategies based on scientific models for monitoring and decreasing levels of environmental pollution.

Key words: environmental policy, model, theory, framework, integration.

Intégration de la science et de la politique dans le cadre de la conception de stratégies de protection de la santé publique et de l'environnement

Ce rapport présente une vision générale de la structure scientifique et décrit la dimension politique de l'activité scientifique, celle-ci étant liée à l'élaboration et à l'introduction de la politique environnementale. Ce texte résume le développement de la politique environnementale au cours de ces deux derniers siècles et aborde des problèmes tels que les débuts de la pollution industrielle et des radiations nucléaires ainsi que, plus récemment, les polluants organiques persistants ; ceux-ci, en raison de leur action spécifique au sein de l'environnement, ont été à l'origine de nombreux problèmes environnementaux ces dernières décennies, d'où la nécessité d'élaborer des stratégies fondées sur des modèles scientifiques en vue de contrôler et de réduire les niveaux de la pollution environnementale.

Mots-clés : politique environnementale, modèle, théorie, cadre, intégration.

Sobre la integración de ciencia y políticas en el diseño de estrategias para proteger la salud pública y el medio ambiente

Este artículo ofrece un panorama de la estructura de la ciencia y explica cómo la actividad científica tiene una dimensión política, dado que está relacionada con la determinación e implementación de políticas medioambientales. Se ofrece un resumen de cómo se ha desarrollado la política medioambiental en los últimos dos siglos, con problemas que van desde la primera contaminación industrial, la radiación nuclear y, más recientemente, contaminantes orgánicos persistentes, que, debido a que se mueven de forma diferente a otros contaminantes en el medio ambiente, han sido objeto de numerosos problemas medioambientales en las últimas décadas. De ahí la necesidad de estrategias basadas en modelos científicos para monitorear y reducir los niveles de contaminación medioambiental.

Palabras clave: política medioambiental, modelo, teoría, marco, integración.

Introduction

Does exposure to a given chemical pose a threat to human health or the environment? This is a question of obvious practical importance that is as simple to ask as it is difficult to answer. The answer will depend on the properties of the chemical, on what other substances are present, on the amount present, the length and intensity of the exposure, the age, sex and health status of the body burdened by it.

Assuming there is a clear answer to these questions, to which all scientists from different disciplines agree, which is highly unlikely, the following question concerns the assessment of the

current situation in a given environment or population, is there a risk from that substance or group of substances? And if so, what can be done about it, and who should do it?

How can all these components be related to each other in an effective and consensual way? In this brief note we will explore some of these questions: first, how is science made, then how is the work of scientists related to the work of environmental policy makers and other social actors, and then we will describe a few examples of this relation in existing multilateral environmental agreements.

How is science made?

The working of scientists has, of course, many rational components in the detailed development of the experiments and arguments, but it is also important to remember that many components of the activity of scientist and scientific institutions are not driven only, or even primarily, by rational sequences of arguments, but also by power struggles and cultural belief systems (Estellie Smith 1996 p 206) resulting from historical, disciplinary and institutional backgrounds.

Reaching agreement among scientists from a given discipline and integrating the information from a multiplicity of disciplines is thus a much more complicated issue than just laying down the arguments and the available data; it requires stable communication processes and consensus-building efforts based on agreed objectives and

cooperation. These processes are challenging for scientists but, interestingly, they are not only productive in terms of exporting scientific assessments to other fields of social and political work, they do in fact also provide a framework for enlarging the per-

When dealing with environmental protection and public health, information is needed

spectives and understanding of the participating scientists.

When dealing with environmental protection and public health, information is needed from the molecular level concerning the structure and properties of the

relevant substances, their toxicity in organisms, their behaviour and modes of transport in the air, water and soil and through the trophic webs and the epidemiology or assessment of effects on health and ecosystems. Consequently, a range of processes at different scales, in different media and different locations in space and time need to be related in a coherent framework. This is done with models, formal structures in which concepts and data are related in mathematical terms.

Models can be thought of as networks of metaphors organised into procedures or ordered sequences of abstract gestures on material objects. The network of metaphors in a model are an instance, a sample, of a formal theory. A theory is a purely abstract construct expressed in concepts using specific notations in a general language. Models of the material world are composed of

a theory of models and a set of postulates formulated in the framework of a theoretically acceptable model. The work to develop procedures for establishing the validity of the result of the operation of a model has a very long history. More recently formal theories of models including definitions of notions of satisfaction, truth and computability that enable the comparison of models and theories in terms of their logical structure and practical value have been developed and successfully applied.

In the words of Cohen (Cohen 2004): The four main points of the applied mathematical landscape are data structures, algorithms, theories and models (including all pure mathematics), and computers and software. Data structures are ways in which to organise data. Algorithms are procedures for manipulating symbols. Some algorithms are used to analyse data, others to analyse models. Theories and models, including the theories of pure mathematics, are

used to analyse both data and ideas. Mathematics and mathematical theories provide a testing ground for ideas in which the strength of competing theories can be measured. Computers and software constitute an important, and frequently the most visible, vertex of the applied mathematical landscape.

How is environmental policy made?

As we have described elsewhere in more detail (Castells and Guardans 2007) the activity of human societies throughout history has always resulted in the intentional and unintentional diffusion of substances to the environment, to the air, water and soil (see Martínez-Cortizas et al. 1997). By the end of the 18th century the environmental and health impact of urban and industrial combustion was well established, and early regulations and norms were proposed (Newell 1997). In the early years of the 20th century the work on ionising radiation had started, and in 1928 the precursor to

the International Commission for Radiation Protection was established (Lindell and Dunster 1998), and over the years it has produced many of the components of environmental and medical monitoring, global scale assessments and regulations that have been applied to other health and environmental hazards.

The early nuclear explosions in 1945, the multiple tests and a few accidents in subsequent years showed clearly how long-range atmospheric transport could occur in short time periods and ultimately lead to the global dispersion of substances in the atmosphere. The atmospheric models and operational procedures such as global monitoring networks developed in the nuclear technology environment (Jacobson and Ziegler 1996), were applied to other forms of pollution in the mid-1960s and established the framework on which the problem of acid rain was identified (Eliassen and Saltbones 1975). The theoretical and empirical evidence gathered between 1950 and 1970 demonstrated the importance of the long-range transport of air pollution, and the effects of some pollutants in turn have been modelled in detail for policy applications (Tuinstra 2006).

Over the past few decades many large-scale environmental issues (e.g. Acidification, Stratospheric and Tropospheric Ozone, Heavy Metals, Persistent



Organic Pollutants, Climate Change) have been brought to the attention of the public by different groups in society from regions where their effects were particularly significant, given the understanding that the problems could not be handled on a local basis; but required international action and this could only take place under the umbrella of multilateral environmental agreements, and action was moved to international fora.

Two outstanding examples of science and policy integration are the 1979 Convention on Long-range Transboundary Air Pollution and the 2001 Stockholm Convention on Persistent Organic Pollutants.

The UNECE Convention on Long-range Transboundary Air Pollution (www.unece.org/env/LRTAP) was established in 1979 and entered into force in 1981. Over the past 25 years it has provided a framework in which MEAs (such as several protocols to the Convention) have been negotiated, agreed, implemented and shown to work (de Vries and Posch 2003). The work under LRTAP has benefited over the years from synergies with other processes in the ECE region. Working groups, laboratories and funding involved in other important institutional frameworks such as OSPAR (www.ospar.org), MAP (www.unepmap.org) and

The long-term evolution of science, policy making and our future depends on the development of effective strategies to relate these diverse components

AMAP (www.amap.no) have played, and still play, important roles; but it can be argued that the binding reporting obligations and the assessment methods developed in the ECE/LRTAP Convention have been particularly innovative in linking policy and science in a long-term dynamic integrated framework. The bottom-up process by which the plain concern of some populations and the political concern of scientists on the one hand, and by policy-makers on the other, has led to a unique configuration of transdisciplinary design embedded in the definition of the agreement itself. The convergence of concerns raised issues of health, environment, social impact (loss of traditional means of subsistence due to acidification of lakes in Scandinavia) and policy definition: at the cross-roads, the framework to set-up the LRTAP Convention was created.

The Convention on Long-range Transboundary Air Pollution is one of the central means of protecting our environment. Over the years it has served as a bridge between different political systems and as a factor of stability in times of political change. It has substantially contributed to the

development of international environmental law and has created the essential framework for controlling and reducing the damage to human health and the environment caused by transboundary air pollution. It is a successful example of what can be achieved through intergovernmental cooperation.

The aim of the 1979 LRTAP Convention is that Parties shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution, including long-range transboundary air pollution. The Parties develop policies and strategies to combat the discharge of air pollutants through exchanges of information, consultation, research and monitoring.

The Parties meet annually at sessions of the Executive Body to review ongoing work and plan future activities, including a work plan for the coming year. The three main subsidiary bodies –the Working Group on Effects, the Steering Body to the EMEP (European Monitoring and Evaluation Programme) and the Working Group on Strategies and Review– as well as the Convention's Implementation Committee, report to the Executive Body each year.

Currently, the Convention's priority activities include the review and possible revision of its most recent protocols, implementation of the Convention and its protocols across the entire UNECE region (with special focus on Eastern Europe, the Caucasus and Central Asia and Southeast Europe) and sharing its knowledge and information with other regions of the world.

Several innovations were introduced in the process under the LRTAP Convention that have proven to be effective. These include (i) mandatory reporting and the undertaking by parties to provide the best available information through a network of cooperative research efforts, (ii) cooperative and consistent monitoring and modelling of atmospheric transport and effects on ecosystems and health on a continental scale, and (iii) an iterative process of assessment and simulation performed by a network of technical groups including representatives of all countries working on agreed data on emissions,

transport, effects and abatement costs and a simulation framework where this information is integrated. This process can identify strategies that, according to the best available knowledge, achieve maximum environmental effects at minimum costs (Castells and Guardans 2007).

The Stockholm Convention (www.pops.int) is a global treaty to protect human health and the environment from persistent organic pollutants (POPs). POPs are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms, and are toxic to humans and wildlife. POPs circulate globally and can cause damage wherever they travel. In implementing the Convention, Governments will take measures to eliminate or reduce the release of POPs into the environment.

The work on Persistent Organic Pollutants has had several important consequences in the conceptual framework to address the

assessment of risk from air pollution and to formulate risk-reduction strategies. The way POPs move in the environment and in organisms is different from the way pollutants such as sulphur, nitrogen oxides or ozone move or intervene in the environment and in organisms. As a consequence, the models of emission, atmospheric transport and effects for POPs are different in several aspects from the Integrated Assessment Models developed for acidification and ground-level ozone. Concerning emission and atmospheric transport, POPs are volatile and can thus go back to the atmosphere from the soil, water or vegetation for hours, days, weeks or years following deposition if the temperature or concentration conditions change. This means that the relatively simple source-receptor relations that can be used for sulphur, nitrogen and ozone are of no help for POPs, and models based on fugacity or non-steady-state assumptions have been developed. On the effects side,



due to their tendency to accumulate in lipids and to their mode of action, POPs, can be a risk to human health and the environment at very low environmental concentrations. Consequently, the lengthy pathways and routes that lead to exposure and the resulting dose need to be included in the monitoring and modelling efforts to identify effective and practicable ways to decrease exposure and environmental levels.

The international action on POPs has largely benefited from NGOs energy and effective advocacy ([http://](http://www.ipen.org/ipenweb/ipen.html)

www.ipen.org/ipenweb/ipen.html, www.wecf.org).

Conclusion

Scientific activities have a political dimension and, increasingly, political activities have a scientific component; these interactions are mediated by Intergovernmental Organisations (ILO, WHO, FAO etc), Non-Governmental Organizations, National Governments and Scientific Institutions organised in Multilateral Environmental Agreements. The long-term evolution of science, policy making and our future depends on the devel-

opment of effective strategies to relate these diverse components. Environmental policy making through MEAs provides a solid international base for stable, fair and effective scientific, industrial and political cooperation. ■

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After the Seveso Accident, Are Our Industries really Safer? Brussels Commemorates the 30th Anniversary of the Accident

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The accident at the chemical plant in Seveso in 1976 played a major role in the development of EC environmental policy, leading to the adoption of the Seveso Directive, which was amended in 1996 and 2003 as a result of subsequent industrial accidents. In October 2006, the European Parliament and the European Commission organised an event in Brussels to commemorate the 30th anniversary of the accident, dealing with progress made in industrial risk prevention. Thanks to the Seveso Directive, many establishments in Europe are now subject to well-accepted safety requirements. In the long term, it is stressed that safety is economically beneficial; nevertheless, there have still been accidents in recent years, and the existing legislation needs to be fully and effectively implemented to further reduce risks.

Key words: Seveso Directive, dangerous substances, risk, industrial accidents, safety.

Après l'accident de Seveso, nos industries sont-elles réellement plus sûres? Bruxelles commémore le 30^e anniversaire de l'accident

L'accident survenu dans l'usine chimique de Seveso en 1976 a joué un rôle majeur dans le développement de la politique environnementale de la CE et a mené à l'adoption de la directive Seveso, amendée en 1996 et 2003 suite à d'autres accidents industriels. En octobre 2006, Le Parlement européen et la Commission européenne ont commémoré le 30^e anniversaire de l'accident à l'occasion d'un événement organisé à Bruxelles relatif aux progrès de la prévention des risques industriels. Grâce à la directive Seveso, de nombreux établissements européens sont aujourd'hui soumis à des obligations sécuritaires bien acceptées. À long terme, la sécurité entraîne des bénéfices économiques ; cependant, des accidents ont encore eu lieu ces dernières années et la législation en vigueur doit être introduite efficacement, dans son ensemble, pour réduire encore les risques.

Mots-clés : directive Seveso, substances dangereuses, risques, accidents industriels, sécurité.

Tras el accidente de Seveso, ¿son realmente seguras nuestras industrias? Bruselas conmemora el 30.º aniversario del accidente

El accidente de la planta química de Seveso en 1976 tuvo un papel protagonista en el desarrollo de la política ambiental de la Comunidad Europea, pues llevó a la adopción de la Directiva Seveso, modificada en 1996 y 2003 como consecuencia de otros accidentes industriales. En octubre del 2006, el Parlamento Europeo y la Comisión Europea organizaron en Bruselas un evento para conmemorar el trigésimo aniversario del accidente centrado en los progresos realizados en la prevención de riesgos industriales. Gracias a la Directiva Seveso, muchas empresas europeas están sometidas en la actualidad a exigencias de seguridad ampliamente aceptadas. A largo plazo, se resalta que la seguridad es económicamente beneficiosa; sin embargo, todavía ha habido accidentes en los últimos tiempos, y la presente legislación necesita ser implementada de forma completa y efectiva para continuar reduciendo riesgos.

Palabras clave: Directiva Seveso, sustancias peligrosas, riesgo, accidentes industriales, seguridad.

On 10 July 1976 a vapour cloud containing dioxin escaped from ICMESA, a chemical manufacturing plant based in the small town of Seveso, in the province of Milan. This disaster raised the overall level of awareness of industrial accidents and their consequences on environment and human health. Similar industrial accidents had already occurred in Europe, but on this occasion the time was ripe for a new political reaction to the risk posed by dangerous substances. Therefore the Seveso accident played a major role in the development of the European environmental policy. In a period when industrial development was significantly changing and improving the way of life of European citizens, the need to combine economic growth, human health and environmental protection found a strong answer at the European level with the adoption of the so-called "Seveso Directive". Unfortunately, other accidents still happened. This led to a revision of the policy pursued so far and to the adoption, in 1996, of the "Seveso II Directive" which broadened the scope of the previous Directive and introduced new safety measures. A further revision was also carried out in 2003.

Thirty years after the Seveso accident, on 11 October 2006, the European Parliament and the European Commission organised a commemorative event in Brussels, aimed at brainstorming on the progress achieved in the field of industrial risk prevention. Among the participants were

EU Commissioner, Mr. Stavros Dimas, the Italian Minister for the Environment, Territory and Sea, Mr. Alfonso Pecoraro Scanio and the Mayor of Seveso, Mr. Clemente Galbiati.

For the European Commission the Seveso anniversary falls within a very important phase for the development of environmental policy, in fact the new European REACH regulation (for the Registration, Evaluation, Authorisation and Restriction of CHemicals), also creating the European CHemicals Agency, is in the process of being discussed.

Minister Pecoraro Scanio underlined how the Italian government is working to develop seven decrees implementing the Seveso Directives, and that the mapping of more than one thousand risk sites has been approved.

Commissioner Dimas recalled how the "Seveso II Directive has introduced new concepts which have become the pillars of our policy in the areas of safety management systems, emergency plans, land-use planning and an effective inspections system. Both inside and outside Europe, Seveso II has become an important benchmark. It is the legal and technical instrument through which the European Community fulfils its international obligations: in particular those arising from the UN convention on the transboundary effects of industrial accidents".

The Seveso accident highlighted the need for a different way of working, taking into account risks and side effects, revising production standards and establishing safeguard obliga-

tions with which every manufacturing process must comply, as the primary concern should be people's safety. This was the statement of Clemente Galbiati, the Mayor of Seveso, who concluded his intervention asking

The Seveso accident played a major role in the development of the European environmental policy

the EU to symbolically recognise Seveso as "European City of the Environment for opening up a path of progress for our community of people".

Today, thanks to the Seveso Directives, almost 8,000 establishments in Europe are subject to safety requirements. These safety requirements have also been well accepted by industry where, as underlined by Commissioner Dimas, it is understood that safer industrial plants make for better conditions for workers and the surrounding area, and that the reduction of accident risks also implies economic advantages: in the long term safety pays off. Nevertheless, despite the measures adopted, there are still risks, as proved by a number of serious accidents that have occurred in recent years: "Our main priority is to ensure that existing legislation be fully and effectively implemented and this seminar will help to treasure the lessons of the past to further reduce risks of industrial accidents" was the conclusion of Commissioner Dimas. ■

Seveso Directives

Directives Seveso

La CE a adopté la directive Seveso en 1982. Suite à plusieurs accidents industriels graves, la directive a été amendée (1987 et 1988) afin d'inclure le stockage des substances dangereuses. En 1996, la directive Seveso II relative à la prévention des accidents majeurs impliquant des substances dangereuses a été adoptée. Celle-ci établit le cadre juridique de l'utilisation des types et des quantités de substances dangereuses. À la lumière des récents accidents industriels, la directive a été étendue aux risques liés aux substances explosives et aux engrais ammoniaqués en 2003.

Mots-clés : directives Seveso, amendements, accidents industriels, substances dangereuses, prévention des risques.

Directivas Seveso

En 1982, la Comunidad Europea adoptó la llamada Directiva Seveso, que, tras otros accidentes industriales de gravedad, fue enmendada en 1987 y 1988 para incluir consideraciones sobre el almacenamiento de sustancias peligrosas. En 1996 se adoptó la Directiva Seveso II sobre el control de accidentes de gravedad con sustancias específicas, que establecía un marco legal para el tratamiento de tipos y cantidades de sustancias peligrosas. A la luz de accidentes industriales recientes, en 2003 la directiva se extendió a los riesgos implicados por las sustancias explosivas y fertilizantes con base de amonio.

Palabras clave: directivas Seveso, enmiendas, accidentes industriales, sustancias peligrosas, prevención de riesgos.

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In 1982, the EC and adopted the so-called Seveso Directive, which, subsequent to further severe industrial accidents, was amended in 1987 and 1988 to include the storage of dangerous substances. In 1996 the Seveso II Directive on the control of major accident hazards related to specific substances was adopted, establishing a legal framework for dealing with types and quantities of dangerous substances. In the light of recent industrial accidents, in 2003 the directive was extended to risks for explosive substances and ammonium-based fertilisers.

Key words: Seveso Directives, amendments, industrial accidents, dangerous substances, risk prevention.

Seveso directives in Italy

In 1982, Council Directive 82/501/EEC on the major-accident hazards of certain industrial activities (so-called Seveso Directive) was adopted. It was transposed into Italian law by DPR 175/88, which established the procedures to be followed, by classifying industry types and the quantity of materials handled, treated or stored.

Following other severe accidents which occurred in Bhopal, India, in 1984 where a leak of methyl isocyanate caused more than 2500 deaths and in Switzerland in 1986 where fire-fighting water contaminated with mercury, organophosphate pesticides and other chemicals caused massive pollution of the Rhine river and the death of half a million fish, the Seveso Directive has been amended twice: in 1987 by Directive 87/216/EEC and in 1988 by Directive 88/610/EEC. Both amendments aimed at broadening the scope of the Directive, in particular to include the storage of dangerous substances.

