



Vinyl 2010

Sustainable Development: Progress Report 2003



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**ECONOMIC
DEVELOPMENT**

**RESPECT FOR
THE ENVIRONMENT**

**SOCIAL
PROGRESS**



1 | Foreword by the Chairman

Sustainability: Is Our Role Important?

My answer is a clear yes. In this third annual report on the Voluntary Commitment of the PVC industry, I should like to share with you why.

PVC is an excellent product with many qualities that already underpin modern life. As an industry, however, we recognise that this by itself is still not enough. We need to be sure that everything we do supports the three pillars of sustainable development: environmental protection, social advancement and economic wealth creation for current and future generations.

Our industry's Voluntary Commitment is a tangible expression of how we are achieving this goal. It is hard work. I believe that our calendar of achievements makes clear how much effort and resources the whole sector – from producers through to the thousands of firms that use PVC – is investing.

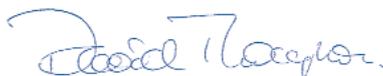
We have made good progress. More, of course, needs to be done. This is a challenge that we have accepted and are eager to demonstrate our commitment. You will find many details in the pages that follow.

The role of PVC in sustainable development is larger than targets alone. It is a material that uses resources efficiently to help people to live well, in comfort and safety, through literally thousands of products. PVC is part of our society.

For this reason we have chosen to work with someone who is keenly interested in society and the natural world to illustrate this report.

Marie-Francoise Plissart is an artist who lives in Brussels. Her photographs shown in this report – of people, their cities and nature – capture the world as it is. I believe there is something to be learned there for anyone interested in sustainable development.

Sustainability will not be achieved through wishful thinking. Sustainable development depends on real commitments and actions, by real people in a real world. This is what Vinyl 2010 is all about.



David Thompson
Chairman

2 | Johannesburg and the Role of a Responsible Industry



**The Johannesburg Declaration on Sustainable Development:
Draft political declaration submitted by the
President of the Summit,
4 September 2002**

... We agree that in pursuit of its legitimate activities the private sector, including both large and small companies, has a duty to contribute to the evolution of equitable and sustainable communities and societies.

... We agree that there is a need for private sector corporations to enforce corporate accountability, which should take place within a transparent and stable regulatory environment. ...

World leaders last year in Johannesburg declared sustainable development a "central element of the international agenda".

Together as Vinyl 2010, the European PVC production and converting chain has been working hard to ensure that the challenge of sustainable development is taken to heart. We are relentlessly improving production processes and products, investing in technology, minimising emissions and waste and boosting collection and recycling.

This is why the PVC industry – which represents 23,000 businesses – is putting into practice an integrated approach to deliver responsible, full cycle product stewardship. This approach is spelled out in the Voluntary Commitment of the PVC Industry. Vinyl 2010 is the legal entity set up for providing the organisational and financial infrastructure for managing and monitoring the actions undertaken as part of the commitment.

The Voluntary Commitment was originally signed in 2000. We see it as a European milestone in the emerging sustainable development debate. Our approach certainly is in line with the 2002 Johannesburg declaration, which states the private sector "has a duty to contribute" to the drive toward sustainability.

The commitment sets out a challenging long-term plan to deliver continuous improvement in product stewardship throughout the entire PVC lifecycle. The plan comes with quantifiable targets and interim deadlines to allow the industry and its various stakeholders to track progress.

Sustainable development, however, also requires openness and good governance. Therefore Vinyl 2010 warmly welcomes contributions from third parties. We have invited the European Commission, trade unions, non-governmental organisations, consumer organisations and the European Parliament to be part of a Monitoring Committee, which will independently review the progress of our project. The first meeting of the committee is scheduled for Quarter 2, 2003.

3 | The Sustainable Approach of the PVC Industry

Although predating the Johannesburg World Summit on Sustainable Development, Vinyl 2010's commitments are closely in line with the conclusions set out in chapters 'Sustainable Production and Consumption, Energy and Chemicals.'

Vinyl 2010's work rests on:

- The ECVM Charters for responsible manufacturing signed in 1995 and 1998;
- The Voluntary Commitment signed by the four Associations of the PVC industry to guarantee effective product stewardship with responsible, cradle-to-grave management.

Vinyl 2010 advances these commitments by researching and initiating medium- and long-term projects in:

- PVC manufacturing
- Additives: plasticisers and stabilisers
- Waste management
- Social progress and dialogue

The Vinyl 2010 program has a strong scientific and technological element and progress is therefore closely linked to advances in these areas. This is why Vinyl 2010 verifies and evaluates its findings and progress on a regular basis, looks for new solutions and tests new ways toward PVC sustainability.

A study by The Natural Step, an international environmental Non Governmental Organisation, concludes that PVC could be considered a sustainable material provided the industry can deliver on five key challenges. These challenges are huge, but are similar to those faced by the competing materials.

Vinyl 2010 means:

RESPECT FOR
THE ENVIRONMENT

ECONOMIC
DEVELOPMENT

SOCIAL
PROGRESS



4 | Milestones for 2002 and Targets for 2003

Milestones 2002

Q U A R T E R 1

- Start up of Vinyloop® at Ferrara plant > achieved, see projects
- Go-ahead for large-scale production in Redop project for trial in a commercial blast furnace > achieved, see projects

Q U A R T E R 2

- 2001 statistics for the three main uses of lead published by ESPA > achieved, see projects
- Completion of Phase 2 of the Stigsnaes project expected in May 2002 > achieved, see projects
- Phase I of EuPR study “The picture of PVC mechanical recyclers in Europe” > achieved, see projects

Q U A R T E R 3

- Endorsement and acceptance of EPPA proposals > reviewed, see projects
- Following the completion of the eco-efficiency study, decision taken regarding the scaling-up of feedstock recycling in Denmark > achieved, see projects

Q U A R T E R 4

- Completion and publication of results of the ECVM S-PVC Charter re-verification > achieved, see projects
- EU risk assessments on DBP, DEHP, DINP, DIDP and BBP completed > delayed for external causes, see projects
- Operational systems for TEPPFA project in place in priority countries by end of 2002 > partially achieved, see projects
- Second research phase concerning technology screening for ESWA project completed > achieved, see projects
- Research concerning technology screening and use of recycle for EPCOAT project > screening achieved, use of recycle ongoing.
- Decision taken on the applicability of the Linde technology > achieved, see projects
- Results from the improved logistics scheme for delivering larger quantities of waste to the DOW/BSL plant > in progress, see projects
- EPFLOOR to complete Development Programme > ongoing, see projects

Targets 2003

Q U A R T E R 1

- 2002 statistics on the three main uses of lead published by ESPA

Q U A R T E R 2

- Eco-efficiency study peer-reviewed and published
- Conclusion from the improved logistics scheme for the DOW/BSL plant
- Set-up of Recovinyl SA to boost PVC mechanical recycling by independent recyclers
- Recovinyl SA (www.recovinyl.org) website interface with waste owners (input specifications) on-line

Q U A R T E R 3

- Starting large-scale pilot production for Redop project
- Starting plant modifications for large-scale Stigsnaes feedstock recycling plant
- Test collection under the EPCOAT project starts in Germany and France
- Various pilot collection tests initiated by EPFLOOR
- Recovinyl SA sales department on-line

Q U A R T E R 4

- Compliance deadline for the ECVM E-PVC Charter
- EU risk assessments on DBP, DEHP, DINP, DIDP and BBP completed
- 25% recycling of collectable, available PVC post-consumer waste from pipes, windows, fittings and roofing membranes by EPPA, TEPPFA and ESWA
- Final choice on recycling process expected for ESWA project
- Pilot tests to expand flooring waste collection scheme completed by EPFLOOR
- Study on artificial leather collection and recycling completed by EPCOAT
- Results from survey on possible novel gasification processes for treating PVC-rich waste streams
- Interim conclusions of UK mixed PVC waste project
- Evaluation on start-up period of Recovinyl SA

5 | Respect for the Environment

Resilience and Resource Efficiency



PVC is extremely durable in use and difficult to break down.