On 9 December 1996, Council Directive 96/82/EC on the control of major-accident hazards related to specific dangerous substances (Seveso II Directive) was, then, adopted. This Directive has fully replaced the previous one. The new version of the European Directive, transposed into Italian law by D. Lgs. 334/99, establishes a legislative frame-

work which defines the aims and application of the standard on the basis of types and quantities of dangerous substances treated, stored or in manufacture.

In the light of recent industrial accidents occurred in Toulouse (France), Baia Mare (Romania) and Enschede (Netherlands), and of studies carried out on carcinogens and substances dangerous for the environment, the Seveso II Directive 96/82/EC was extended by the Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003. The most important extensions of the scope of this Seveso II Directive are to cover risks arising from storage and processing activities in

mining, from pyrotechnic and explosive substances and from the storage of ammonium nitrate and ammonium nitrate-based fertilisers.

“In 2003 the directive was extended to risks for explosive substances and ammonium-based fertilizers”

Directive 2003/105/EC (so-called Seveso II) has been transposed into Italian law by D. Lgs 238/2005, which introduced significant changes to D. Lgs 334/99 in the field of prevention and control of major accidents related to specific dangerous substances. ■





MODASIN. Le « glamour » pour dénoncer

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La fabrication de produits textiles entraîne des émissions directes dans l'environnement qui persistent lors de l'utilisation ou du lavage du vêtement. Pour prouver qu'il est possible d'éviter cette situation et substituer les toxiques par des alternatives plus sûres, Greenpeace a invité, en juin 2006, 16 stylistes espagnols à créer et à présenter des vêtements sans toxiques dans le cadre du projet mode sans toxiques (modasintóxicos). Les créateurs ont tout d'abord mis en place une analyse des tissus, qui a révélé le manque d'informations du secteur, l'industrie chimique n'étant pas actuellement obligée de signaler les substances utilisées ou d'éliminer les plus dangereuses. Dans ce sens, Greenpeace s'est également associé aux entreprises Camper et Mango en vue de demander à l'Union européenne un renforcement de la législation REACH obligeant l'industrie chimique à fournir des informations sur les produits employés et, le cas échéant, à utiliser des alternatives moins dangereuses.

Mots-clés : mode sans toxiques, Greenpeace, REACH, toxiques, mode.

Modasin. Using "glamour" to denounce

The manufacture of textile products gives rise to direct emissions into the environment, which persist when garments are worn and washed. In order to demonstrate that it is possible to avoid this situation and replace toxics with safer compounds, in June 2006 Greenpeace invited sixteen Spanish designers to create and present toxic-free garments in their toxic-free fashion project (modasintóxicos). The designers went through an initial garment-analysis phase in which the lack of information in the sector was patently clear, as currently the chemical industry is not obliged to inform of the substances used or eliminate the most dangerous ones. In this sense, Greenpeace has joined forces with the companies Camper and Mango in order to ask the European Union to strengthen the REACH legislation with the aim of obliging the chemical industry to supply data on the products used and to employ, wherever possible, less dangerous alternatives.

Key words: toxic-free fashion, Greenpeace, REACH, toxics, fashion.

Modasin. Usar el «glamour» para denunciar

La fabricación de productos textiles provoca emisiones directas al medio ambiente, que continúan cuando se usa o lava la prenda. Para demostrar que es posible evitar esta situación y sustituir los tóxicos por alternativas más seguras, en junio del 2006 Greenpeace invitó a 16 diseñadores españoles a crear y presentar prendas libres de tóxicos en el proyecto modasintóxicos. Los diseñadores pasaron por una fase previa de análisis de los tejidos en la que quedó patente la falta de información del sector, pues la industria química no está actualmente obligada a informar acerca de las sustancias que utiliza ni a eliminar las más peligrosas. En este sentido, Greenpeace se ha aliado también con las empresas Camper y Mango para pedir a la Unión Europea un reforzamiento de la legislación REACH que obligue a la industria química a proporcionar datos sobre los productos utilizados y a emplear, si las hay, alternativas menos peligrosas.

Palabras clave: moda sin tóxicos, Greenpeace, REACH, tóxicos, moda.

La mode espagnole pour un avenir sans toxiques

Textes : Marta Rodríguez et Sara del Río. **Photos :** Jean-Marc Manson. **Assistants :** Antonio Márquez et Magaceda Escribano. **Stylisme :** Amparo Utrilla et Lucía Prada. **Maquillage :** José Belmonte. **Coiffure :** Manu Hernández. **Studio :** Cenital

Le 19 juin dernier, Greenpeace a lancé son projet intitulé mode sans toxiques (modasintóxicos). Seize créateurs espagnols ont présenté au Cercle des beaux-arts de Madrid une collection de vêtements confectionnés sans toxiques dangereux. Les stylistes ainsi que les marques Camper et Mango se sont unis à Greenpeace pour attirer l'attention des gouvernements européens sur la lutte contre les toxiques, leur demander d'assumer leurs responsabilités et de voter pour la législation REACH qui nous protégera contre ces substances si dangereuses

Le travail et l'engagement des créateurs ainsi que des entreprises textiles espagnoles pour une mode sans toxiques prennent place à un moment crucial pour l'Europe. À la fin de cette année, l'UE devra approuver une nouvelle réglementation sur les substances toxiques, le règlement REACH. Nous devons par conséquent nous décider à trouver des solutions aux problèmes que causent les substances chimiques dangereuses sur notre santé et l'environnement ou nous verrons augmenter notre exposition quotidienne à ces toxiques.

Greenpeace a contacté la plupart des stylistes espagnols, et Ágatha Ruíz de la Prada, Anke Schlöder, Antonio Pernas, Carlos Díez, Carmen March, David Del-fín, Hannibal Laguna, Ion



Fiz, Jocomomola, Josep Abril, Juana Martín, Juanjo Oliva, La casita de Wendy, Locking Shocking, Luxoir ainsi que Txell Mirás ont répondu à son appel. Le défi est de créer des vêtements sans toxiques afin de prouver qu'il est possible de substituer les toxiques dangereux par des alternatives plus sûres.

L'Union européenne est l'une des régions du monde qui produit le plus gros volume de substances chimiques. Approximativement 100 000 substances y sont enregistrées. Cependant, seul 5 % de ces substances a été analysé afin de connaître leurs risques pour la santé, même si nous savons qu'il y a une relation entre les toxiques et l'augmentation de certaines maladies telles que le cancer, les allergies ou l'asthme.

Face à ce problème, l'Union européenne a décidé en 1998 de mettre en place une législation, REACH, dont les deux objectifs clés sont les suivants : obliger l'industrie chimique à fournir des informations sur la sécurité des substances mises sur le marché et interdire l'utilisation des substances dangereuses lorsqu'il y existe des alternatives.

Cependant, la portée de REACH s'est progressivement affaiblie. Les gouvernements européens souhaitent continuer d'autoriser l'utilisation des toxiques

dangereux. Les pressions exercées par la puissante industrie chimique ont été les plus fortes, même si les gouvernements eux-mêmes reconnaissent qu'il est impossible d'établir des limites sûres pour l'utilisation de ces substances.

L'UE semble disposée à laisser passer l'opportunité, qui ne se représentera pas

La mode a prouvé que la substitution des substances dangereuses était parfaitement viable

avant plusieurs années, de placer la santé publique au-dessus des intérêts de quelques entreprises chimiques.

C'est pour cette raison que ce projet est particulièrement important. La mode espagnole n'a pas seulement prouvé que la substitution des substances dangereuses était parfaitement viable, mais qu'il s'agissait de l'unique moyen de garantir la protection des personnes et de l'environnement contre la pollution chimique.

Les créateurs ont choisi des tissus qu'ils ont fait analyser par Inditex. Une fois la composition connue, ils se sont mis à la recherche de tissus similaires sans plomb, nickel, chrome VI, arylamines, formaldéhyde ou phtalates, substances liées au cancer, aux allergies et aux altérations des reins, du système nerveux et de reproduction.

Au cours du processus, il est apparu que l'industrie textile ne dispose pas de suffisamment d'informations. En outre, il s'agit d'une industrie très fragmentée et il est très difficile de retrouver la composition d'un vêtement (il faut cher-

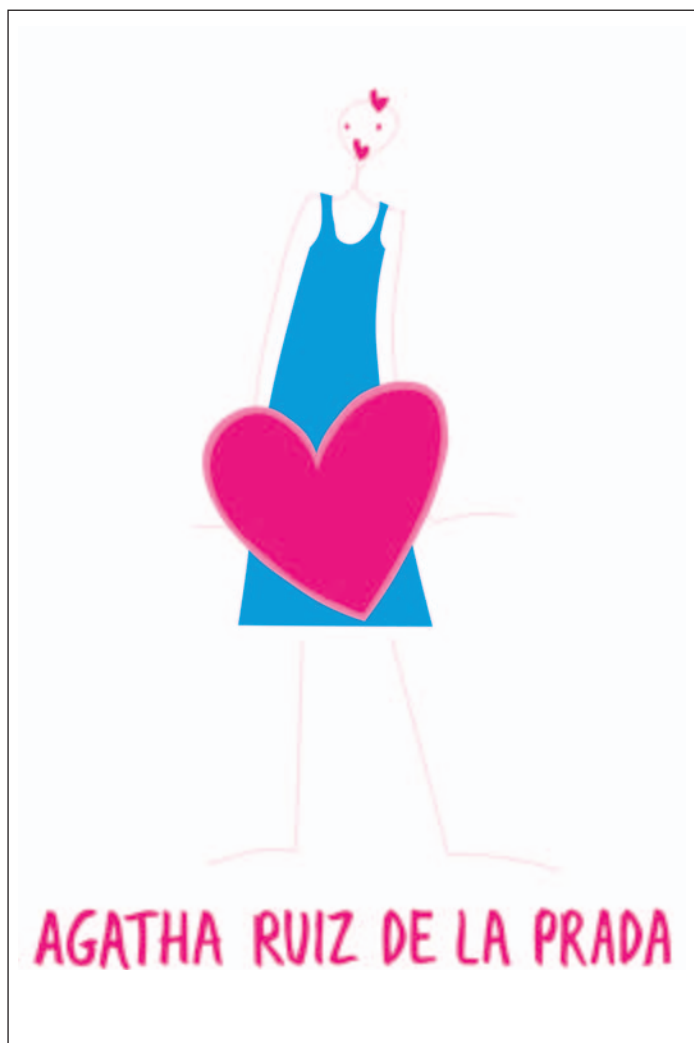
cher l'entreprise qui a élaboré le tissu, celle qui l'a teint, qui l'a imprimé, le fabricant du fil, des boutons, etc.). Le problème est que la législation n'oblige pas l'industrie chimique à donner des informations sur les substances dangereuses pour la santé et l'environnement ou à les éliminer.

Deux grandes entreprises espagnoles du secteur de la mode, Mango et Camper ont également participé au projet « mode sans toxiques ». Mango, qui disposait déjà d'une politique sur les substances nocives, s'est engagé à remplacer progressivement les substances chimiques dangereuses dans ses articles. Il ne s'agit pas en effet de réduire l'utilisation de ces substances mais bien de les éliminer.

La mode espagnole parie sur un avenir sans toxiques pour la planète et les personnes. Cependant, ces efforts ne seront pas suffisants si REACH continue de s'affaiblir. La nouvelle loi doit obliger l'industrie chimique à donner des informations sur les substances dangereuses et à interdire leur utilisation lorsqu'il exis-



Greenpeace



te des alternatives plus sûres sur le marché. Le consommateur ne peut se charger lui-même de rechercher les produits contenant des toxiques ou ceux qui n'en contiennent pas. La loi doit nous protéger de façon à ce que, tout simplement, ces substances n'existent plus.

Le mannequin Laura Ponte, enceinte de huit mois, a souhaité poser avec cette robe créée par Carmen March pour rappeler que les fœtus et les nouveau-nés sont les plus vulnérables face aux toxiques. À l'arrière-plan, les instal-

lations de l'entreprise Aiscondell, produisant des dérivés de chlore.

Verónica Blume habillée par Antonio Pernas.

“La mode espagnole parie sur un avenir sans toxiques pour la planète et les personnes”

À l'arrière-plan, le complexe chimique de Montecinca.

Martina Klein fait, elle aussi, partie des top models

qui ont prêté leur image à la campagne. Elle porte ici une robe de Ion Fiz. À l'arrière-plan, les installations de l'entreprise chimique Dapfne.

Le mannequin Verónica Blume, autre figure de la campagne, porte un sweat à capuche de Carlos Díez. À l'horizon, le complexe chimique d'Aiscondell-Polidux.

Le mannequin et acteur Iván Sánchez porte un pull de Luxoir pour la campagne « mode sans toxiques ». Derrière lui, le complexe chimique de Monzón.

Le défilé

Ágatha Ruíz de la Prada, Anke Schlöder, Antonio Pernas, Carlos Díez, Carmen March, David Delfín, Hannibal Laguna, Ion Fiz, Jocomomola, Josep Abril, Juana Martín, Juanjo Oliiva, La casita de Wendy, Locking Shocking, Luxoir et Txell Mirás ont participé au défilé organisé le 19 juin dernier au Cercle des Beaux-Arts de Madrid.

Sur le podium, les vêtements présentés étaient fi-

dèles au style habituel des créateurs. Ceux-ci ont souhaité montrer que le problème n'était pas le type de tissu, qu'il s'agisse de soie,



Greenpeace. Jean-Marc Manson

de lin ou de coton, mais le traitement dont ils font l'objet. La production de filaments, de fibres synthéti-

Au cours de la fabrication textile, des émissions directes sont diffusées dans l'environnement. Le problème est que ces émissions continuent de se diffuser à long terme

ques ou du fil, les traitements préalables, la teinture, l'impression ou les traitements postérieurs et de conservation impliquent l'utilisation de toxiques. Au cours de la fabrication textile, des émissions directes sont diffusées dans l'environnement. Le problème est que ces émissions continuent de se diffuser à long terme car les déchets toxiques présents dans les vêtements sont libérés via l'utilisation,

le lavage et l'usure. Ceci contribue à augmenter notre exposition quotidienne à des substances chimiques dangereuses, le facteur aggravant étant que l'exposition est plus directe en cas de contact avec la peau. Par conséquent, avec ce projet, la mode espagnole mise sur la santé et l'environnement.

À gauche, Paola Dominguín porte un pantalon et une chemise de David Delfín.

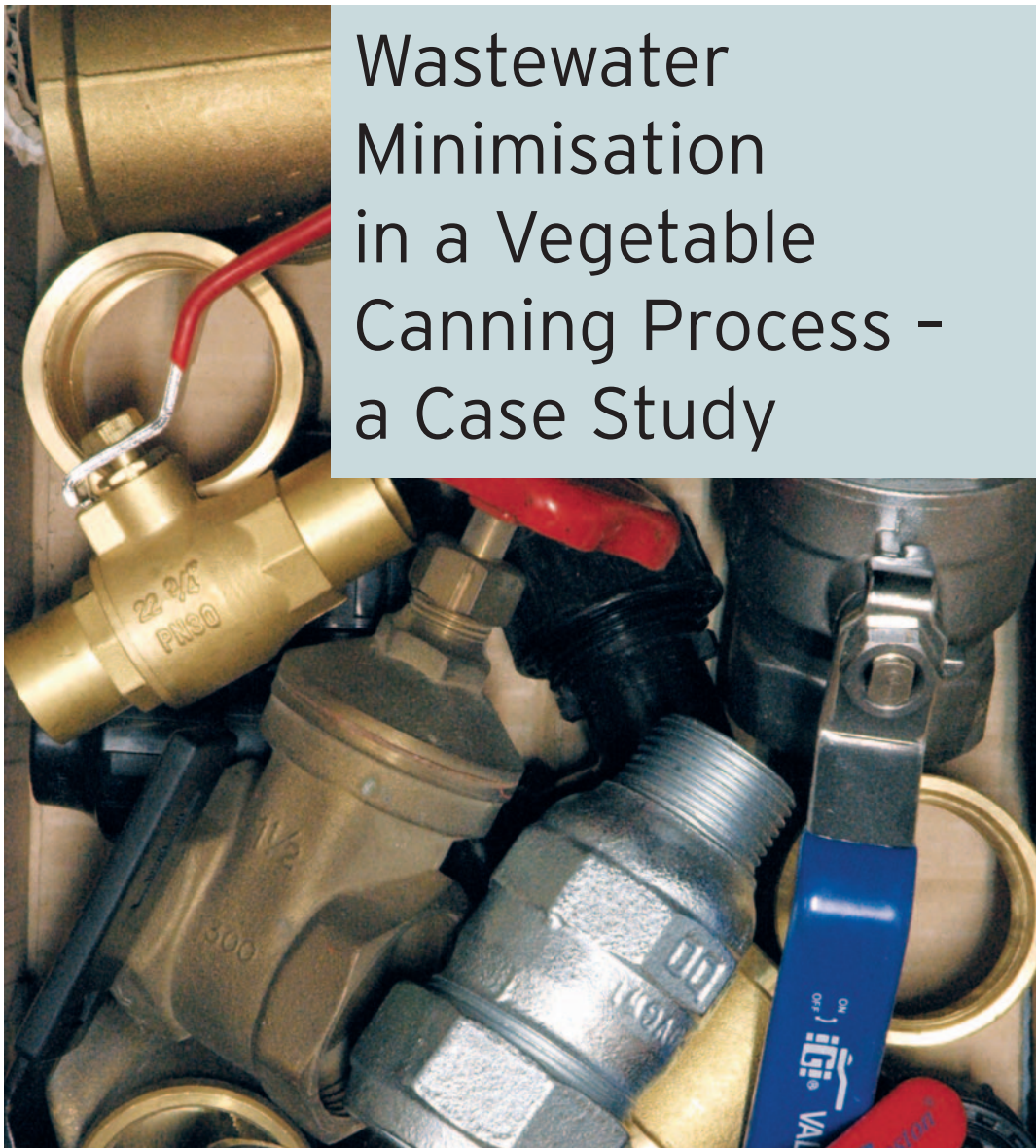
En bas, la jeune Gimena Jiménez porte une robe de Jocomomola. Derrière elles, respectivement, les entreprises Dapfne et Químicas del Cinca.

Des visages connus

Le photographe Jean-Marc Manson a réuni les mannequins Verónica Blume, Paola Dominguín, Martina Klein et Gimena Jiménez pour une séance photo où les vêtements sans toxiques con-

trastent avec l'arrière-plan, des industries chimiques de la localité de Monzón (Huesca). Toutes ont participé à ce projet de façon bénévole. Le mannequin Iván Sánchez a travaillé avec Greenpeace pour les vêtements homme et le mannequin Laura Ponte, enceinte de huit mois, a souhaité collaborer en présentant deux vêtements et en rappelant que l'exposition aux toxiques est deux fois plus dangereuse pour les fœtus et les nouveau-nés. Jean-Marc Manson est un photographe de mode de renom qui a travaillé avec les magazines de mode les plus prestigieux, notamment Elle, Vogue ou Telva, en Espagne et dans d'autres pays. ■

Wastewater Minimisation in a Vegetable Canning Process - a Case Study



Ass. prof. dr.
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Director
Steng-national
Cleaner Production
Centre Ltd.

Vegetable canning processes consume water for cooling, washing and the preparation of process solutions. The cooling water is mostly unpolluted and can be easily recycled. This is not possible in the case of washing water because of strong HACCP demands. This type of water should be minimised and then treated in a wastewater treatment plant.

A case study of wastewater minimisation was carried out in a small vegetable processing plant. It was found that it is possible to save 66.5% of water by means of three options: recycling of cooling water, reuse of tightening water and minimisation of floor-washing water.

Key words: recycling, reuse, minimisation, wastewater, vegetable canning process.

Minimisation des eaux résiduaires dans un procédé de mise en conserve de légumes : cas pratique

Les procédés de mise en conserve des légumes consomment de l'eau lors du refroidissement, du lavage et de la préparation des solutions de traitement. L'eau de refroidissement est très peu polluée et peut être facilement recyclée, ce qui n'est pas le cas de l'eau de lavage, à l'origine de fortes demandes en HACCP. Ce type d'eau doit être minimisé puis traité dans une usine de traitement des eaux résiduaires.

Un cas pratique de minimisation des eaux résiduaires a été mis en place dans une petite usine de traitement des légumes. Il a été découvert qu'il était possible d'économiser 66,5 % de l'eau employée via l'utilisation des trois options suivantes : recyclage de l'eau de refroidissement, réutilisation de l'eau d'étanchéité et minimisation de l'eau de lavage des sols.

Mots-clés : recyclage, réutilisation, minimisation, eaux résiduaires, mise en conserve de légumes.

La minimización del consumo de agua en un proceso de enlatado de vegetales: un caso práctico

Los procesos de enlatado de vegetales consumen agua para refrescar, lavar y preparar soluciones de proceso. El agua de refresco está, en su mayoría, sin contaminar y puede ser reciclada fácilmente. Esto no es posible en el caso del agua de lavado, debido a las fuertes exigencias relativas al APPCC. Este tipo de agua ha de ser minimizado y después tratado en una planta de tratamiento de aguas residuales.