This is one of product's greatest strengths from a sustainability perspective.

A sustainable society needs products that make best use of natural resources and provide long, cost-efficient usage and have low environmental impact. PVC already meets many of these requirements. Vinyl 2010 is adding to its strong sustainability profile by lessening the impact on the natural world.

PVC pipes, window frames and cables – which account for about half of all PVC applications – have a lifetime of 30 years or more.

Environmental protection has to be advanced logically and on the basis of real knowledge if it is to be successful. For this reason, the approach of Vinyl 2010 places heavy emphasis on studies and pilot projects as well as on formal, immediate commitments.

Strong and leak proof, PVC piping systems help reduce drinking water losses and sewage pollution – even in contaminated soils that would corrode many other materials. Worldwide, as much as 30% of domestic fresh water supply is estimated to be lost because of old and inadequate pipes.

Our activities cover all parts of the PVC life cycle from production and additives, to usage and waste collection, recycling initiatives and efficient energy recovery technologies.

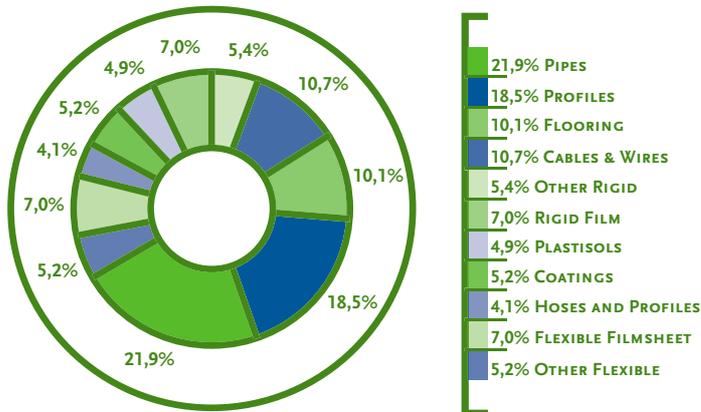
Lightweight, insulating, durable PVC products help save energy in a variety of domestic, industrial and transport applications.

6 | Economic development

Investing in the Future



WESTERN EUROPEAN PVC CONSUMPTION PER APPLICATION



Source: EuPC

The PVC sector is an important part of Europe's socio-economic fabric.

More than 23,000 companies are directly involved in the PVC production chain in Western Europe. Most of these are small- and medium-sized companies that support local economies. PVC production and converting accounts for more than 530,000 jobs.

However, the role of PVC is more fundamental than the figures show. Its product qualities and cost effectiveness facilitate invention and ingenuity in new and existing applications and therefore support the dynamics of development in industry.

Sustainable development needs such dynamism. Vinyl 2010 is an investment in the future.

By funding research and development in advanced production and waste-management technologies, Vinyl 2010 reinforces the industry's prospects. It also helps ensure that the product and the businesses that support it are here to stay.

PVC consumption is a good economic indicator of prosperity. This is because PVC products are used in leading economic sectors, from construction to transport, packaging and healthcare.

7 | Social progress

Dialogue and Quality of Life



Sustainable development promotes quality of life through social dialogue.

PVC products make our daily lives safer and more comfortable at affordable prices. On our website (www.vinyl2010.org) you will find links that illustrate and will help you discover the thousands of PVC products in the world today.

Vinyl 2010 is also committed to well being in the workplace. As a major European industry we pay particular attention to constructive social dialogue.

Vinyl 2010 and its partners have set up regular consultations and co-operation with the European Mine, Chemical and Energy Workers' Federation on workplace health, safety and training issues that can contribute to the sustainability process.

Meanwhile, Vinyl 2010 is gearing up to become more deeply involved in the PVC-related issues within key European Union candidate countries in an effort to harmonise health, safety and environmental standards and achieving common sustainability goals.





8 | Our Commitments in Summary

The following summarises the individual engagements that together form the Voluntary Commitment.

For full details please visit our website:

www.vinyl2010.org.

Manufacturing in General

- Cut raw material and energy consumption where economically and ecologically warranted.
- Review progress on an annual basis.