Se llevó a cabo el estudio de un caso práctico de minimización de aguas residuales en una pequeña planta de procesamiento de vegetales. Se descubrió que es posible ahorrar el 66,5 % del agua mediante tres opciones: reciclar el agua de refresco, reutilizar el agua de sellado y minimizar el consumo de agua para lavado.

Palabras clave: reciclaje, reutilización, minimización, aguas residuales, proceso de enlatado de vegetales.



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1. Introduction

Most process industries are abundant water consumers. They take clean water from the environment, which in most cases needs physical and/or chemical treatment. Through its use they pollute it with impurities and hazardous substances. Then it is released back in to the environment with or without purification. Because of stronger environmental legislation, water abundance and costs, water consumers are forced to minimise its consumption. There are various methodologies and approaches in the literature regarding wastewater minimisation. For example Goldblatt /1/ presented the zero discharge approach

Because of stronger environmental legislation, water abundance and costs, water consumers are forced to minimise its consumption

where a water minimisation hierarchy is considered (Figure 1). Starting at the top of the triangle, the designer takes steps to incorporate minimisation of wastewater into the process design. Segregation of waste streams allows for reuse and/or recycling of water streams with or without processing. The polluted water, which cannot be reused should be finally treated in a wastewater treatment plant and re-

turned to the environment. Rosain /2/ suggested establishing a plant water/wastewater database which should include the following information:

- raw water use and process water quality requirements;
- current water treatment capability and costs;
- process wastewater generation (flow and composition);
- current wastewater treatment capability and costs; and
- flow and mass balances for the water/wastewater management system.

During the development of wastewater minimisation the researcher should consider the following typical water reuse goals:

- minimisation of raw water consumption;
- minimisation of effluent discharge;
- zero liquid discharge;
- cascade reuse;
- waste minimisation and
- source reduction.

Wang and Smith /3, 4/ developed an approach for wastewater minimisation (for continuous and batch processes) using water pinch technology. The approach is based on limiting the water profile that identifies the maximum inlet and outlet pollutants concentrations in the water, used in the process. Zbontar and Glavic showed that the pinch approach cannot be

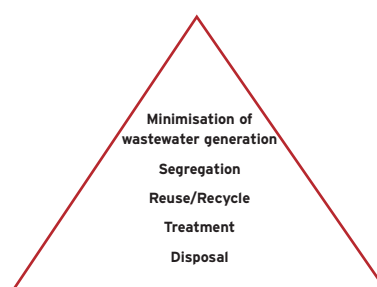


Figure 1. Wastewater management hierarchy

applied to all kinds of processes and industries /5/. In the case of a refinery it was unsuccessful as most of the water was used for cooling outflows, and for equipment and floor cleaning. Important factors such as safety, distances between processes and water flow temperatures could not be efficiently combined by using the water pinch approach, and there were also too many contaminants in the water flows themselves.

This showed that in most cases a simple methodology should be efficient enough to elaborate the most evident wastewater minimisation options. Such a methodology was also used in the presented case study.

2. A case study

2.1. Description of process

A small vegetable processing plant with 60 employees produces 10 different products in glass jars and tin cans in acetic acid solution or brine (red beet, cucumbers, green peppers, sweet peppers, mixed vegetables, olives, turnips, onions, corn, mushrooms and red pepper sauce). The process steps depend on the type of product. In general the following steps are common to all processes: raw material reception, sorting and grading, washing and solution preparing, filling, thermal treatment, labelling and storage. Figure 2 shows the production process of cucumbers in acetic acid solution which represent 45 % of the entire production of vegetables here.

2.2. Water balance

The company takes water from public waterworks and consumes it for drinking, product washing, steam production, cooling and for the preparation of process solutions. Through process analysis all water consumers were

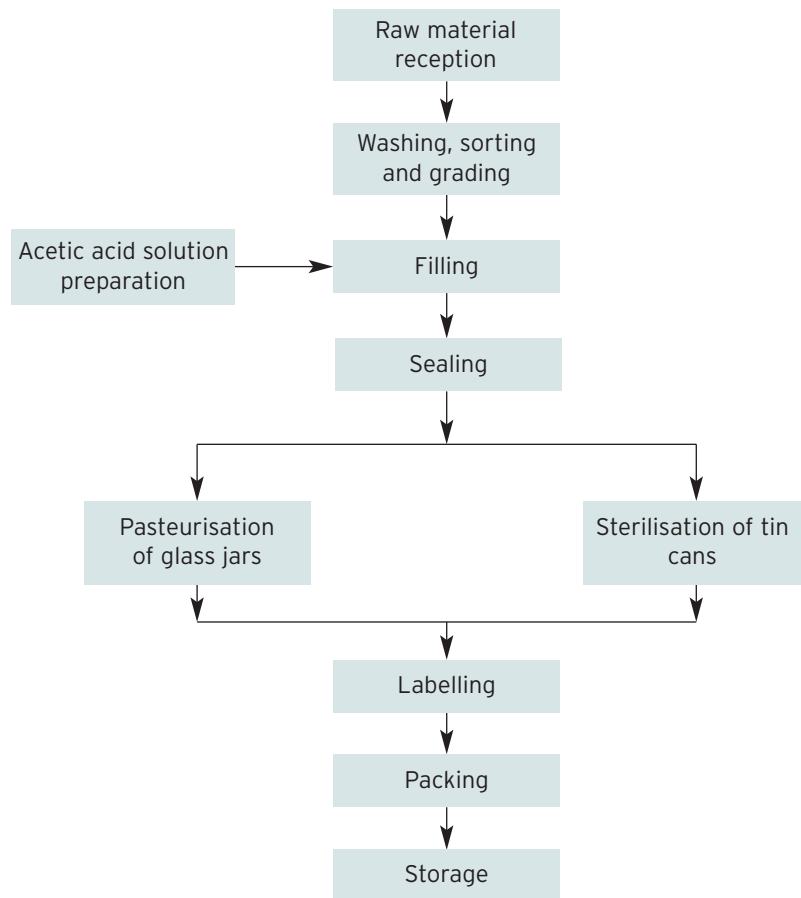


Figure 2. Cucumber processing

determined, and the flow sheet with detailed water balance was drawn up. The water balance of the whole plant is shown in Figure 3 and in Table 1.

2.3. Wastewater minimisation options

Option 1: Reuse of the tightening water for a vacuum pump

The vacuum needed for the product-filling machine is produced in a centrifugal vacuum pump which needs tightening water. The filling machine consumes 9.5 % of fresh water, which is after being used is discharged into the sewers as wastewater.

This type of wastewater does not contain any impurities and can be reused. It can be collected in a small volume tank with the circulating pump

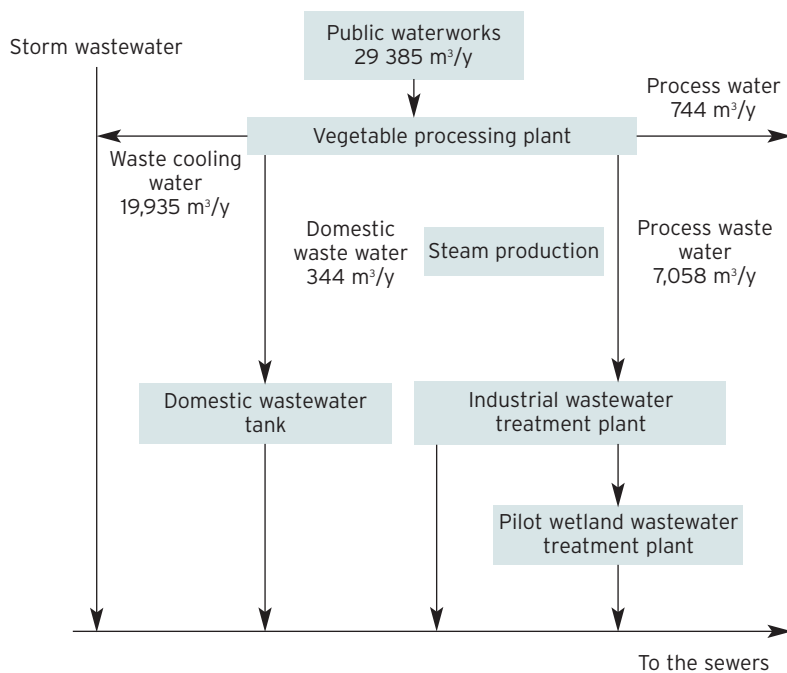


Figure 3. Water balance of the vegetable processing plant

and sent back into the vacuum pump, as shown Figure 4.

The economic feasibility analysis showed that the payback period was 1.1

year and the internal rate of return was 87.7 %.

Option 2: Recycling of the cooling water

Cooling water is produced in the pasteuriser, the autoclave and in the sealing machine. The waste cooling water reaches the maximum temperature of 40 (C, but usually does not exceed 25 (C. Half of the processes are batch processes (sterilisation in autoclaves), while the rest are continuous (pasteurisation and sealing). There is no possibility of recovering low temperature heat. Recycling of the cooling water was proposed. The cooling system consists of a water preparation unit, of primary (two water tanks, pipes, filter, desinfector, pumps and heat exchanger) and of secondary cooling systems with a cooling tower, an evaporative water cooler, a pump, a water softener and pipes (Figure 5).

A water saving of 56% was possible compared to total water consumption of the plant. The payback period for

Table 1. Water balance of the vegetable processing plant for one year

TOTAL CONSUMPTION (m ³ /y)	Floor washing water	Product washing water	Process water	Cooling water	Total
Cucumbers	382	1,573	384	7,974	10,313
Green pepper	57	276	52	981	1,366
Red beet	122	1,781	103	2,063	4,069
Pepper sauce	166	442	0	2,453	3,061
Sweet pepper	330	561	57	2,630	3,578
Mixed vegetables	35	74	31	563	703
Olives	31	242	33	542	848
Corn	25	40	15	790	870
Turnip	10	0	7	183	200
Onion	2	28	1	30	61
Mushrooms in acetic acid	22	134	10	389	555
Mushrooms in brine	30	695	51	797	1,573
Total process consumption	1,212	5,846	744	19,395	27,197
Total (%)	5	21	3	71	100
Drinking water					344
Steam production					1,844
TOTAL CONSUMPTION					29,385

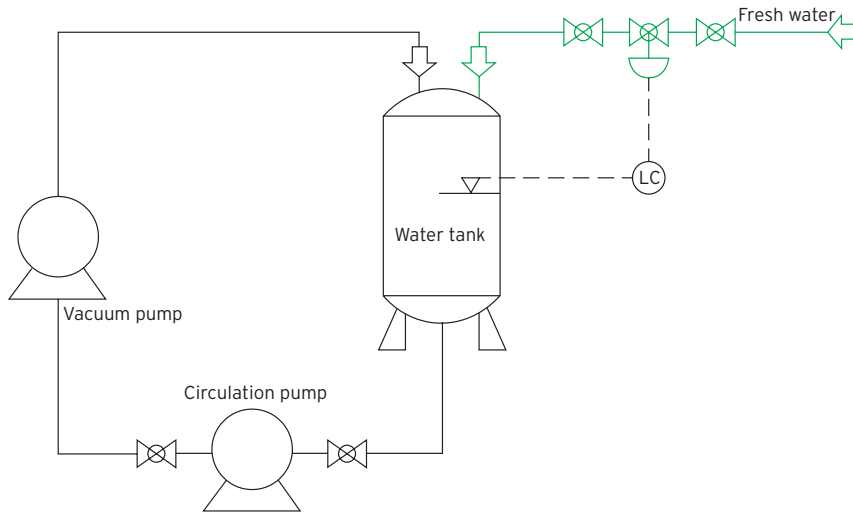


Figure 4. Reuse of the tightening water

the investment reached 9.2 years, the net present value was negative.

Option 3: Minimisation of the floor washing water

The Hazard Analysis and Critical Control Points (HACCP) do not allow simple recycling of the raw materials washing water. For this reason the research was directed at the minimisation of floor and equipment washing water. Floor washing water represents 5 % of

the total consumption. Hoses without water flow control were used. A low-pressure washing system was proposed. The washing unit uses warm water and the appropriate chemicals. Water consumption could be decreased to 4 %. Results from the economic valuation showed that the payback period was 8.5 years, and the net present value was negative. Although the investment was not profitable the company implements it due to the HACCP demands.

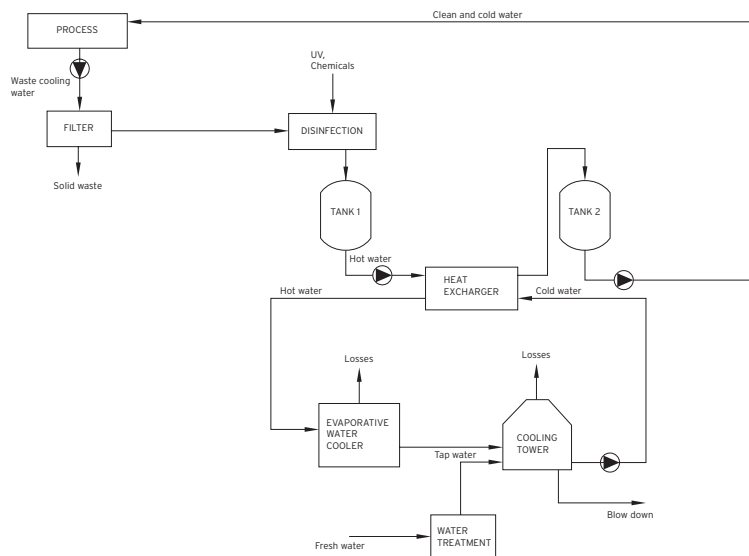


Figure 5. Recycling of the cooling water



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the simple methodology for wastewater minimisation should be used. This methodology consists of four steps:

1. Detection of problems, setting up goals and priorities.
2. Process analysis (process and/or water flowsheet, water balance, options generation).
3. Evaluation of the proposed options (technical, economic and environmental);
4. Final report preparation and implementation.

3. Conclusions

A huge water potential (e.g. more than 50 %) does not mean that this can be implemented in a profitable way. The profitability of measures depends mainly on water costs (fresh and wastewater), on the type of water minimisation option, on the type of process and on the rate of production. As is evident from Table 2, only the first option has an acceptable IRR. The third option was implemented immediately due to the HACCP demands. The other two are to be implemented in the near future due to rising water prices and wastewater taxes.

Because of the high water savings potential (66.5 %), the project is being continued. In the next phase wastewater minimisation possibilities in a new process (i.e. vegetable sauce production) will be examined. Our experience shows that in such small plants

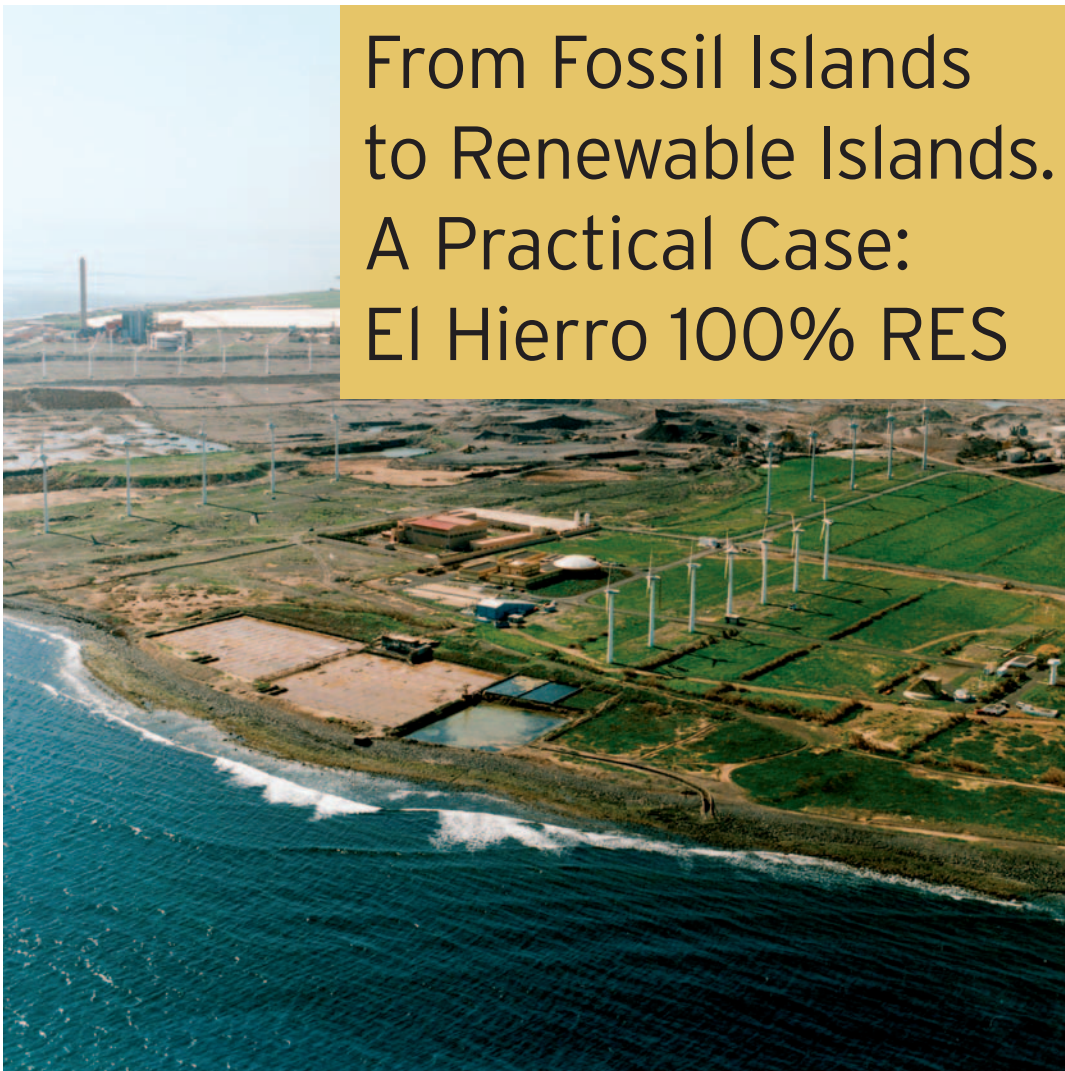
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Table 2. Results of the economic and environmental evaluation of the proposed options

Option	Investment costs (USD)	Net operating cost savings (USD/year)	Payback period (year)	NPV (USD)	IRR (%)	Wastewater minimisation potential (%)
Option 1	2,750	2,500	1.1	5,170	87.7	9.5
Option 2	83,300	9,000	9.2	-42,500	-	56.0
Option 3	10,600	1,250	8.5	-4,900	-	1.0

From Fossil Islands to Renewable Islands. A Practical Case: El Hierro 100% RES



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The island of El Hierro, Canary Islands (declared a Biosphere Reserve by UNESCO in 2000), has an area of 278 km², a population of approximately 10,500 inhabitants and is not connected to a continental electricity grid. Currently, the electricity demand is covered by a conventional power station. The island has decided to implement a 100% RES (Renewable Energy Sources) project for its energy supply. In a first phase the project focuses on a "100% RES for electricity supply" programme, which aims to cover 80% of the island's electricity demand by the integration of several RES.

A large number of European islands could benefit from the results of this project, since approximately 300 European islands are not grid connected.

Key words: 100% RES Island, renewable energy sources, security of supply, wind-hydro power system, solar energy.

Des îles fossiles aux îles renouvelables. Cas pratique : Hierro 100 % renouvelable

L'île de Hierro, aux Canaries (déclarée réserve de biosphère par l'UNESCO en 2000), s'étend sur 278 km², sa population atteint environ 10 500 habitants et elle n'est pas connectée à un réseau électrique continental. Actuellement, ses besoins en électricité sont couverts par une centrale électrique conventionnelle. L'île a décidé d'introduire un projet pour lequel l'approvisionnement énergétique provient à 100 % de sources d'énergie renouvelables. Dans un premier temps, le projet est centré sur un programme d'approvisionnement en électricité 100 % renouvelable dont l'objectif est de répondre à 80 % des besoins en électricité de l'île en introduisant plusieurs sources d'énergie renouvelables.

Environ 300 îles européennes n'étant pas connectées à un réseau électrique, bon nombre d'entre elles pourraient s'inspirer des résultats de ce projet.

Mots-clés : île 100 % renouvelable, sources d'énergie renouvelables, sécurité de l'approvisionnement, générateur hydroéolien, énergie solaire.

De islas fósiles a islas renovables. Un caso práctico: El Hierro 100% renovable

La isla de El Hierro, en las Islas Canarias (declarada reserva de la biosfera por la UNESCO en el 2000), tiene un área de 278 km², una población de unos 10.500 habitantes y no está conectada a ninguna red eléctrica continental. Actualmente, la demanda de electricidad está cubierta por una estación de energía convencional. La isla ha decidido implementar un proyecto para obtener un suministro de energía procedente 100% de fuentes renovables. En una primera fase, el proyecto se basa en un programa de fuentes de energía 100% renovables para el suministro de electricidad, que pretende cubrir el 80% de la demanda de electricidad de la isla a través de la integración de varias fuentes de energía renovables.

Un gran número de islas europeas podrían beneficiarse de los resultados de este proyecto, ya que unas 300 islas europeas no están conectadas a ninguna red.

Palabras clave: Isla 100 % renovable, fuentes de energía renovables, seguridad de suministro, sistema de energía eólico-hidroeléctrica, energía solar.



Instituto Tecnológico de Canarias

I. Current energy situation on El Hierro

Nowadays the electricity demand is covered by a conventional diesel power station of 12.78 MW (peak demand: 6.3 MW, demand: 42 GWh/y). The island's electricity demand has increased rapidly in recent years (1984: 5.71 GWh; 1989: 10.13 GWh; 1999: 23.18 GWh; 2005: 35 GWh). Electricity represents approximately 65% of the internal energy consumption, the rest corresponds to transport. Although the re-

newable energy potential is very high, as on the other Canary Islands, the current contribution of renewables is still very low: there is only one grid-connected wind farm on the island (100 kW installed power), stand-alone PV systems with a total capacity of approximately 7 kW_p (no grid-connected installation), around 25 kW_p PV systems connected to the grid and about 500 m² of installed solar thermal panels.

II. "El Hierro 100% RES" Project

The island has a great RES potential, mainly wind, and is willing to implement a 100% RES project for its energy supply. In order to reach this objective 3 different programmes will have to be developed and implemented:

- The Energy Saving Programme.
- The 100% RES for the Electricity Supply Programme.
- The Transport Programme (conversion from Fossil Fuels to Clean Transport).

The island government (Cabildo de El Hierro), with the political support of the Government of the Canary Islands, has decided to implement the first phase of this programme, the "100% RES for Electricity Supply" programme.



Figure 1. El Hierro island and the project location

With the financial support of the DG TREN of the European Commission, a consortium of 7 partners, coordinated by ITC (Instituto Tecnológico de Canarias), is carrying out a 5-year project that will take the first steps of the “100% RES for electricity supply” programme. The project aims, in an initial phase, to cover 80% of the electricity demand of the island. This objective can only be reached by integrating several RES. The most relevant action consists of:

- Implementation of a Wind-Pumped Hydro Power Station (with the target of covering 75% of the island’s electricity demand)
- Implementation of a Solar Thermal Energy Programme (with the target of installing 500 m² of solar collector area in 5 years)
- Implementation of a PV Roof Programme (with the target of installing 50 kWp grid-connected in 5 years)
- Implementation of a Biomass Programme (in order to evaluate the exploitation possibilities of biomass residues on the island)

Furthermore, feasibility studies for similar systems are under development on Crete (Greece) and Madeira (Portugal). Moreover, further feasibility studies will be developed for other Greek islands. More than 20 islands in Greece alone could benefit from these kinds of systems. In fact, 9 islands have already been selected to carry out pre-feasibility studies.

Besides ITC, the other partners in the European project are: the National Technical University of Athens (NTUA, Greece), the Regional Agency for Energy and Environment of Madeira (AREAM, Portugal), the Regional Energy Agency of Crete (REAC, Greece), the Cabildo Insular de El Hierro (Canary Islands, Spain), INSULA and the company E4Tech (Switzerland).

This is an innovative concept of combination of 2 RES: wind and hydro power, using water as energy storage

III. The wind-hydro power station

III.1. Basic description of the System

The most innovative part of the project, from the technical point of view, is the Wind-(Pumped) Hydro power station (WHPS). This is an innovative concept of combination of 2 RES: wind and hydro power, using water as energy storage. The system overcomes the usual problems of intermittency (discontinuity) and power fluctuations caused by the random character of the wind resource and, thanks to the potential energy storage (pumped water) and the controllable power output of hydro turbines, it can establish a stable grid in terms of frequency and voltage. This is the first experience world wide of a WHPS that will provide, on a yearly basis, approximately 75% of the electricity demand of an isolated area and, in some months (such as June, July and August), 100% of the electricity demand. The rest of the demand will be covered by the existing diesel power station and/or the combination of other RES.

III.2. Components of the Wind-Hydro System

The WHPS will consist of the following subsystems:

Table 1. Main components of the Wind-Hydro System

Wind farm	20 MW
Pumping station	16 MW
Hydro power station (Pelton turbines)	13 MW
Diesel power station (existing)	2 MW
Upper reservoir (existing crater)	300,000 m ³
Lower reservoir	225,000 m ³
Penstock	
Distribution system	

The wind park (20 MW) will be installed at almost the same location of the existing one (100 kW). It will supply energy:

- a) to inject directly into the grid or
- b) to pump water from the lower to the upper reservoir (water-proofed volcanic crater), located at 682 m.a.s.l.

When the wind resource is scarce and does not cover the demand, the water from the upper reservoir will be turbinated to the lower one. If a large period without wind has exhausted the water in the upper reservoir, the system will commute to the existing diesel power station. The dimension of the upper reservoir for the project purpose will be approximately 300,000 m³ (in fact this reservoir is larger, as an existing volcanic crater will be used for this purpose), which is enough to cover the energy demand of the island for 5 consecutive days without wind.

The system enables the electricity production to match the electricity demand perfectly. This adjustment can be achieved because the turbines to be used (Pelton-type) are able to operate between 10 and 100% of their rated power (by changing the flow rate) with the same efficiency.

The estimated yearly electricity production from the system is:

- From the wind park: 41 GWh
- From the hydro station: 10 GWh

III.3. Innovations

The project has both technological as well as non-technological innovations.

Technological Innovations:

- a) Hydraulic Subsystem - Distribution System

A hydraulic turbine and a pump station will be installed instead of a reversible hydraulic turbine. The installation of separated turbine and pump station allows the optimal operation between the wind farm, which produces a non-controlled load, and the pump station. The proposed system has the peculiarity of using only one penstock for both operations - the pumping mode and the turbine mode.

- b) *Intelligent dispatcher control system*

An intelligent dispatcher control system that provides the control and co-ordinates the operation of all generators is foreseen. The control system has to control the upper and lower reservoir, the generators (hydropower, wind farm or diesel), the pumping station, etc.

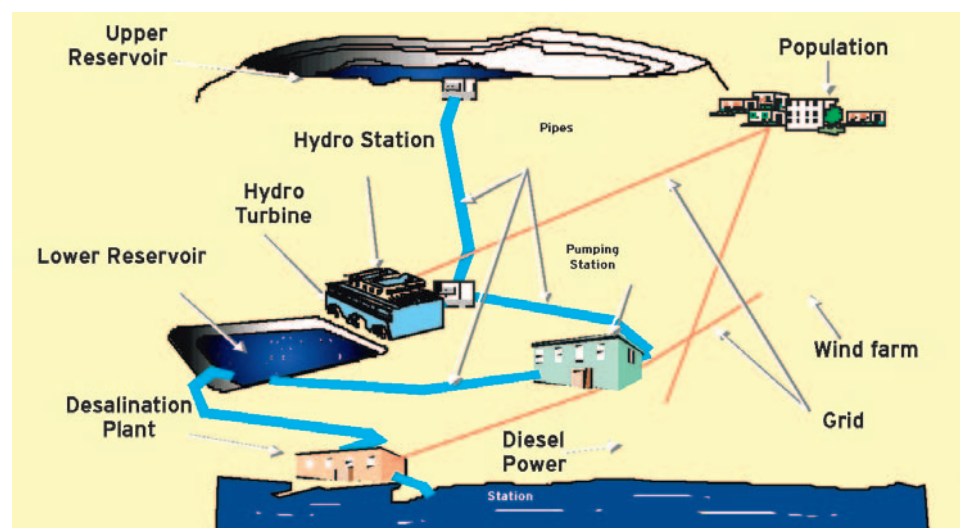


Figure 2. Basic scheme of the Wind Hydro Power Station (WHPS)

c) Grid stability

The island will be a laboratory for grid stability issues and the experience will contribute to defining the real wind penetration limit.

d) Waterproofing of upper reservoir

The waterproofing of the upper reservoir (natural volcanic crater) represents a challenge in the project. The use of synthetic materials (including new geo-membranes) will be studied.

Non-technological innovations:

A company, "Gorona del Viento El Hierro", has been created in order to promote, manage and exploit the proposed wind-hydro power station. The social purpose of this company will be to sell electrical energy to the distribution company (the utility established on the island is ENDESA), under what in Spain is called a "special regime" (generation from renewable energy sources and cogeneration, which establishes the legal framework for autonomous energy producers and the feed-in tariffs for each type of renewable energy installation). The shareholders of "Gorona del Viento El Hierro" are:

- the Island Government, Cabildo de El Hierro: 60%
- the Canary Islands Government through ITC: 10%
- the electrical utility, ENDESA: 30%.

Given that this is an isolated small-scale electrical system, an electrical market with competing generation companies cannot be created, so that the system constitutes a natural monopoly.

The electricity generation on El Hierro island will be carried out by the "Gorona del Viento El Hierro" company, which will have preferential access to the electricity grid ("special regime" producer) and complemented under an ordinary regime by ENDESA when "Gorona del Viento El Hierro" cannot cover the island's electrical demand.

This configuration of the island's electrical system is compatible with

The system enables the electricity production to match the electricity demand perfectly

the existence of small generators under the "special regime", which would complement the electrical supply, contributing to energy self-sufficiency. These contributions are foreseen in the project, particularly through grid-connected photovoltaic and biogas plants. Given the dimension of the island (and the system), demand-side management aspects can be evaluated, taking into account the medium and long-term contributions of these sources, as well as indirect contributions caused by foreseen increasing solar thermal energy systems (replacement of electric water-heating systems).

Another important issue will be that the population will be directly involved in the project. The Island Government (Cabildo de El Hierro) will probably implement a share scheme: a portion of the shares belonging to the Island Government will be divided into smaller shares, so that some SMEs can buy some of them, thus becoming co-owners of the WHPS. This is a highly innovative system from a social point of view, and an effective way of involving the island's population in the project.

III.4. Environmental Impact of the Wind-Hydro Power Station

The WHPS will contribute to reducing CO₂ emissions into the atmosphere by 25,500 tonnes per year, considering that 80% of the electricity demand will be covered by renewables.

But there are economic benefits as well as environmental ones, as the cost of the diesel purchase for the next 20 years alone will be greater than that of the WHPS investment

IV. Integration of different RES: PV, SOLAR THERMAL AND BIOMASS

IV.1. PV Programme

At the beginning of the project, in 2003, no PV system had been con-

nected to the grid on the island. The quantitative objective of the programme is to install 50 kW_p by 2008. Up to now 25 kW_p have been installed on the island. The PV integration is particularly interesting since solar PV electricity is produced during the day, when the electricity demand is higher.

IV.2. Solar Thermal Programme

A high penetration of solar thermal systems for domestic hot water production should be reached. The aim is to substitute electrical heating by solar thermal systems, which is important for reducing the total electricity demand and helping to reduce peaks in the demand curve.

In 2003 the total collector area installed on the island was approximately 370 m², corresponding mainly to old installations, all low-temperature systems for domestic hot water production. The quantitative objective of the programme is to install 500 m² by 2008. During the last 3 years 130 m² have been installed.

IV.3. Biomass Programme

A detailed study has been carried out in order to evaluate all kind of possibilities of biomass exploitation on the island.

The available biomass potential of forestry residues is 3,000 tons. A power

supply system based on gasification coupled to a modified existing engine seems to be a particularly interesting option in El Hierro.

Around 250 hectares of tagasaste ((1% of the total surface of El Hierro), in addition to the available forestry residues, would be needed to achieve 100% RES and fully displace the diesel share in the electricity supply. If available land for energy crops were limited to 20 hectares (~300 t of tagasaste per year), IT would be enough to run a 2 MW biomass power plant, which would process in the region of 3,540 dry tonnes of biomass. The resulting overall power generation system would be associated with a 91% share of renewable energy sources in the electricity generated annually.

V. Overall benefits of the project

Hundreds of islands worldwide could benefit from the results of this project. The foreseen actions are expected to yield the following results:

- Reduction of GHG emissions
- Increase of quality of life on islands
- Increase of energy independence on islands
- Demonstration of the fact that RES integration is a way of providing 100% energy supply on islands
- Demonstration of the fact that synergies between RES (e.g. combination of wind, hydro, solar, etc.) can contribute considerably to increasing the penetration of RE into weak grids in isolated areas
- Demonstration of the fact that pumped water storage is an economical way of accumulating energy
- Optimisation of the available potential of RES using them together in integrated systems for local power supply. ■

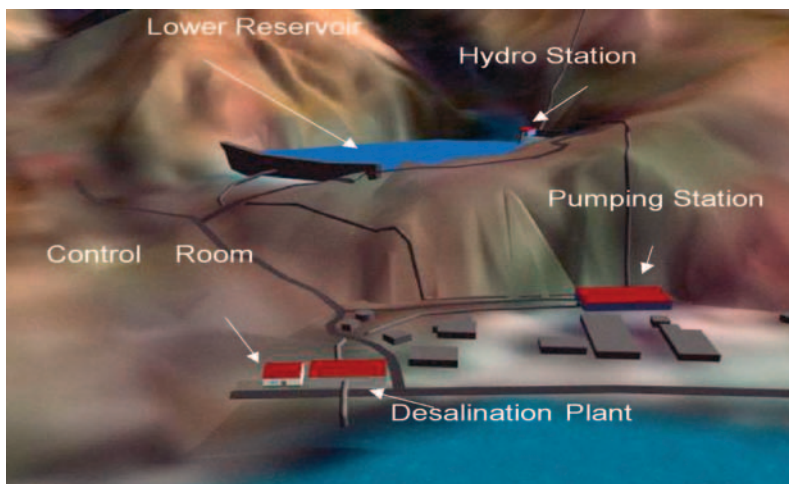
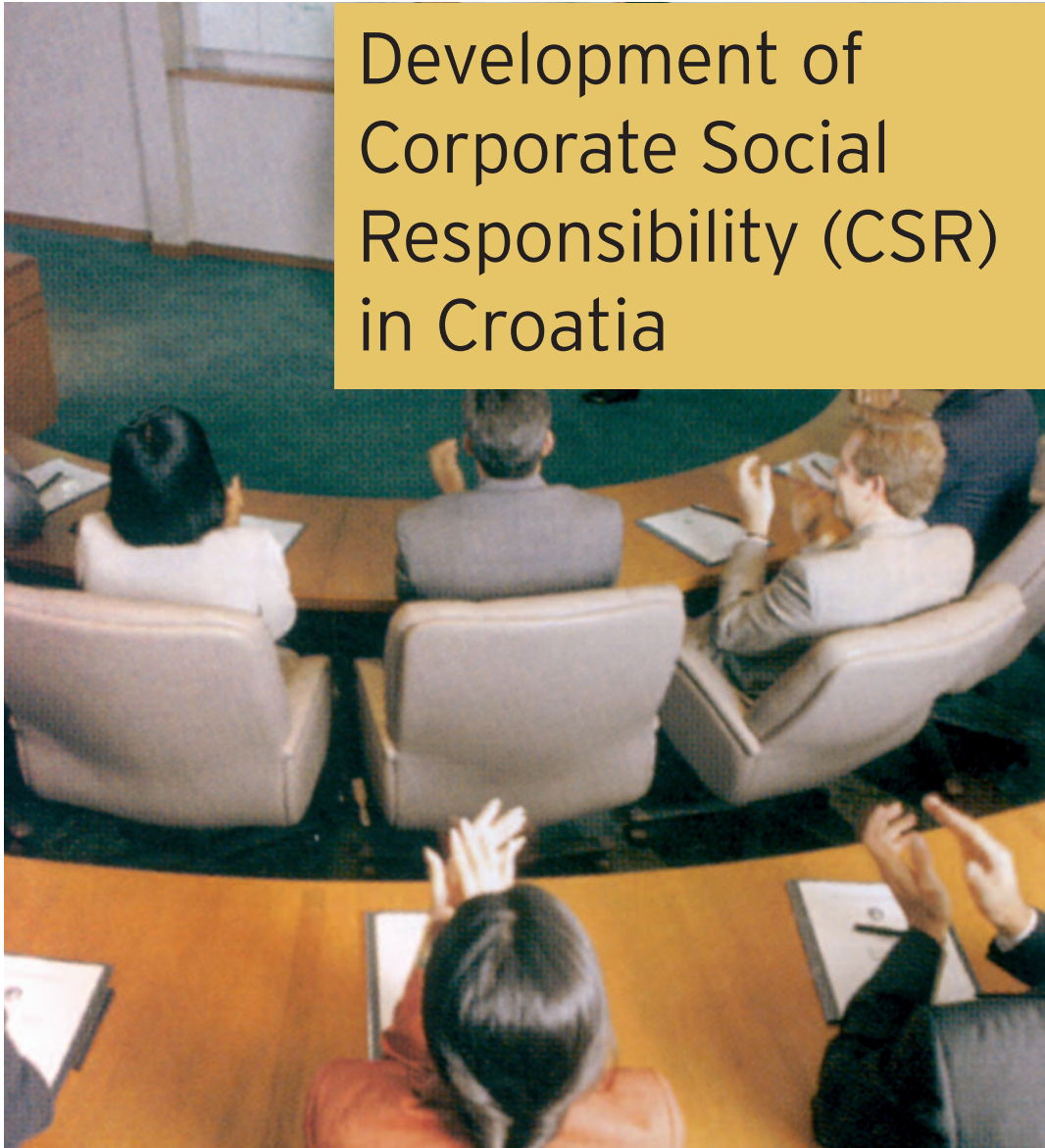


Figure 3. Details of the siting of the main system components

Development of Corporate Social Responsibility (CSR) in Croatia



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Croatia is supporting the introduction of corporate social responsibility (CSR) with the aim of disseminating good practices, supporting the business sector by increasing the CSR capacity of industry support institutions, and setting a business agenda for CSR. The methodology used is the Triple Bottom Line (TBL) approach, which involves taking economic, social and environmental considerations into account. This CSR project, operated by the Croatian Centre for Cleaner Production, has enabled companies to implement specific measures in the TBL domains, and the impact has been measured in a social domain questionnaire.

Key words: CRS, Triple Bottom Line, Croatian Centre for Cleaner Production, good practices, UNIDO.

Développement de la responsabilité sociale des entreprises (RSE) en Croatie

La Croatie soutient l'introduction de la responsabilité sociale des entreprises (RSE) dans le but de diffuser les bonnes pratiques et de soutenir l'activité économique en augmentant la capacité de RSE des institutions qui financent l'industrie et en établissant un programme économique pour la RSE. La méthodologie utilisée est celle du triple résultat ou Triple Bottom Line (TBL), qui prend en compte les performances financières, sociales et environnementales. Ce projet de RSE, développé par le Centre de production propre croate, a permis aux entreprises d'introduire des mesures spécifiques dans tous les domaines du triple résultat ; l'impact du projet a été évalué par le biais d'un questionnaire de type social.

Mots-clés : RSE, Triple Bottom Line, Centre de production propre croate, bonnes pratiques, ONUDI.

Desarrollo de la Responsabilidad Social Corporativa (RSC) en Croacia

Croacia está apoyando la introducción de la responsabilidad social corporativa (RSC) con el fin de extender buenas prácticas, apoyar al sector empresarial a través del incremento de la capacidad de RSC de las instituciones de apoyo a la industria, y poner en marcha una agenda empresarial de RSC. La metodología empleada es la de triple base, que implica tener en cuenta factores económicos, sociales y ambientales. Este proyecto de RSC, gestionado por el Centro Croata para una Producción más Limpia, ha otorgado a las empresas el poder de implementar medidas específicas dentro del alcance de la triple base, y su impacto se ha medido a través de un cuestionario de tipo social.

Palabras clave: RSC, triple base, Centro Croata para una Producción más Limpia, buenas prácticas, ONUDI.

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In the process of stabilisation and accession to the EU, the Croatian Government has started to bring its policies and practices in line with EU standards. One policy that is rapidly growing in importance in the EU is Corporate Social Responsibility (CSR), an integral part of EU commitment to sustainable development. This commitment is reflected in the designation of 2005 as the Year of Corporate Social Responsibility within the European Union.