PVC Resin Producers

- Minimise environmental impact through compliance with the ECVM Industry Charters for the suspension and emulsion production methods.

Plasticiser Producers

- Conduct research to help policy-makers make informed decisions;
- Add to the already comprehensive available scientific data about plasticisers;
- Ensure that plasticisers are used safely, in line with the final conclusions of the EU risk assessments;
- Conduct material lifecycle analysis to identify additional possible improvements to the product and its use;

Stabiliser Producers

- Phase out cadmium stabilisers in the European Union by 2001. Continue to work with the European Commission on targeted risk assessments.
- Work together with the rest of the lead industry and the independent consultants appointed with the approval of the Dutch authorities to compile the necessary data for a full EU risk assessment on lead. This report is due to be available in 2004.
- Continue to research and develop alternative stabilisers to the widely used and highly effective lead-based systems as part of a commitment to replace lead stabilisers by 2015.
- Produce yearly statistics on stabiliser consumption by converters.

Converters

- Promote substitution of lead stabilizers by 2015.
- Key role in waste management through sectorial initiatives.
- Communicate cadmium phase-out.
- Stimulate synergies between product recycling projects.

Waste Management

- Actively support an integrated waste management approach. The aim is to use raw materials as efficiently as possible and utilise the most sustainable end-of-life options.
- Vinyl 2010 and its members will work with stakeholders to research, develop and implement the necessary recycling technologies to achieve this target.
- Thanks to the development of additional mechanical and feedstock recycling technologies, total PVC post-consumer waste recycling is expected to reach 200,000 tons per year in Europe in 2010*.

(*) In addition to quantities already recycled today and coming from EU legislation on packaging, end-of-life vehicles and waste electrical and electronic equipment.

9 | Projects Report

1. PVC resin production

Resin producers are working towards minimising environmental impact through compliance with the ECVM Industry Charters for producing PVC by the suspension (S-PVC) and emulsion (E-PVC) processes.

1.1. VCM and S-PVC

The Charter, which was signed in 1995, committed member companies to comply with environmental standards by the end of 1998. Compliance was reviewed a first time in 1999 by Det Norske Veritas (www.dnv.com). In 2002, the independent Norwegian foundation undertook a second review of compliance by each production site of ECVM's member companies.

The reporting is based on the measurement of 12 different standards relevant to the S-PVC manufacturing cycle. For the 38 production sites in Western Europe – which represent 100% of ECVM production and 98% of total Western European capacity – this involved making a total of 264 different measurements.

The compliance results can be summarised as follows:

- 93% full compliance, up from 88% in 1998;
- 4% either partial compliance, or compliance not entirely confirmed due to uncertainties about reported data;
- 3% non-compliance, down from 9% in 1998.

“The scale and nature of this initiative continues to make it unique. The learning has been evident, with improvements to compliance and the provision of information to demonstrate this,” DNV writes in its verification statement of the Charter. *“Four years on from the original target date, full compliance across the membership has yet to be achieved. However, improvements have been made, both in terms of the proportion of sites included within the verification and in actual performance against the Charter requirements. Additional information from sites since the end of June 2002 indicates that the goal of full compliance is even closer.”*

Concrete actions to cope with non-compliance cases have already been announced by ECVM members. Meanwhile, an ECVM task force will seek to clarify any methodological uncertainties remaining in the compliance process.

1.2. E-PVC

The PVC resin manufacturers are progressing toward the achievement of the goals of the ECVM charter on E-PVC. This deadline for compliance is end 2003. An external verification is planned to assess compliance during 2004.

1.3. Inhibitors

ECVM member companies have agreed to stop using bisphenol-A as an inhibitor in the polymerisation stage of PVC production as from Jan. 1, 2002. The decision was made following preliminary conclusions from the draft risk assessment on bisphenol-A currently being conducted under the responsibility of British authorities. The British-led study indicated that emissions to waste water from PVC plants could, under certain conditions, result in concentrations that would exceed predicted no-effect concentrations (PNEC) derived from eco-toxicological studies. Other uses of bisphenol-A in the production of PVC products do not present a risk of exceeding current PNEC values and hence will continue.