At the same time, Croatian enterprises, especially SMEs, are under pressure to show their clients and potential clients that they are practicing CSR. Requirements for CSR are already clearly affecting the business sector in economies in transition, both through the direct supply chain, as well as through the development of legislation and international standardisation and certification. CSR represents not

Requirements for CSR are already clearly affecting the business sector in economies in transition

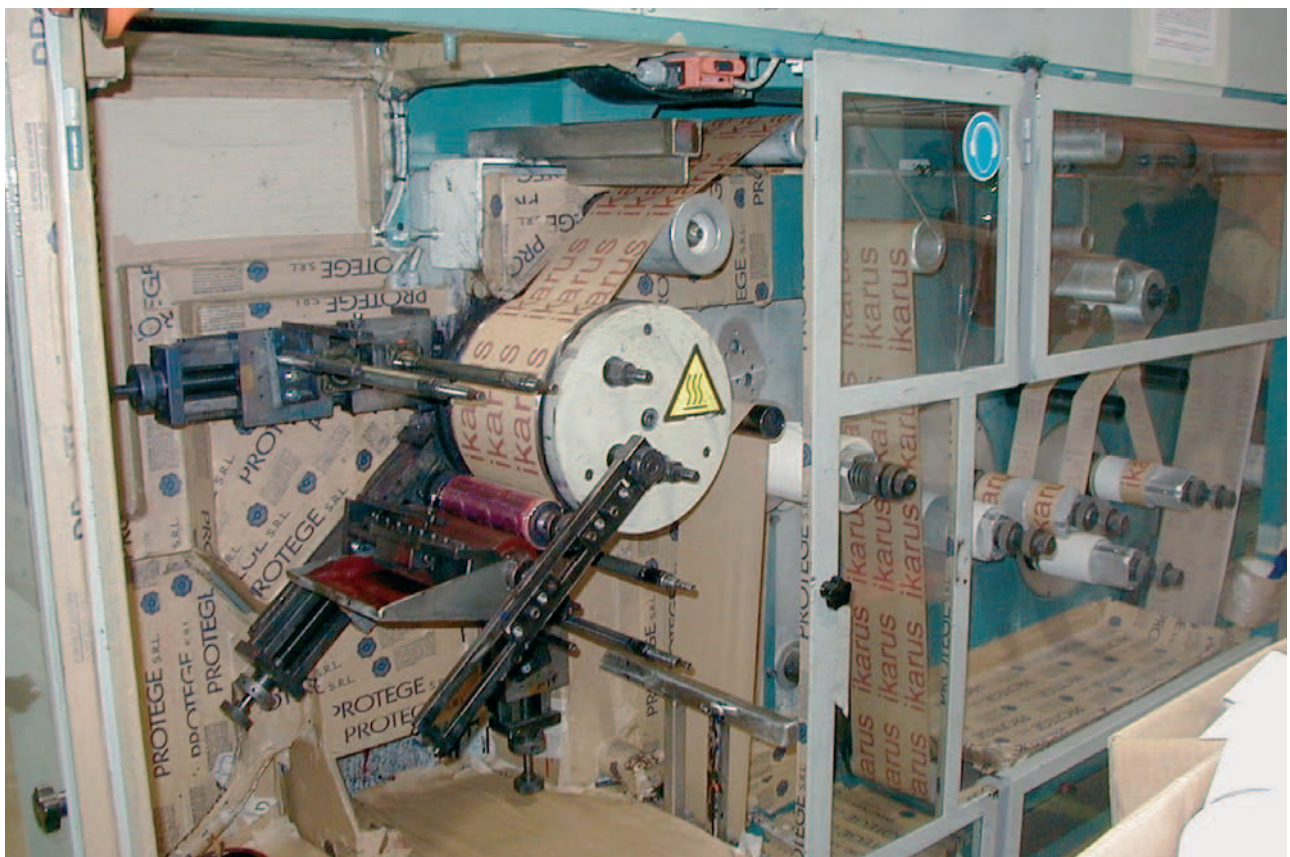
just a change in the commercial environment in which individual companies operate, but also the socio-cultural environment in which they are located.

In order to respond to these twin needs, the CSR project in Croatia will support the introduction of corporate social responsibility, as an important component of business policy, as well as the dissemination of a practical methodology with supporting tools that SMEs in Croatia can use cost effectively.

The project document is signed by the Croatian Government and the United Nations Industrial Development Organization (UNIDO).

Project activities are aimed at the following objectives:

- By disseminating international and national good practices in CSR, and by giving practical demonstrations, it will generate the evidence for



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the Croatian stakeholders in CSR that the concept has a positive impact on SMEs, in areas such as company competitiveness, enhanced social and environmental performance, as well as on society as a whole.

- It will build the necessary CSR-related capacity in Croatia so that industry support institutions (such as the Croatian Centre for Cleaner Production) can assist the business sector, especially export-oriented SMEs, to use a practical methodology and related tools that will enable them to cost-effectively comply with the CSR requirements of global buyers and supply chain. In this way, national capacity will be built to continue with the approach after the formal finalisation of the project.

- By sharing achievements and results with other firms and stakeholders, the project will contribute to establishing a Croatian business agenda for CSR, and engaging stakeholders in policy dialogue in Croatia as well as at regional level.

Four firms are participating in the project:

SIPRO d.d., Umag,
PPM d.o.o., _akovec,
Kerami_ka industrija Orahovica d.d.,
LURA d.d. - Tvornica Sirela. Bjelovar

The methodology for the implementation of CSR improvements at company level is based on the triple bottom line approach (TBL), which allows companies to take into account not only their financial performance but also their social and environmental performance. As business moves into the new millennium, the old methods of reporting are proving to be no longer sufficient. New forms of corporate disclosure, which integrate financial, environmental and social, reporting, are starting to take shape. One of them is the Triple Bottom Line approach, which allows companies to take into account not only their finan-

cial performance but also their social and environmental performance.

The Triple Bottom Line approach, a phrase initially coined by Elkington in 1999, goes beyond the traditional "financial bottom line", to include two additional components of corporate

The triple bottom line paradigm encourages managers to take into account the "social bottom line" as well as the "environmental bottom line"

disclosure and reporting: the "social bottom line" and the "environmental bottom line". While it is well understood that companies have to make profits in their financial bottom line in order to be sustainable, the approach is based on the assumption that the bottom line, defined as the return on investment, should not only take into account financial capital, but also include "social capital" and "natural capital".

The social capital includes the company's relationship with its internal stakeholders (in particular the employees), as well as, in certain cases, its external stakeholders (local communities, business partners, consumers), while the environmental capital refers to the company's impact on its natural environment (waste, harmful emissions, etc.). The triple bottom line paradigm encourages managers to take into account the "social bottom line" as well as the "environmental bottom line" in their decision making.

The practical methodology developed by UNIDO/Ministry of Economy/CRO CPC combines three main approaches:

- **Productivity domain:** in this field, the aim is to support a more efficient and systematic organisation of the

workplace and improve the efficiency of production processes, based on Total Quality Management methods such as the Japanese methodology of the 5 S and 3 M.

- **Social domain:** in the social field, the focus is on working conditions and employees' health and safety, as well as issues related to their involvement in decision making. The approach includes benchmarking with international, European and Croatian labour standards to support companies in the improvement of their social bottom line.

- **Environmental domain:** in the environmental field, the aim is to support companies to introduce cleaner and more rational use of their resources and in reducing waste and emissions at source, based on the experience of the Croatian Cleaner Production Centre.

In the project the three approaches have been combined to contribute jointly to the enhancement of the triple bottom line. Synergies between the three domains have also been considered.

Productivity domain: in this field, the aim is to support a more efficient and systematic organisation of the

workplace and improve the efficiency of production processes, based on Total Quality Management methods such as the Japanese methodology of the 5 S and 3 M. In the productivity field, the total quality management methods of the 5 S and 3M, very often seen as the basic tools of lean production, have been used as the pillars of the productivity component.

Developed in Japan, this method assumes that no effective, high-quality job can be done without a clean and safe environment and without behavioural rules. The 5 S methodology establishes a basis for the visual management of the workplace and for further improvements. It enables the setting up of a participatory process of change aimed at improving the organisation of the workplace and initiating continuous improvement within the production process.

Coaching was provided on the 5 S and 3 M methodology to support companies in the implementation of measures.

Social domain: in the social field, the focus is on working conditions, and employees' health and safety, as well as issues related to their involvement in decision-making. The approach includes benchmarking with international, European and Croatian labour standards to support companies in the improvement of their social bottom line. The methodology included coaching as well as training on the main social issues. In the social domain, emphasis was given to the internal dimension of CSR, related to enhancing employees-management relations, as well as working conditions through the promotion of enhanced labour standards.

The methodology included coaching as well as training on the main social issues, such as working hours, wages and benefits, freedom of association, health and safety, discrimina-



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tion and harassment, forced labour, employee satisfaction and so on.

Work at company level started with a questionnaire directed at employees, aimed at assessing the current situation with regard to each of the areas, and was followed by training and coaching to identify priority areas for the implementation of measures.

Benchmarking was carried out with international, European and Croatian standards and practices to support companies in their work.

Environmental domain: in the environmental field, the aim is to support companies in introducing a cleaner and more rational use of their resources and in reducing waste and emissions at source, based on the experience of the Croatian Cleaner Production Centre. The Cleaner Production methodology aims to support companies in introducing a more rational use of their resources, and in reducing waste and emissions at source.

Several of the participating companies had already worked with the Croatian Centre for Cleaner Production on implementation of the cleaner production methodology within their processes.

The Responsible Entrepreneurship Achievement Programme (REAP) was introduced to the participating companies through training as a tool to document their performance and the measures adopted in the promotion of their triple bottom line initiatives.

In addition to allowing the documentation of the triple bottom line status and improvements, UNIDO REAP software enables companies to inform relevant stakeholders and business partners of their achievements.

The companies initiated a change process aimed at achieving sustainable improvements and implemented several measures within the framework of the project.



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The summary below gives an overview of the project achievements:

The CSR project has raised awareness of the participating companies (both management and employees) on the relevance of triple bottom line improvements to their work and performance.

It has enabled the companies to implement concrete measures in the triple bottom line domains and start measuring their impact.

It has facilitated initiating change processes within the firms, such as the establishment of multi-functional teams or employees' suggestion schemes, which will continue after the completion of the project.

Impact measurement was performed, in particular in the social domain, through the social domain questionnaire.

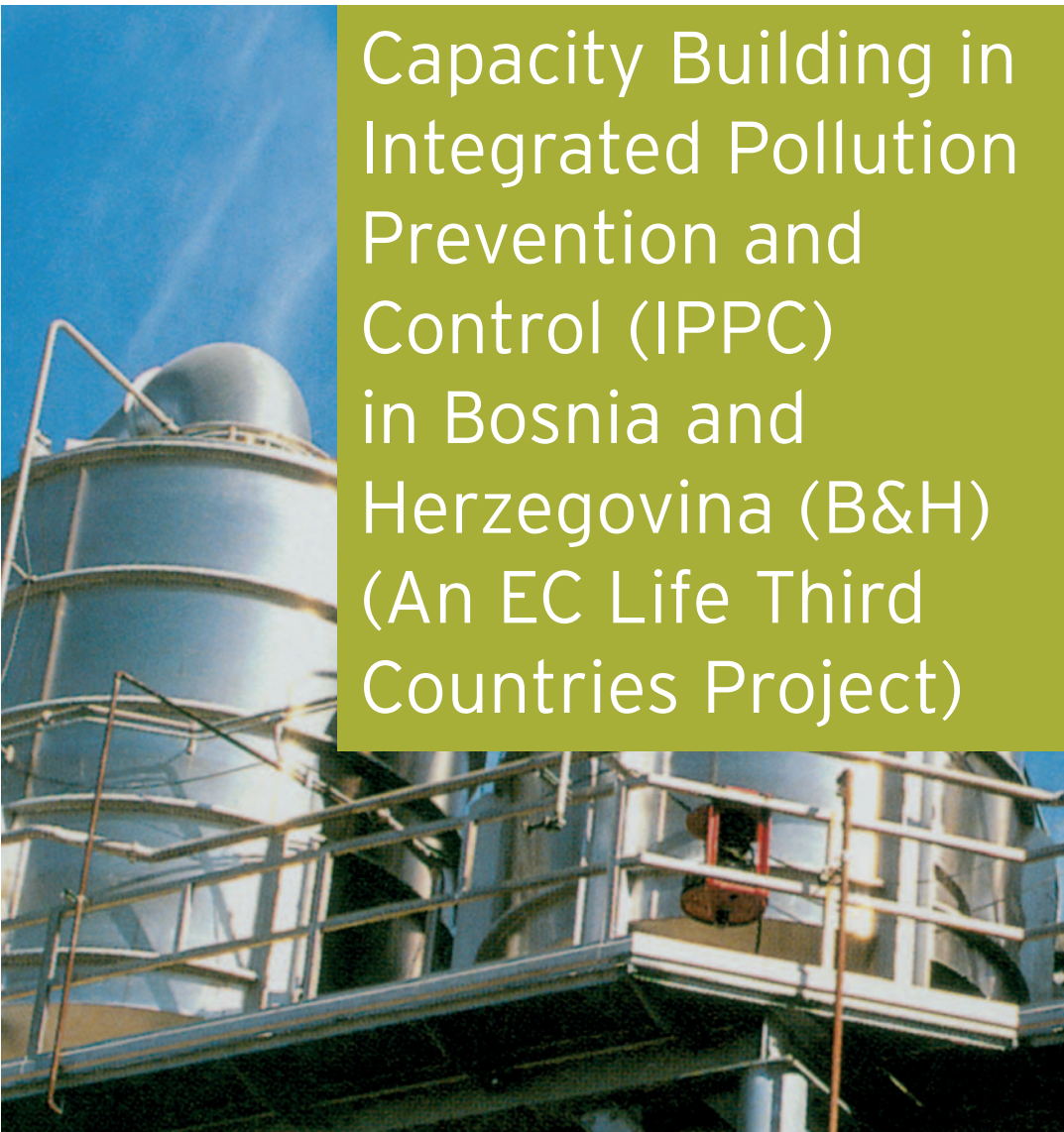
The CSR project has operated through the Croatian Centre for Cleaner Production, which allowed the programme to be brought closer to the companies.

Parallel to the process of working with the companies, the project enabled the training of the Croatian CPC in the productivity and social domains, extending its area of expertise.

The measures implemented were related to both content and process issues. They included:

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PRODUCTIVITY DOMAIN	
Area	Description
Red tag campaign	Introduction of regular red tag campaign on the shop floor
Working groups	Initiating the process of forming the teams within the company
Involvement of employees	Initiating the suggestion process
Productivity indicators	Introduction and regular monitoring of indicators
SOCIAL DOMAIN	
Area	Description
Noise level	Identifying and implementing a solution to reduce excessive noise level in one department
Employee training	Carrying out a training programme on CSR issues for all employees
Suggestion scheme	Establishing a suggestion scheme and worker-management communication mechanism on health and safety or TBL issues
Ergonomics	Realising a detailed analysis of the workplace with manual manipulation of weight
Medical check up	Establishing regular medical check-up, including mammography for women over 40 years old, covered by the company
Working time arrangement	Establishing a schedule allowing smokers to take short breaks, aimed at preventing smoking on the shop floor
Employee satisfaction survey	Regularly implementing employee satisfaction surveys
Health and safety training	Adopting a health and safety training mechanism
Personal Protective Equipment	Acquiring updated personal protective equipment, aimed at enhancing the use of protective equipment on the shop floor
Working time	Establishing of a policy regulating working time
ENVIRONMENTAL DOMAIN	
Measure	Description
Waste reduction	Introduction of separate waste collection (PET, glass, metal, paper, etc.)
Hazardous waste reduction	Replacement of hazardous material
Environmental indicators	Introduction and regular monitoring of indicators
Water usage reduction	Reduction of water consumption on the shop floor
Electricity consumption reduction	Introduction of good housekeeping measures (i.e. turning on of machinery)



Capacity Building in Integrated Pollution Prevention and Control (IPPC) in Bosnia and Herzegovina (B&H) (An EC Life Third Countries Project)

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With recent industrial growth in Bosnia and Herzegovina, a number of environmental laws have been adopted with a comprehensive approach aimed at prevention at source, selection of raw materials and the production of best available techniques. In order to implement permitting, an environmental programme has been put into action to strengthen the capacities of the administrations and develop the polluters' register and best available techniques for improving environmental management. The principal aim is to minimise adverse effects on human health by building the capacities of stakeholders, and to strengthen the capacity of environmental ministries.

Key words: capacity building, IPPC, best available techniques, polluters' register, prevention at source.

Renforcement des capacités dans le cadre de la prévention et de la réduction intégrées de la pollution en Bosnie-et-Herzégovie (IPPC/B-H) (Projet Life-Pays Tiers de la CE)

La récente croissance industrielle de la Bosnie-et-Herzégovie a entraîné l'adoption de lois sur l'environnement impliquant une approche globale de prévention à la source, de sélection des matières premières et de production des meilleures techniques disponibles. Dans le but d'introduire l'autorisation, un programme environnemental a été mis en marche afin de renforcer les capacités des administrations et de développer le registre des pollueurs et les meilleures techniques disponibles d'amélioration de la gestion de l'environnement. L'objectif principal est de minimiser les effets nocifs sur la santé humaine en renforçant les capacités des acteurs concernés et des ministères de l'Environnement.

Mots-clés : renforcement des capacités, IPPC, meilleures techniques disponibles, registre des pollueurs, prévention à la source.

Fomento de capacidades en la prevención y control integrados de la contaminación en Bosnia y Herzegovina (IPPC-B&H) (Proyecto Life-Terceros países de la UE)

Con el reciente crecimiento industrial de Bosnia y Herzegovina, se han adoptado una serie de leyes medioambientales con una perspectiva global orientada a la prevención en origen, la selección de materiales no elaborados y la aplicación de las mejores técnicas disponibles. Para implantar los permisos, se ha puesto en marcha un programa medioambiental para fomentar las capacidades de las administraciones, desarrollar un registro de contaminantes y mejores técnicas disponibles, y mejorar la gestión medioambiental. El principal objetivo es minimizar los efectos negativos sobre la salud humana mediante el fomento de capacidades de las instituciones y de los ministerios de medio ambiente.

Palabras clave: fomento de capacidades, IPPC, mejores técnicas disponibles, registro de contaminantes, prevención en origen.

1. Introduction

In the last few years, B&I Industry has started to grow after a period of stagnation in the post-war years, contributing to the economic revival of the country. However, the structure and dynamics of this economic development are hardly based on the principles of sustainable development, which is borne out by examples of the inefficient exploitation of natural resources, which has had a significant impact on the environment.

With the aim of harmonising economic development and environmental protection, in 2002 and 2003 entity ministries responsible for the environment in B&H (Federation of Bosnia and Herzegovina (FB&H) and Republic of Sprska (RS)) have adopted a set of environmental laws, including the Law on Environmental Protection (LEP). The LEP is based on and contains provisions from the most important European Directives, (including the EIA Directive, the Seveso II Directive and the IPPC Directive) and introduces new procedures such as EIA, SEA, and

of setting emission limits through bylaws, it introduces a comprehensive approach based on pollution prevention or minimisation through: (a) prevention at source, which is priority, (b) selection of adequate raw materials, and (b) application of good house-keeping practices, with reference to best available techniques (BAT).

In order to be able to enforce the LEP, entity ministries are required to develop a number of bylaws and tools for the successful implementation and monitoring of legal provision on integrated pollution prevention and control. The basic requirements include the development of a Polluters' Register (Article 28) and the development of reference documents on best available techniques (Articles 6, 71 and 86) for most industrial sectors. The industrial BATs will have to be developed in stages, the most important being those for industries considered to be priority in industrial development. Taking into account current economic development and economic potential in the country, the food and beverage sector is currently considered to be the top priority for BAT development by the ministries responsible for environment.

This new comprehensive approach to regulating the operation of an industrial installation cannot be applied without extensive capacity building for ministry staff, which for the first time is facing the complexity of integrated environmental permitting. It is not believed that either entity in B&H is in a position to carry out this institutional change in such a limited time scale, taking into consideration the limited human and financial resources.

To address this urgent need, the Hydro-Engineering Institute, in cooperation with the Greek company Exergia S.A., has proposed a project for financing the EC LIFE Third Countries environmental programme entitled Capacity Building for Implemen-

This new comprehensive approach to regulating the operation of an industrial installation cannot be applied without extensive capacity building for ministry staff

integrated environmental permitting (IEP). By introducing environmental permitting, for the first time the regulator is obliged to consider all the environmental effects of a facility in an integrated way, including emissions into the air, water and soil, generated solid waste, raw materials and their use, energy efficiency, noise, risk prevention, risk management, etc. Instead

tation of Integrated Pollution Prevention and Control in B&H (IPPC-B&H). The project was approved, and got under way in March 2006. It consists of a set of specific activities aimed at strengthening the capacities of the environmental administrative structures needed for the efficient implementation of environmental regulation on integrated pollution prevention and control. Additionally the project will develop tools for IEP implementation (polluters' register and BATs) and train environmental authorities on their use with the ultimate aim of assisting the ministries in improving environmental management.

2. Project components

The overall objective of the IPPC-B&H project is to minimise adverse impacts on human health and the environment as a result of industrial activity in Bosnia and Herzegovina. More specifically, the project aims to strengthen the implementation of integrated environmental permitting (the Bosnian analogue to IPPC) by building the capacities of all relevant stakeholders for the development of BATs that are custom-made for the industrial sectors in B&H, and by familiarising both the administration and industry with the permitting process within the new IEP framework. Further project objectives are to raise the awareness of industry on its new obligations stemming from IEP and the use of BATs, and to strengthen the capacity of the Ministries of Environment in both entities in B&H to implement relevant requirements of LEP, such as monitoring of environmental performance.

The project comprises a series of complementary tasks designed to contribute fully to the achievement of the project objectives, namely:

- Comparison of environmental permitting practices in B&H and the EU, aiming at assessing the differences in

concept and implementation between environmental permitting in B&H and the IPPC framework of the EU.

- Support for the establishment of the Polluters' Register (PR), comprising the development and population of the PR, and its transfer to the Ministries of Environment, following legislative requirements (Article 28 of the LEP).

- Assessment of the environmental and technological level of the food and beverage (F&B) sector, comprising a series of audits for the mapping of the production and environmental technology of the F&B sector and its sub-sectors.

Project aims to strengthen the implementation of integrated environmental permitting by building capacities of all relevant stakeholders

- Strengthening the knowledge of national key stakeholders on IEP and BAT use, involving the organisation and delivery of training activities in selected regions.

- Development of BATs (Article 71 of the LEP) for the F&B sector, including the launching and support of a participatory process for the development of BATs for the F&B sector and its sub-sectors, based on EU BATs but adapted to the existing conditions in B&H.

- Demonstration of BAT use within the IEP process: case studies on integrated environmental permit issuing, comprising on-the-job training for industry and the administration in the new IEP framework.

- Dissemination, comprising a series of communication actions that form part of an integrated dissemination campaign addressing individual target audiences.

3. Activities carried out so far

In the period up to the present (March-December 2006) the project team has been working on the implementation of three tasks:

- **Task on the comparison of environmental permitting practices in B&H and EU**, where the project team has identified and evaluated the existing state of environmental permitting in B&H, revised progress of implementation of IPPC and BAT development in EU. Comparative analysis of environmental permitting in EU and B&H has also been carried out, and within this task, three reports have been developed:

- Report on the current status of integrated environmental permitting in B&H
- Report on the EU status of IPPC implementation
- Comparative analysis of EU and B&H practices with respect to IEP

Comparative analyses have shown that LEP in both entities in its provisions refers to the "Principle of Integration"; however practice has shown that the permit itself does not fully integrate all environmental aspects and does not fully transfer the concept of IPPC. The key problems related to implementation are:

- Complexity of LEP and existing rulebooks which combine EIA, IPPC and Seveso Directive requirements in one procedure, giving rise to a complicated procedure.
- Unavailability of BREF documents, and non-existent or outdated emission limits values result in most of the permits issued being focused on pollution prevention; however, they do not contain emission limits.
- Lack of knowledge of all stakeholders on Best Available Techniques, including those that are applying for environmental permits and those that are issuing them.
- Insufficiently treated aspect of water consumption which is in the

hands of the ministry responsible for water.

- Insufficient capacity of MoE (staff and knowledge) to deal with all new and existing requests for environmental permits.

The report gives recommendations for approximation to IPPC best practice.

- **Task on support for the establishment of the Polluters' Register (PR)** which focuses on the development of PR software, setting mechanisms for its maintenance, transfer to the ministries and training of ministry staff on its use. PR is based on the E-PRTR model and is aimed at creating a comprehensive database that will correspond to European and national requirements from LEP on keeping information on polluters, their activities and emissions. IT experts on the project have developed the B&H - PRTR entity relationship model and created a software database that is ready for use. This task is being carried out in close coordination with the EC CARDS project Support to Environmental Inspection in B&H, which will develop a legal basis for the collection of relevant data in the form of a bylaw on PR. Upon adoption of the bylaw, which is in its final development phase, IPPC-B&H experts will create questionnaires to be sent to industries in B&H to collect information on their activities and pollution which will be used to populate B&H -PRTR.

- **Task on the assessment of environmental and technological level of the food and beverage (F&B) sector**, aimed at mapping the production and environmental technology in order to allow (in subsequent project stages) the development of BATs appropriate for the sector, namely those leading to environmental improvement at affordable costs. It is expected that our environmental audit will be carried out in 30 enterprises from 5 sub-sectors, including brewery,



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dairy, meat and fish processing, vegetable processing and slaughterhouses. In the period up to the present, the project team has been working on motivating industries to participate in environmental auditing by carrying out seminars on IEP in both entities. During the seminars IPPC-B&H experts explained the legal obligation of these industries to obtain environmental permits by 2008, application procedure and preparation of Compliance plans, focusing on the benefits for them of environmental audits in preparation of the permit application. As a result of these activities 14 cooperation agreements have been signed, including 2 fish processing industries, 3 slaughterhouses and 2 meat processing industries, 3 fruit and vegetable processing industries, 2 dairies and 1 brewery. The auditing activities will start in December 2006 and will continue until April 2007, when the team will have concrete information on the environmental situation in the B&H F&B industry and input data for development on B&H BATs.

• **Task on information dissemination** carried out with the aim of making the project results and findings available to a wide range of stakeholders and interested parties, and to increase the awareness of stakeholders and involve them in project activities. Until now, the project team has made several *project presentations* to the entity ministry authorities and industrial representations of the two entities (B&H and RS), the *project web site* has been set up on the HEIS web site (<http://www.heis.com.ba>), and several *articles have been published in the local press, along with TV and radio appearances* of team members. Moreover, the *Voice of Sustainability Newsletter* launched within the LIFE Third countries project Capacity Building in Cleaner Production in B&H has been renewed and 10 issues will be published throughout the project. - to



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date only two issues of *Voice of Sustainability* in the local languages have been published. The aim of the magazine is to supply the latest news from EU on IPPC and BAT implementation, information on IEP implementation in the country and information on the project's progress. All information on the project can be found on the project web site.

4. Expected results

The major outcome of the project is the implementation of IEP in B&H, which is considered instrumental in combating environmental pollution from industry. A number of complementary but equally important results are also expected, such as the familiarisation of key stakeholders with the BAT development process, the setup of the Polluters' Register, the familiarisation of both industry and the administration with the environmental permitting procedures, the increased capacity of the administration and stakeholders as a result of formal and on-the-job training, the increased awareness of industry in relation to IEP and environmental issues, and the experience gained from the application of an extensive participatory process in environmental decision-making. ■

Second Pollution Abatement Project (SPAP) 2006-2012



Ms. Maysoun Nabil

Head of Technical Support Unit, Egyptian Pollution Abatement Project

Egyptian Environmental Affairs Agency (EEAA)

The aim of this project is to assist Egyptian industry in improving its environmental performance and comply with regulations, reducing industrial pollution in specific areas of Greater Cairo and Alexandria by promoting industrial investment projects in pollution prevention, adoption of cleaner technology, energy efficiency and waste management. Industry is given technological support for the enforcement of environmental regulations, public awareness campaigns and to reduce the load of land-based sources of industrial and domestic pollution to the Mediterranean Sea.

Key words: SPAP, waste management, cleaner technology, technical support.

Deuxième projet de réduction de la pollution (SPAP) 2006-2012

L'objectif de ce projet est d'aider l'industrie égyptienne à améliorer ses performances environnementales et à respecter la réglementation. Pour ce faire, elle va devoir réduire la pollution industrielle dans certaines zones des agglomérations du Caire et d'Alexandrie en promouvant des projets d'investissement industriels de prévention de la pollution, l'adoption de technologies plus propres, l'efficacité énergétique ainsi que la gestion des déchets. L'industrie est assistée sur le plan technologique dans le cadre de l'application de la réglementation sur l'environnement et des campagnes de sensibilisation du public ; l'objectif est de réduire la charge de la pollution industrielle et domestique de source terrestre sur la mer Méditerranée.

Mots-clés : SPAP, gestion des déchets, technologies plus propres, assistance technique.

Segundo proyecto de lucha contra la contaminación (SPAP) 2006-2012

El objetivo de este proyecto es ayudar a la industria egipcia a mejorar su actuación ambiental y cumplir con las regulaciones, reduciendo la contaminación industrial en áreas específicas de El Cairo y su área metropolitana y Alejandría a través de la promoción de proyectos de desarrollo industrial en prevención de la contaminación, adopción de tecnologías más limpias, eficiencia energética y gestión de residuos. A la industria se le ofrece asistencia tecnológica para el cumplimiento de las regulaciones ambientales, campañas de concienciación de la población y reducción de la cantidad de fuentes terrestres de contaminación industrial y doméstica en el mar Mediterráneo.

Palabras clave: SPAP, gestión de residuos, tecnologías más limpias, asistencia técnica.

new policies and legislation

Background:

The Second Pollution Abatement Project (SPAP) is one of the main projects managed by the Egyptian Environmental Affairs Agency (EEAA). Its main goals are to help Egyptian industry to comply with the environmental regulation, as well as improving its overall environmental performance.

SPAP is a project financed jointly by the World Bank (WB), the European Investment Bank (EIB), the Japanese Bank for International Cooperation (JBIC) and the French Development Agency. In addition, grants from the European Commission (EC), the Facility for Euro-Mediterranean Investment and Partnership (FEMIP), the Government of Finland, and the Government of Egypt have been provided.

Its main goals are to help Egyptian industry to comply with the environmental regulation

SPAP's Objective:

- To provide a soft financing package to support industrial pollution abatement projects in industrial establishments from both the public and private sectors.
- To develop sustainable financial, technical and institutional mechanisms for pollution abatement to decrease the pollution loads in selected hot-spots areas in the Greater Cairo and Alexandria Governorates in order to improve local environmental conditions.
- To introduce suitable environmental management approaches, improve the quality of inspection activities, develop the technical capacity of environmental institutions and participating banks, and improve public information, awareness and activity relating to industrial environmental



Egyptian Environmental Affairs Agency (EEAA)



affairs in Egypt, particularly in the Alexandria and Greater Cairo Govern-
orates.

Soft Loans

- The Co-financers:

The National Bank of Egypt (NBE) is the Apex bank through which resources provided by the Co-financers will be made available for financing environmental projects in industrial establishments. The company should provide at least 10% of the total investment to cover civil works, customs & taxes.

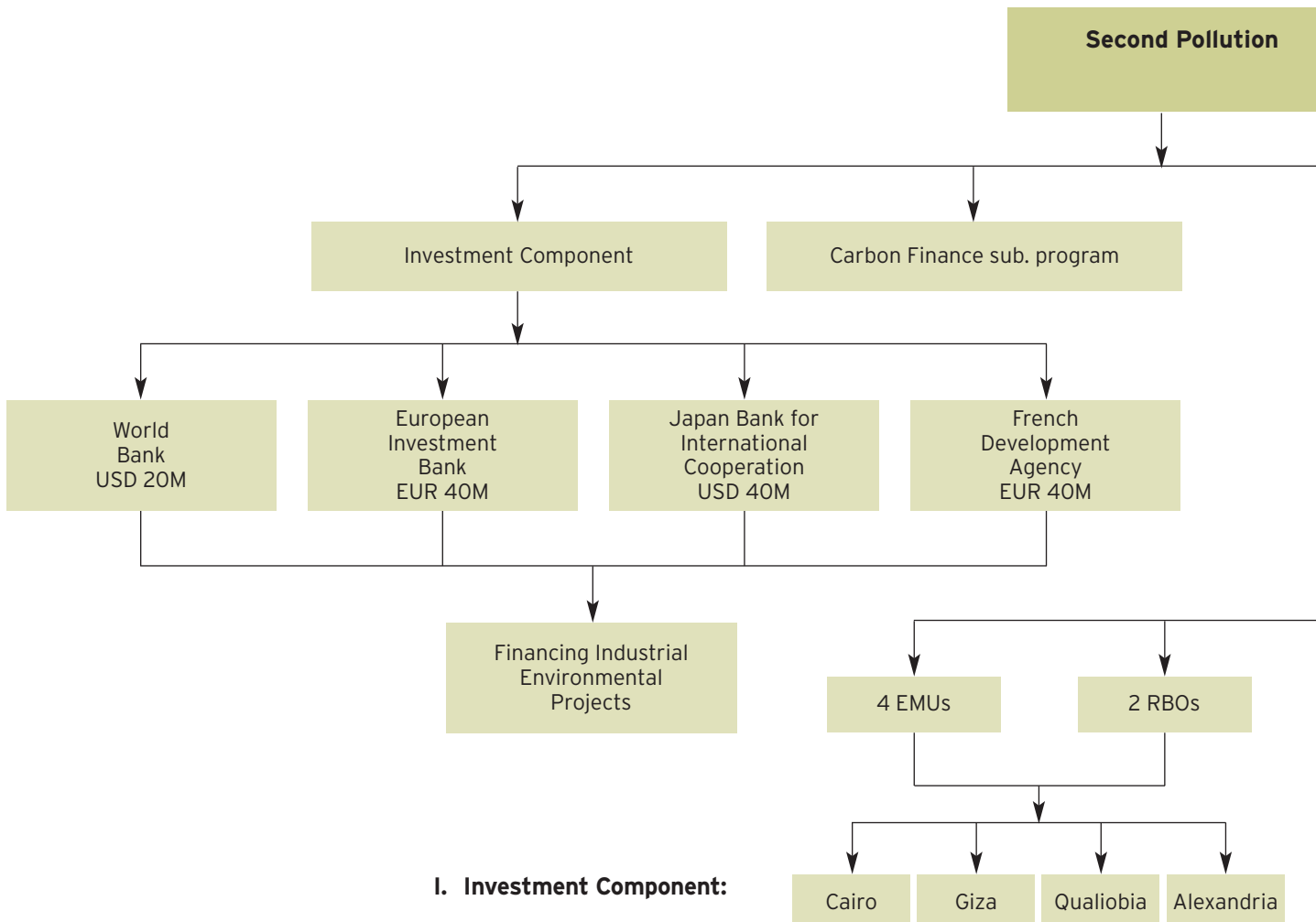
The Co-financers' package consists of a grant of 20% of the total investments cost and an 80% loan on com-

mercial terms with a 1-2 year grace period and a total repayment period of up to 8 years.

SPAP Eligible Projects:

Industrial investment projects in Egypt in all industrial sectors for:

1. Pollution prevention projects: air emissions reduction, work environment improvement and wastewater treatment and management.
2. In process modification, in plant modification and end-of-pipe treatment.
3. Adoption of cleaner technology.
4. Projects for improving the efficiency of utilising energy and other



resources in addition to switching to cleaner fuels.

5. Hazardous Waste management projects.
6. Environmental services projects.

Participating Commercial Banks

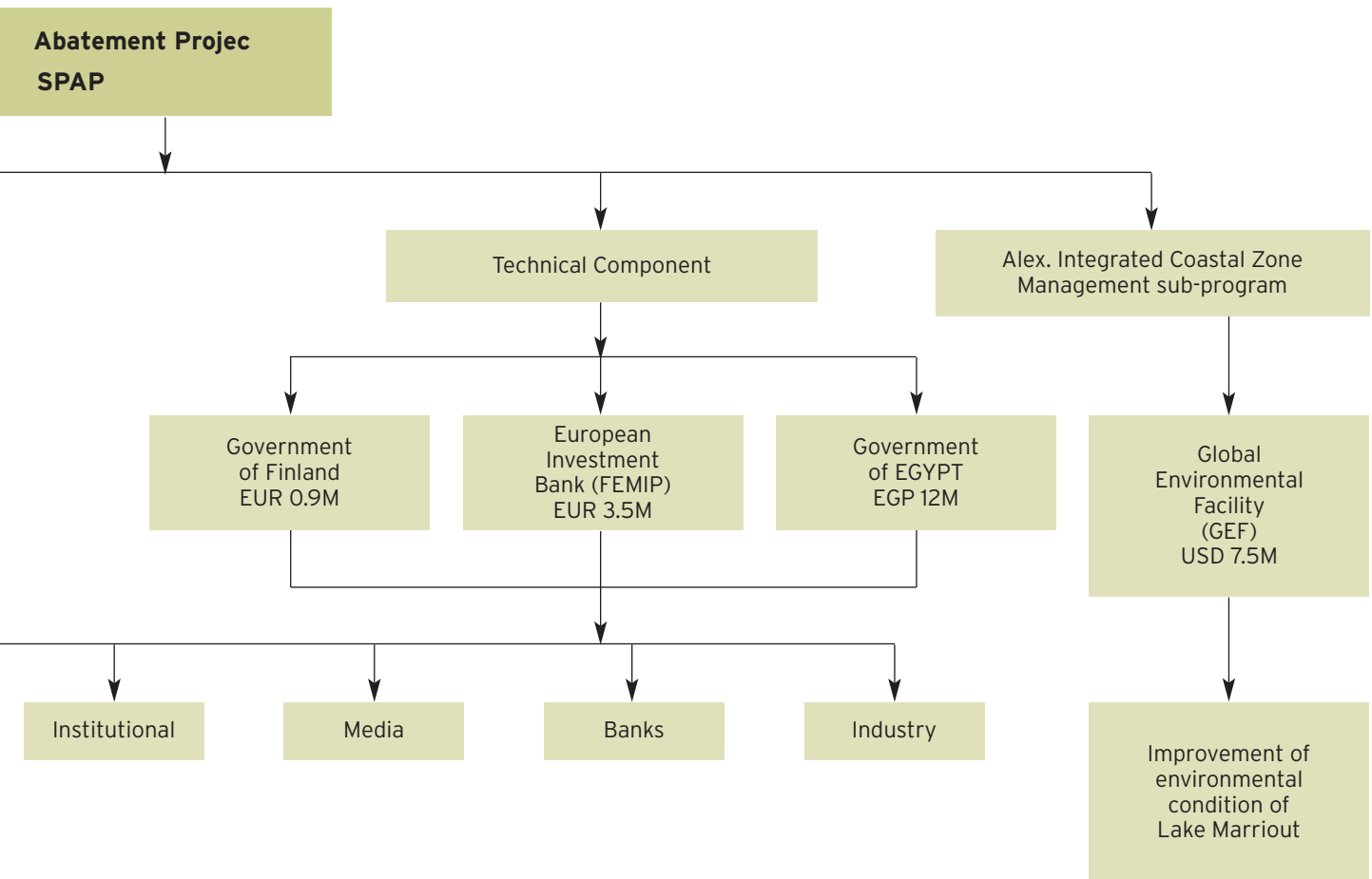
- National Bank of Egypt (NBE) - as an Apex Bank.
- Other participating banks that will be identified in coordination with NBE.
- The Finnish Government, EUR 0.9M.
- European Investment Bank (FEMIP), EUR 3.5M.

II. Technical Assistance Component: Co-Financers:

- The Egyptian Government, EGP 12M and NBE USD 1M.

The Technical and Institutional Support Component (TISC) provides industry with technical support for upgrading environmental performance

The Technical and Institutional Support Component (TISC) provides industry with technical support for upgrading environmental performance, institutional support to improve the enforcement of the environmental





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regulations and support of awareness efforts of media and NGOs.

The Carbon Finance Sub-Program:

This sub-program will assist the Government of Egypt in its efforts to set up a sustainable pollution abatement programme by using portions of the revenues from the sales to the World Bank and other buyers of emission reductions (ERs) generated under the Kyoto Protocol's Clean Development Mechanism (CDM).

Alexandria Integrated Coastal Zone Management Sub-Program:

The main objectives of this sub-program is to supply a strategic framework and immediate small-scale investments to reduce the load of land-based sources of industrial and domestic pollution discharged into the Mediterranean Sea; and protect coastal heritage and ecosystem processes by supporting the Recipient's efforts to develop and implement a National Coastal Zone Management Plan. ■

The main objectives of this sub-program is to supply a strategic framework and immediate small-scale investments



Egyptian Environmental Affairs Agency (EEAA)

What District Heating and Cooling Offers



Mr. Birger Lauersen
Manager Opportunities International Cooperation and Communication
Dansk Fjernvarme

District heating and cooling is a system in which water is heated in a central unit and piped to end-users. In Europe, it is used predominantly in northern countries, but with the need for higher efficiency, its benefits are also being seen elsewhere. Combined heat and power (CHP) can reach efficiency levels of efficiency of 90%, and its main source is waste energy, and practically any fuel or waste can be used in district heating; heat losses in the energy transformation sector can cover the total heat requirements. Using low-efficiency cooling equipment will put a strain on electricity capacity and demand, which could be alleviated by district heating and cooling. Additional legislation will be required in this respect, along with more research to create a political and commercial environment for its implementation.

Key words: district heating, district cooling, cogeneration, waste energy, combined heat and power.

Bénéfices du chauffage et du refroidissement urbains

Le système de chauffage et de refroidissement urbains consiste à chauffer l'eau dans une unité centrale et à l'acheminer jusqu'aux utilisateurs finaux. En Europe, ce système est principalement utilisé dans les pays du Nord. Cependant, une plus grande efficacité étant nécessaire, ses bénéfices se font sentir dans d'autres pays. La production combinée de chaleur et d'électricité peut atteindre une efficacité de 90 % et sa source principale est l'énergie des déchets. Presque tous les combustibles et déchets peuvent être utilisés pour le chauffage urbain. L'utilisation d'un équipement de refroidissement peu efficace exerce une forte pression sur la capacité en énergie électrique et la demande électrique, qui pourrait être allégée par le chauffage et le refroidissement urbains. Une nouvelle législation en la matière ainsi qu'un environnement politique et commercial propice est nécessaire pour l'introduction de ce système.

Mots-clés : chauffage, refroidissement, cogénération, énergie des déchets, production combinée de chaleur et d'électricité.

Qué ofrecen los sistemas urbanos de calefacción y aire acondicionado

La calefacción y el aire acondicionado urbanos son sistemas en los cuales el agua se calienta en una unidad central y se hace llegar a los usuarios. Este sistema se utiliza especialmente en los países del norte de Europa, pero, con la necesidad de mayor eficacia, sus beneficios serían aplicables al resto de países. La producción combinada de calor y electricidad (PCCE) puede alcanzar una eficacia del 90%; su principal fuente es la energía de desecho, y prácticamente cualquier combustible o desecho puede ser utilizado en la calefacción urbana. El uso de equipos de aire acondicionado de bajo rendimiento supondrá un impedimento a la capacidad y demanda de electricidad, que podría ser paliado por los sistemas urbanos de calefacción y aire acondicionado. A este respecto, será necesaria legislación adicional, unida a más investigaciones para crear el ambiente político y comercial necesario para su implementación.

Palabras clave: calefacción, aire acondicionado, cogeneración, energía de desecho, PCCE.

In recent years we have seen a renewed focus on energy and the environment. The signs are clear: energy is not only projected to be both scarcer and more expensive in the future, but its use will also have to be less environmentally damaging. One way of mitigating both concerns is to focus on energy efficiency and the use of renewable energy.

What is district heating and cooling?

For readers in the Mediterranean area a brief explanation of the concept of district heating and cooling may be necessary. District heating can be described as a system in which water is heated in one or several larger units and is then delivered via underground pipes to the residential/commercial/industrial customer's premises, where the heat is extracted for heating purposes or hot tap water preparation. The water is then returned through parallel return pipes. District heating

systems make it possible to optimally use and combine a large spectrum of energy inputs.

District heating systems can cover entire cities with thousands of connected buildings – just like the electricity system. Currently, approximately 10 % of heat consumption (or 6% of net heat and electricity end use) in the target area (32 European countries) is covered with district heating from more than 5,000 district heating systems.

District cooling is similar, but with distribution of cold water rather than



hot water. The source of the cold water can be natural sources, such as cold water from the bottom of deep lakes, or there may be a plant producing cold water from waste heat (absorption chiller). Or building owners can possess their own absorption chillers, so that they can produce cooling for their building and hot water for consumption from the same supply of hot district heating water.

Cogeneration

Cogeneration is the simultaneous production of electricity and heat for industrial purposes or for heating. This is called combined heat and power or CHP. CHP can reach total overall efficiency of 90 % if all the heat associated with electricity production is recovered and used. This is quite a gain compared with state-of-the-art electricity-only production, where best results are between 45 and 55%. And it is even more impressive if we compare it with the average of existing electricity-only plants, which have efficiencies in the area of 35-40%. CHP (with a 68% share) is the main source of heat for district heating systems throughout Europe

The main source is waste energy

The share of district heat originating from CHP reaches around 64 to 94% in the 'old' EU 15 and between 35% (Baltic States) to 72% (Hungary) in new Member States of the Union. Other main sources of heat are industrial waste heat (from cement factories, refineries and other energy intensive industries), heat from incineration of municipal waste and from boilers using solid biomass such as wood or straw. Minor, but interesting, sources include heat from raw sewage water (extracted with heat pumps), geothermal energy or surplus electricity from unpredictable

sources, such as wind or hydro power.

The main point is that practically any fuel or any waste heat that others cannot or will not use, can be used in district heating. And it also means that the use of fuels for heating purposes takes place under controlled circumstances with emission control, flue gas cleaning and the

The main point is that practically any fuel or any waste heat that others cannot or will not use, can be used in district heating

secure handling of what little remains after incineration, which is something that does not often happen with individual use of fuels for heating purposes.

Only for Northerners?

District heating is today used mostly in Northern and Eastern Europe. Governments and/or utilities in these countries saw the benefit arising from higher efficiency in the use of primary fuels and energies, and there was an easily recognisable need for the heating of buildings. But the need for higher efficiency in the use of primary fuels is growing all over the world as a result of scarcer resources, environmental concerns and insecurity of supply; so are the requirements for a comfortable indoor climate regardless of outdoor conditions. Countries without a tradition of heating buildings are seeing this developing, just as the need for

building cooling is growing in Northern countries where it was traditionally believed that this service was not needed.

The need for higher efficiency in the use of primary fuels is growing all over the world

ECOHEATCOOL

Two years ago the European association for district heating, cooling and CHP, Euroheat & Power initiated a study to look at the European heating sector. The study received financial support from the EU - Intelligent Energy for Europe programme, and covered not only all the existing EU countries, but also four accession countries (Bulgaria, Romania, Turkey, and Croatia) and three EFTA countries (Iceland, Norway and Switzerland).

The study focuses on both the heating and the cooling sectors of Europe by creating an estimate of the total need for energy to heat/cool. It also identifies possible sources of surplus or renewable energy that can be used for these purposes.

Heat losses can cover need for heat

The total end use of net heat and electricity in Europe was 32.1 EJ in the target area during 2003. The final transportation demand can be estimated to be only 2.6 EJ. The total primary energy supply was 81.1 EJ, while the final energy consumption was 57.3 EJ. This gives total heat losses in the energy transformation sector (mainly electricity production) of 23.8 EJ, while the heat losses in the consuming sectors was 22.6 EJ, mainly in the transportation sector.

These figures lead to the amazing conclusion that the final net heat demands of Europe is 21.7 EJ, and which is equivalent to the total heat losses in the energy transformation sector. In other words, the huge amount of heat lost when producing electricity, refining oil or doing similar transformations, can actually cover the total need for heat!

And there is even more!

The five major strategic heat source options for district heating are normally identified as combined heat and power (CHP), waste incineration, industrial surplus heat and combustible renewables such as biomass. Another, potentially even greater, resource is geothermal heat, which today plays a major role in Iceland, for obvious reasons, but also somewhat in Austria and France. But there is a huge potential in many European countries, and sources are conveniently close to a number of major cities.

The total available potential from these resources are about 200 times higher than the current district heat deliveries, and about 20 times higher than the current total net heat demand for the industrial, residential, and service sectors in the target area. Hence, there appear to be no limitations with respect to the strategic fuel and heat sources available for more district heating in Europe.

Also for cooling

The major conclusions of the study with regard to district cooling are, that the potential cooling demand and the pace of expansion for the European cooling market are greater than previously believed. It is also shown, that forecasted demand for cooling, using conventional, low-efficiency cooling equipment, will put a great deal of pressure on electricity capacity and

cleaner technologies for the future

demand. This will hinder the European commitments regarding CO₂ savings, will increase the electricity prices and drive the need for capacity investments (especially for peak loads) both in production and transmission.

The study provides further evidence that a fast and wide implementation of energy efficient District Cooling could play a major role in providing a robust and environmentally sound future energy solution for Europe.

The benefits

The ECOHEATCOOL study estimates the overall benefits from an assumed greater market penetration of district heating and cooling.

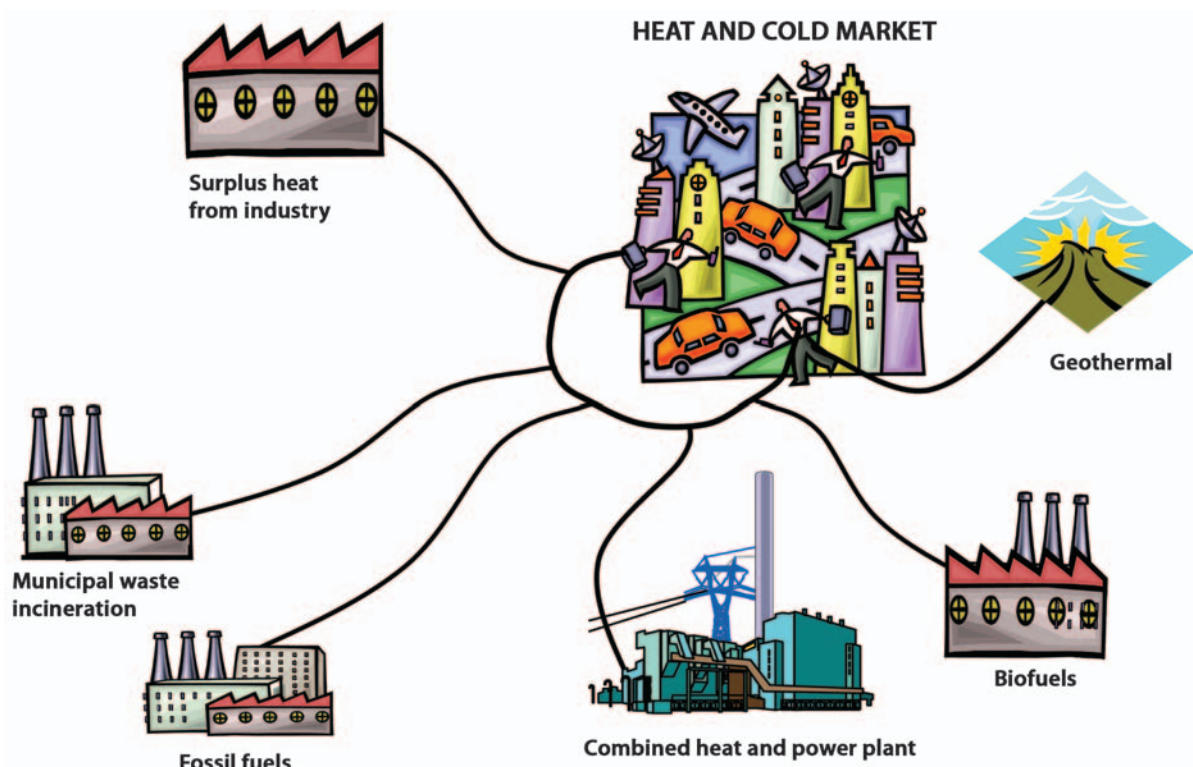
The social-economic feasibility of expanding the district heating market share is estimated by calculating the payback period for the costs of a known investment assuming a certain oil-price and a certain use of recovered waste heat. It shows that with today's oil prices and a not unrealistic share of

waste heat, a district heating scheme could have a payback period of around 5 years.

Existing district heating systems in the target area can and should also be improved. The share of CHP can be increased; renewables, industrial waste incineration, geothermal, solar and other natural sources of heat can be increased, and conversion efficiencies can be improved.

Such improvements combined with a doubling of heat sales from district heating can bring quite spectacular benefits to the countries in the target area:

- **Higher energy efficiency**, since primary energy supply for local heat demands are mainly replaced with recycling of heat losses from the energy system. The current benefit is 0.9 EJ/year, reducing the overall primary energy supply from 82.0 to 81.1 EJ/year. If the current district heating systems are improved and heat sales are doubled, this benefit will increase



District heating and cooling is an important tool for optimising energy use

to 3.0 EJ/year. The possible reduction of 2.14 EJ/year is equivalent to the whole annual energy balance of Sweden.

- **Higher security of supply**, since imports of fossil fuels are reduced and use of domestic renewable resources are increased when district heating systems are improved and district heat sales are doubled. This combined effect will reduce the current import dependency with 4.45 EJ, or 5.5% of all primary energy supply. This is more than the whole energy balance of Poland.

- **Lower carbon dioxide emissions**, since fossil primary energy supply is reduced from improved and doubling district heat sales. Currently, the avoided carbon dioxide emissions from district heating in the target area can be estimated at 113 million tons annually. These avoided emissions can increase to 516 millions tons if the district heating systems are improved and district heat sales doubled. The reduction will be 404 million tons annually, corresponding to 9.3 % of all carbon dioxide emissions from fuel combustion in the target area (4330 million tons). This reduction is also slightly more than all annual carbon dioxide emissions from fuel combustion in France.

(Quote: ECOHEATCOOL, Euroheat & Power 2006.)

Cooling contributes

Assuming a market share of 25% of the cooling market (in the case of a demand of 660 TWh corresponding to a saturation rate of 49%), the benefits of a greater use of district cooling are estimated to be a reduction of 50-60 TWh of electricity. CO₂ emissions are also reduced to around 40 million

tons annually, which corresponds to 10-18% of the total reduction commitment of the EU. The study also shows, that the investment required in district cooling systems to achieve a market shares of 25% of the cooling needs, are offset to the extent of 40-50% by reduced investment needs for electricity infrastructure.

What could make this happen?

The study also puts forward a set of recommendations on how Europe could gain the benefits identified in the study.

Heating and cooling markets generally need more attention and should be systematically addressed by European and national legislation, and heating and cooling policies should be given priority in urban areas. Policies also need to address the location of production facilities and infrastructure planning, in order to optimise the use of locally available sources. EU and national governments need to ensure better monitoring of local heating and cooling markets to enable proper analysis and policymaking. District heating and cooling is an important tool for optimising energy use, and expansion and establishment of new systems should be given priority in markets that are not yet mature, and research programmes should target actions to cut costs for DHC equipment.

The overall conclusion is that district heating and cooling is a very potent technology when dealing with the future challenges of the European energy supply and its environmental effects. The technology exists and is not overly complicated. The main challenge lies in creating a political and commercial environment that leads to its implementation.

Interested readers can find the whole ECOHEATCOOL study at: www.ecoheatcool.org.

Further information on Euroheat & Power at www.euroheat.org. ■

Infrastructures et directive-cadre sur l'eau : modernisation des terrains irrigués en Espagne



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Les terrains irrigués consomment 70 % de l'eau en Espagne. Absence de planification à moyen terme, systèmes obsolètes, puits illégaux et appauvrissement de la diversité sont quelques-uns des problèmes qui empêchent l'optimisation de l'utilisation d'eau sur les terrains irrigués, et éviter ainsi les pertes. Même si les différentes administrations ont mis en place diverses mesures en vue d'augmenter la productivité et d'économiser jusqu'à 30 % d'eau, il n'en reste pas moins que bon nombre de ces plans n'atteignent pas leur objectif ; en effet, l'augmentation de la surface irriguée ou l'utilisation de cultures à plus forte demande hydrique ne modifie paradoxalement pas la consommation d'eau. L'organisation WWF/Adena mise sur la redéfinition de ces mesures de modernisation via l'utilisation appropriée des technologies, la modernisation à l'intérieur et à l'extérieur de la parcelle, la formation des agriculteurs ainsi qu'une analyse préalable détaillée.

Mots-clés : directive-cadre sur l'eau, terrain irrigué, modernisation, gestion de l'eau, WWF/Adena.

Water framework directive and infrastructures: the modernisation of irrigation in Spain

Irrigation accounts for around 70% of water consumption in Spain. The lack of medium-term planning, obsolete systems, illegal wells, and damage to biodiversity are some of the problems that are hindering the optimisation of the use of water in irrigation and waste prevention. The different administrations have implemented various measures to increase productivity and to save up to 30% of the water used, but many of these plans do not fulfil their fundamental objective, since, as the amount of irrigated land has increased or changes to crops with greater water needs have taken place, water consumption has paradoxically remained constant. WWF/Adena is committed to redefining these modernisation measures through the use of suitable technology, modernisation on and off the irrigated land, user training and a detailed prior analysis.

Key words: Water Framework Directive, irrigation, modernisation, water management, WWF/Adena.

Infraestructuras y directiva marco del agua: la modernización de regadíos en España

Los regadíos suponen el 70% del consumo de agua en España. Falta de planificación a medio plazo, sistemas obsoletos, pozos ilegales y perjuicios a la diversidad son algunos de los problemas que impiden optimizar el uso del agua en los regadíos y evitar su desperdicio. Las diversas administraciones han puesto en marcha varias medidas para aumentar la productividad y ahorrar hasta un 30% de agua, pero muchos de estos planes no cumplen su objetivo fundamental, puesto que, al aumentar la superficie de riego o cambiar hacia cultivos con más necesidades hídricas, el consumo de agua permanece paradójicamente invariado. WWF/Adena apuesta por redefinir estas medidas de modernización a través de un uso adecuado de la tecnología, la modernización dentro y fuera de la parcela, la formación de los usuarios y un detallado análisis previo.

Palabras clave: Directiva marco del agua, regadío, modernización, gestión del agua, WWF/Adena.

La WWF/Adena, organisation mondiale de protection de l'environnement, l'une des principales ONG qui se consacre à la protection de la nature, mène des projets dans plus de 100 pays et bénéficie du soutien de plus de cinq millions de personnes à travers le monde.

Par le biais de son programme sur les eaux continentales, l'organisation WWF/Adena essaie de modifier les politiques qui définissent la gestion ainsi que l'utilisation de l'eau et de lancer des projets pilotes qui démontrent qu'une meilleure utilisation de cette ressource est possible.

Le dessalage¹, la réutilisation des eaux épurées et l'utilisation efficace de l'eau, ainsi que d'autres outils plus traditionnels tels que la construction de réseaux d'adduction², de barrages³, la modernisation des terrains irrigués, etc., pourraient être la solution définitive au problème de la rareté de l'eau ; les uns parce qu'ils accroissent les ressources disponibles et les autres, parce qu'ils permettent d'économiser de l'eau.

L'organisation WWF/Adena a mis en place des projets ayant recouru aux dernières technologies et mécanismes disponibles dans le but de garantir une utilisation de l'eau plus efficace. Ainsi, à la fin des années 90, elle a lancé un projet de réduction de la consommation de l'eau dans les villes. Ce projet, mené à Alcobendas (Madrid), a permis à la population d'accéder plus facilement à des économiseurs d'eau

(<http://www.wwf.es/casadelagua/index.html>).

Par la suite, l'organisation WWF/Adena a mis en place d'autres projets visant à démontrer, via les dernières technologies de contrôle du climat, des sols et des la végétation, les possibilités d'économie dans le cadre de l'agriculture d'irrigation, en réduisant de 30 % la consommation habituelle de certaines cultures. Ces technologies ont été appliquées dans des projets menés dans la région de Castilla-La-Mancha, sur diverses cultures, notamment l'oignon, le melon, la vigne, la luzerne et le maïs (<http://www.life-hagar.com/>) et à Doñana (Andalousie) sur les cultures de fraise.

L'organisation WWF/Adena considère ces technologies comme des outils utiles et très souvent nécessaires pour la protection des écosystèmes aquatiques et de la biodiversité. Cependant, elle pense qu'il est indispensable de définir les objectifs recherchés via ces outils, c'est-à-dire leur utilisation correcte, avant de commencer à utiliser ces infrastructures et ces technologies.

Au sein de l'Union européenne, ces objectifs de gestion de l'eau sont établis par la directive-cadre sur l'eau 2000/60 (DCE), qui cherche à « obtenir l'état écologique correct de toutes les masses d'eau d'ici à 2015 ». Cette directive nous invite à réfléchir de façon pragmatique à notre utilisation de l'eau et aux effets négatifs de cette utilisation dans le but de garantir la



WWF/Adena: Felipe Fuentesbaz

¹ WWF/Adena (2004) : « Desalinización: ¿una alternativa al trasvase? », 4 pages. Madrid.

² WWF (2002) : « Seven reasons why WWF opposes the Spanish National Hydrological Plan, and suggested actions and alternatives », 44 pages. Madrid.

³ WWF (2004) : « Rivers at Risk: Dams and the future of freshwater ecosystems », 47 pages. London. WWF/Adena (2003): « Damming Nature: Impacts of Spanish National Hydrological Plan dams on Natura 2000 sites », 7 pages. Madrid.

protection des écosystèmes aquatiques et de pouvoir disposer d'une quantité suffisante d'eau de qualité, tout en minimisant les coûts de cette ressource qui, si elle est bien renouvelable, est de plus en plus rare. Cette directive s'inscrit clairement dans le cadre du développement durable.

La gestion et la protection adéquates des écosystèmes, entre autres les écosystèmes aquatiques, peuvent contribuer de façon très significative à une meilleure utilisation des ressources à moindre coût. Ainsi, la protection des forêts et des milieux humides peut garantir une meilleure qualité des eaux potables⁴ et la gestion appropriée des plaines d'inondation⁵ peut minimiser de manière considérable les risques d'inondations en aval.

Si ces fonctions et services des écosystèmes sont largement reconnus par les organisations et les experts internationaux, ils ne sont pas toujours pris en compte dans des cas concrets de gestion de l'eau, même s'ils ont été identifiés comme l'option la moins onéreuse. En effet, on leur préfère des options plus coûteuses et ayant des impacts significatifs sur l'environnement, notamment la canalisation des fleuves ou la construction de barrages, de stations d'épuration, etc.

Dans ce contexte, l'objectif de cet article de l'organisation WWF/Adena est d'analyser de façon détaillée l'utilisation de l'eau dans le cadre des terrains irrigués, principaux utilisateurs de cette ressource en Espagne, ainsi que les investissements dans des infrastructures en vue de moderniser ces mêmes terrains.

Terrains irrigués : perspectives et bases en vue d'une utilisation efficace de l'eau

Les terrains irrigués étant les plus gros consommateurs d'eau de la quasi-totalité des pays méditerranéens, la dura-

Les terrains irrigués étant les plus gros consommateurs d'eau de la quasi-totalité des pays méditerranéens

bilité de l'utilisation de cette ressource passe par une modification significative de ce secteur agricole. Sur les 26 millions d'hectares de superficie agricole utile en Espagne, 3,5 millions correspondent à des terrains irrigués, un secteur qui consomme environ 24 000 hm³ d'eau par an, soit plus de 70 % de l'eau totale.

Cependant, on ne reconnaît que rarement l'hétérogénéité des terrains irrigués ; elle peut être mesurée à différents niveaux :

- Efficacité de l'irrigation : le plan national des terrains irrigués (PNR) estime qu'un tiers des terrains irrigués espagnols dispose de systèmes d'irrigation obsolètes et que seulement 26 % disposent d'infrastructures adaptées. Ceci étant dit, il existe des zones irrigables très efficaces.

- Postes de travail : si certains terrains irrigués nécessitent plus de main-d'œuvre, et même si celle-ci diminue lors du passage des cultures sèches à l'irrigation, comme c'est le cas des vignobles et des oliveraies, lorsque leur mise en irrigation demande un passage à une culture en escalier, il est possible d'effectuer une récolte mécanique au lieu de la récolte manuelle habituelle pour la méthode en escalier.

- Légalité de l'utilisation de l'eau : il existe en Espagne plus de 510 000 puits illégaux⁶ ; l'eau issue de ces puits est majoritairement destinée aux terrains irrigués et son utilisation entraîne des impacts significatifs sur les

⁴ World Bank/ WWF Alliance for Forest Conservation and Sustainable Use (2003): Running Pure: The importance of forest protected areas to drinking water, 112 pages. Gland, Suisse.

⁵ WWF (2000): Mountains of Water: Water management as sport in the Rhine River Basin, 44 pages. Zeist (Pays-Bas).

⁶ WWF/Adena (2006): Illegal water use in Spain: Causes, effects and solutions, 20 pages. Madrid.

milieux humides d'importance internationale, tels que ceux des parcs nationaux de Doñana et des Tablas de Daimiel.

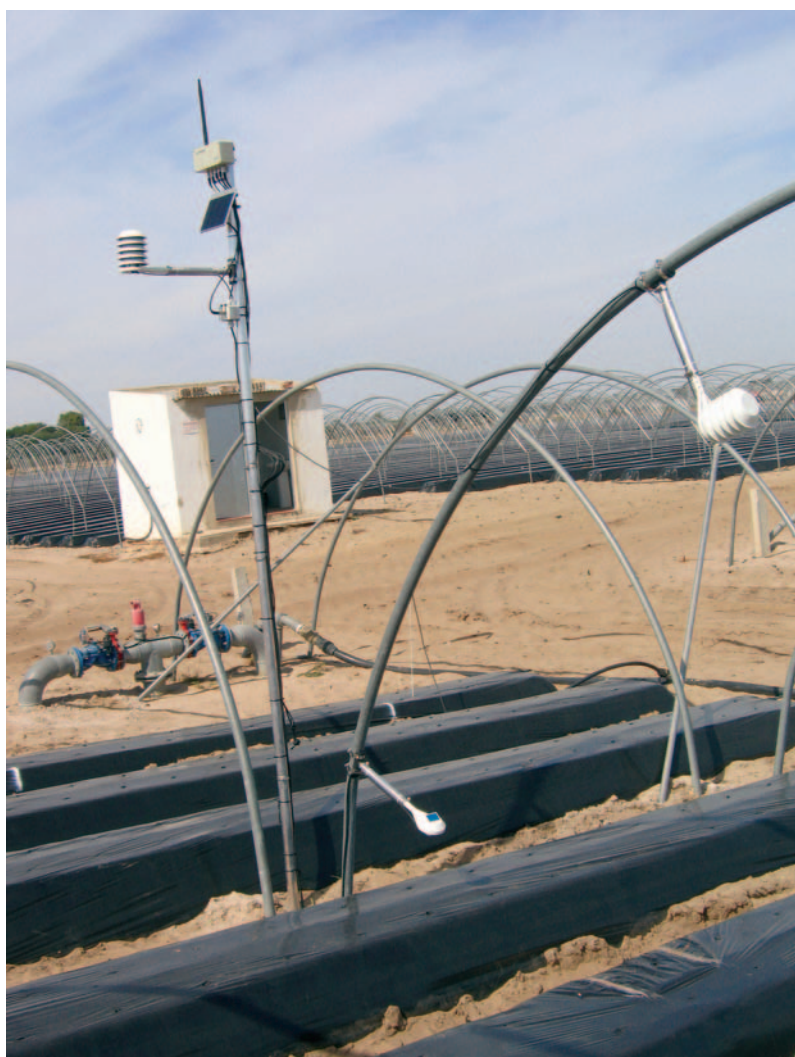
- Biodiversité : de nombreuses cultures d'irrigation (coton, plantes horticoles sous plastique, etc.) ne sont absolument pas bénéfiques pour la biodiversité et sont même nocives pour la faune et la flore forestières étant donné l'utilisation plus importante de produits agrochimiques.

En outre, l'Espagne ne dispose pas d'une planification en matière d'irrigation à moyen terme analysant de façon cohérente les modifications récentes

et à venir dans le cadre des subventions agricoles et des marchés⁷ ainsi que la garantie d'alimentation en eau des bassins, qui ont de plus en plus d'utilisateurs pour de moins en moins de précipitations.

Les alternatives de développement rural⁸ ou de cultures sèches correctement soutenues⁹ n'ont pas non plus été analysées et les terrains irrigués n'ont pas été priorités en fonction de leur type, de leur emplacement et de leur viabilité économique, sociale et environnementale.

Malgré, ou plutôt à cause, de cette absence d'analyse, de planification et d'objectifs, les administrations ont mis en route diverses mesures visant à moderniser les terrains irrigués mal aménagés. Ces mesures permettront d'augmenter la productivité des exploitations, d'améliorer la qualité de vie des agriculteurs et, en théorie, d'économiser jusqu'à 30 % d'eau. Très récemment, en mars 2006, les ministères de l'Agriculture et de l'Environnement ont présenté un « plan choc »¹⁰ de modernisation jusqu'à 2007 de 850 000 ha de terrains irrigués, ce qui permettra en théorie d'économiser 1 200 hm³ d'eau ; L'investissement s'est élevé à 2,4 milliards d'euros, dont 1,8 milliards versés par l'administration.



WWF/Adena: Felipe FuentesBaz

⁷ WWF/Adena (2005): Agricultural surpluses "drink" the water of 16 million Spanish people: An analysis of irrigation overproduction in Spain, 4 pages. Madrid.

⁸ WWF, LUPG & SNM (2005): Rural Development Environmental Programming Guidelines: A Manual based on the findings of the Europe's Living Countryside (ELCo) project, 76 pages. Bruxelles (Belgique).

⁹ WWF/Adena (2005): Agricultura de Secano y Desarrollo Rural, una asignatura pendiente, 14 pages. Madrid.

¹⁰ Décret royal 287/2006 du 10 mars qui réglemente les travaux urgents d'amélioration et de consolidation des terrains irrigués en vue d'obtenir des économies d'eau ad hoc palliant les dommages dus la sécheresse.

Cependant, l'analyse proposée par le « plan choc » et les administrations agraires ne justifie pas de tels investissements financiers et ne permet pas de réaliser les actions prévues et les objectifs établis. Entre autres choses, la sélection des projets a été effectuée sans consulter les comptes rendus de l'article 5 de la directive-cadre sur l'eau qui analysent les principaux impacts et pressions dus à l'activité humaine (agriculture comprise) sur les masses d'eau. La voie légale de réduction des tâches de l'eau d'irrigation et des concessions d'eau dans les terrains irrigués modernisés, en vue de garantir qu'au moins une partie de l'eau économisée serait destinée à l'amélioration de l'état des fleuves, des aquifères et des milieux humides, n'a pas non plus encore été décidée.

La modernisation des terrains irrigués envisagée par les administrations a des impacts évidents sur l'environnement. Elle favorise non seulement la consolidation mais également l'accroissement de la surface irriguée et l'intensification de l'agriculture, en modifiant le paysage de façon permanente. Le passage de l'irrigation par gravité à l'irrigation sous pression implique également une consommation énergétique élevée, et il faut examiner ses impacts en vue d'atteindre les objectifs du protocole de Kyoto. Cependant, la modernisation entraîne également des impacts socioéconomiques directs : moindre nécessité de main-d'œuvre par exploitation et présence de l'agriculteur sur le terrain moins nécessaire.

Selon l'organisation WWF/Adena, la réduction de la consommation d'eau par les terrains irrigués, si elle est effective, peut largement contribuer à atteindre les objectifs environnementaux de la directive-cadre sur l'eau. Cependant, et même si ceci est paradoxal, la quasi-totalité des projets de

modernisation implique, contrairement à ce que l'on pourrait croire, une augmentation de la zone irriguée ou un passage à des cultures nécessitant une consommation d'eau plus élevée ; par conséquent, les zones modernisées consomment autant d'eau qu'auparavant.

Pour l'organisation WWF/Adena, le fait que les économies d'eau attendues suite à la modernisation ne soient pas mises en pratique est particulièrement contradictoire car cela n'est pas ainsi que l'environnement ou les autres composantes considérées comme prioritaires, notamment l'approvisionnement urbain, pourront bénéficier de ces importantes sources d'investissement public. Par ailleurs, ceci ne permet pas non plus d'augmenter la sécurité et la garantie de l'alimentation en eau du terrain irrigué, et les précipitations étant appelées à diminuer, les conflits liés à l'eau seront de plus en plus importants.

C'est la raison pour laquelle l'organisation WWF/Adena considère qu'il est indispensable de redéfinir les mesures de « modernisation » afin

« La modernisation peut a priori être considérée comme positive pour la conservation de l'eau, mais pour que celle-ci effective, il faut reconcevoir certaines actions pratiques »

que celles-ci permettent, dans la pratique, à atteindre les objectifs de la politique agricole et de la politique environnementale de l'Union européenne, en promouvant la convergence et l'intégration des deux politiques sur le terrain. La modernisation peut a priori être considérée comme positive pour la conservation de l'eau,

Les infrastructures et les technologies du futur sont des outils utiles et parfois nécessaires pour une meilleure gestion de l'eau

mais pour que celle-ci effective, il faut reconcevoir certaines actions pratiques¹¹.

Concrètement :

- En premier lieu, et pour atteindre les objectifs sociaux et environnementaux prévus, l'organisation WWF/Adena suggère que les projets de modernisation soient planifiés et exécutés de façon globale, c'est-à-dire en introduisant les aspects de modernisation aussi bien à l'extérieur qu'à l'intérieur de la parcelle.

- L'organisation WWF/Adena considère qu'il est également nécessaire de promouvoir l'utilisation de la technologie la mieux adaptée, choisie en fonction des caractéristiques des exploitations.

- Étant donné que tout projet de modernisation implique une modification de la technologie employée dans les exploitations, il est indispensable de proposer une formation sur l'utilisation correcte de cette technologie. Les agriculteurs doivent être tenus informés des divers aspects et possibilités des nouveaux systèmes d'irrigation. Par ailleurs, il faut promouvoir les systèmes de conseil pour l'irrigation (SIAR) ainsi que les technologies d'autogestion de l'eau existantes.

- De plus, tout projet de modernisation doit comprendre un calcul du volume de l'eau à économiser, la destination de l'eau, ainsi qu'une révision des concessions conformément à ces calculs. Cette révision doit favoriser le rétablissement des fonctions et des services des écosystèmes aquatiques associés au fleuve. L'eau éco-

nomisée ne doit en aucun cas être utilisée pour créer de nouveaux terrains irrigués.

Conclusions

Les infrastructures et les technologies du futur sont des outils utiles et parfois nécessaires pour une meilleure gestion de l'eau. Cependant, elles sont très souvent utilisées sans définition préalable d'objectifs spécifiques. La modernisation des terrains irrigués en Espagne est un exemple clair de cette politique d'investissements et de subventions publiques sans qu'il n'y ait eu de débat ni d'établissement préalable d'objectifs en matière d'économie de l'eau, ni que les priorités aient été fixées.

Parmi les thèmes restant à étudier, citons la réhabilitation et l'utilisation adéquate des fonctions que remplissent les écosystèmes naturels et les services qu'ils offrent, très souvent à des coûts considérablement moins élevés que les infrastructures alternatives. ■

¹¹ WWF/Adena (2005): La modernización de regadíos y la Directiva Marco del Agua: 9 propuestas de WWF/Adena, 5 pages. Madrid.

References

International Code of Conduct on the Distribution and Use of Pesticides

The International Code of Conduct on the Distribution and Use of Pesticides is the worldwide guidance document on pesticide management for all public and private entities engaged in, or associated with, the distribution and use of pesticides. It was adopted for the first time in 1985 by the Twenty-fifth Session of the FAO Conference. The Code is designed to provide standards of conduct and to serve as a point of reference in relation to sound pesticide management practices, in particular for government authorities and the pesticide industry.

Following the adoption of the Rotterdam Convention in 1998, and in view of the changing international policy framework, as well as the persistence of certain pesticide management problems, particularly in developing countries, in 1999 the FAO initiated the update and revision process of the Code.

In November 2002, the Hundred and Twenty-third Session of the FAO Council (with the authorisation of the Thirty-first Session of the FAO Conference) approved the revised version of the International Code of Conduct on the Distribution and Use of Pesticides by Council Resolution 1/123.

http://www.fao.org/ag/AGP/AGPP/Pesticid/Code/PM_Code.htm

Results of the 2006 survey on production and use of PFOS, PFAS, PFOA, PFCA, their related substances and products/mixtures containing these substances

This paper summarises the responses to the 2006 questionnaire. Responses received from OECD member countries, non-OECD countries, the European Commission and some companies manufacturing these chemicals have been included in this paper.

[http://appli1.oecd.org/olis/2006doc.nsf/43bb6130e5e86e5fc12569fa005d004c/ec0131054df5f681c125723c003b1323/\\$FILE/JT03219292.PDF](http://appli1.oecd.org/olis/2006doc.nsf/43bb6130e5e86e5fc12569fa005d004c/ec0131054df5f681c125723c003b1323/$FILE/JT03219292.PDF)

Harmonisation of Environmental Emission Scenarios: An Emission Scenario Document on Insecticides for Stables and Manure Storage Systems

03-Feb-2006

Series on Emission Scenario Documents No. 14 (January 2006)

This document describes emission scenarios for active substances in insecticides, acaricides and products for controlling other arthropods, used in animal housing and manure storage systems. The aim of the document is to present realistic worst-case emission scenarios that are applicable throughout OECD countries.

[http://appli1.oecd.org/olis/2006doc.nsf/linkto/ENV-JM-MONO\(2006\)4](http://appli1.oecd.org/olis/2006doc.nsf/linkto/ENV-JM-MONO(2006)4)

Cleaner production measures in small-scale slaughterhouse industry - case study in Bosnia and Herzegovina

T. KUPUSOVIĆ, S. MIDŽIĆ, I. SILAJDŽIĆ, J. BJELAVAC: Cleaner production measures in small-scale slaughterhouse industry - case study in Bosnia and Herzegovina, *Journal of Cleaner Production*, Volume 15, Issue 4, 2007, Pages 378-383.

The goal of this project was to demonstrate to Bosnian and Herzegovinian industries that significant reductions in water use, wastewater discharge and pollutant load can be obtained at little or no cost, and that efficient use of resources and reduction of waste generation at source are clearly preferable compared with the end-of-pipe wastewater treatment. The project was implemented at a small-scale slaughterhouse industry "Sahbaz" using a methodology prescribed by the Barcelona Regional Activity Centre for Cleaner Production and the Ministry of Environment of Spain. Upon detailed diagnosis of the industrial process and waste flows generated, the opportunities for environmental improvement were identified and CP measures were recommended and implemented. In the first three months of project implementation the amount of water saved and BOD reduced was 32 percent while salt consumption was reduced

by 40 percent. Total annual net savings resulting from the application of selected measures were 669 →/year.

http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VFX-4K128Y8-1&_coverDate=12%2F31%2F2007&_alid=512358574&_rdoc=1&_fmt=&_orig=search&_qd=1&_cdi=6022&_sort=d&view=c&acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=817b13e3703d2c4a00cdc4d11f0652c3

Pollution Prevention in the Structural Ceramics Sector

RAC/CP

The RAC/CP has published a study on pollution prevention in the structural ceramics industry with the aim of improving the environmental behaviour of companies in this industry.

Due to increased construction in most Mediterranean countries, the structural ceramics sector has become one of the most important production industries. However, its environmental actions have generally been limited to very specific procedures such as treating gas emissions, and little has been done to promote actions that deal with the production process as a whole.

The study *Pollution Prevention in the Structural Ceramics Sector* provides an overview of the economic situation of the construction industry and the structural ceramics industry in different countries in the Mediterranean region; it describes the different production processes involved in manufacturing structural ceramics, and indicates the technologies applied and resulting environmental aspects and impacts.

The pollution-prevention opportunities presented in the study are applicable to all the countries in the Mediterranean region, given that actions with a short-term return on investment have been analysed. Priority has been given to those opportunities that make it possible to reduce pollution at source, as opposed to end-of-pipe techniques, which are generally more expensive and less desirable on the environmental scale of action.

The study is available on www.cprac.org

http://www.cprac.org/eng/03_activitats_estudis_01.htm

Pollution Prevention in the Batch Chemical Sector

RAC/CP

The aim of the study is to help companies, particularly small and medium-sized enterprises, achieve sustainable development, through the study of their impacts and to suggest a wide range of possibilities for reducing pollution, which include reduction at source, recycling and recovery at source and waste recovery.

The manual also hopes to provide a useful tool that serves as a guideline for minimising the pollution generated in the batch chemicals sector and to be a practical guide for managing the real application of pollution prevention opportunities in their different varieties through practical proposals whose application is within the means of the chemicals companies in the countries of the Mediterranean Action Plan.

The study is available on www.cprac.org

http://www.cprac.org/eng/03_activitats_estudis_01.htm ■

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The Mediterranean Action Plan (MAP) strives to protect the environment and to foster development of the Mediterranean Basin. It was adopted in Barcelona (Spain) in 1975 by Mediterranean States and the EC, under the auspices of the United Nations Environmental Programme (UNEP). Its legal framework is made up of the Barcelona Convention (1976, revised in 1995) and six Protocols covering certain specific aspects of environmental protection. The Action Plan is built up around an Athens-based Coordinating Unit, the MED POL Programme and six Regional Activity Centres.

The Regional Activity Centre for Cleaner Production (RAC/CP), based in Barcelona-Spain, was established in 1996 with the aim of disseminating and promoting the concept of cleaner production, along with the opportunities and advantages of pollution prevention in the industrial activities in Mediterranean countries. The RAC/CP activities are financed by the Spanish Government once they have been submitted and approved by the Contracting Parties to the Barcelona Convention and by the Bilateral Monitoring Commission made up of representatives from the Spanish and Catalan Governments.

This technical publication is issued yearly by RAC/CP. It is aimed at providing an information exchange system among experts in the Mediterranean region with articles related to cleaner production and waste minimisation. It is intended as a technical publication and does not necessarily reflect the official view of RAC/CP.