2. Plasticisers

2.1. Plasticiser Production

The plasticiser industry is continuing to conduct research to build up the scientific database consistent with Responsible Care® principles.

During 2002, the industry continued to invest heavily in its research programme aimed at providing the necessary scientific studies to ensure that plasticisers are being used without risk to human health or the environment. Members of the European Council for Plasticisers and Intermediates (ECPI) contributed close to € 700,000 to research projects during the year.

Among important projects completed during 2002 was an investigation to determine the concentration of Dibutyl phthalate (DBP) vapour that could cause adverse effects in certain plant species.

A major ECPI initiative was a global workshop in September 2002 in Ghent on biomonitoring and pharmacokinetics aimed at enhancing the understanding of the level of exposure to phthalates and the way in which they are metabolised by various living species, including humans. Work also began on a study to determine if a relationship exists or not between phthalates and asthma. This is being conducted in cooperation with the Danish authorities.

For the second successive year, ECPI supported a very significant and definitive study in Japan which has further confirmed the safe use of the plasticiser Di(2-ethylhexyl) phthalate (DEHP). The study has shown that reproductive effects seen in rodents are unlikely to be relevant to humans.

It closely follows an ECPI sponsored two-generation reproduction toxicity study on DEHP that had also shown the likelihood of adverse health effects to be much less than previously thought. Both findings are considered crucial to the finalisation of the EU risk assessment on DEHP.

2.2. Risk Assessments

EU risk assessments are nearing completion on five phthalate plasticisers: Dibutyl phthalate (DBP), Di-(2-ethylhexyl) phthalate (DEHP), Diisononyl phthalate (DINP), Diisodecyl phthalate (DIDP) and Butyl benzyl phthalate (BBP). The risk assessments on DINP, DIDP and DBP have all been completed but still have to go through the final approval process by the European Commission and European Parliament before they are finally published in the EU Official Journal. For DINP and DIDP there are no risk reduction measures necessary beyond those already in place. For DBP, some measures may need to be taken to reduce exposure levels to workers and the environment.

Final publication of the DEHP risk assessment is expected late 2003 or early 2004. Discussions are still taking place following the presentation of important new data from studies conducted in Germany and the U.S. The BBP risk assessment, meanwhile, is continuing and expected to be concluded by the end of 2003.

2.3. Lifecycle Analysis

The ECPI eco-profile of high-volume phthalate esters is available to users and has been actively promoted on the ECPI web site (www.ecpi.org). The calculations allow users to carry out life-cycle assessments of flexible PVC products.

2.4. Availability of Information

As part of its endeavour to increase people's understanding of the safe use of plasticisers, ECPI has continued to develop an extensive European communications programme. Internet sites have been set up to provide specialist information on the classification and labelling of the phthalates DEHP and DBP and work began on the design of European Plasticiser and Phthalate Information Centres which will be launched in early 2003 (www.plasticisers.org and www.phthalates.com). Information centres following a similar design are being established in national languages, such as the Danish Information Centre (www.phthalater.dk).

3. Stabiliser production

3.1. General Commitments

ESPA member companies have committed to:

- stop selling cadmium stabilisers in the EU;
- carry out risk assessments by 2004 on lead-based stabilisers;
- continue to research and develop alternative stabilisers to lead-based systems;
- produce yearly statistics on stabiliser consumption by converters and their areas of application.

European Production Data:

Tonnes of stabiliser systems	2000	2001	2002	
Formulated Lead Stabilisers ¹	120421	113378	113256	Notes: <i>'Formulated' means that these systems are complete stabiliser/lubricant packages and may also include pigments or fillers as a service to the customer.</i> 1 Used in pipe/profiles for construction and electrical cables. 2 Used only in construction profiles. 3 Includes food-contact and medical applications, plus all lead replacement systems. 4 Used primarily in rigid applications including food-contact use. 5 Used in the wide range of flexible PVC applications, calendered sheet, flooring etc. 6 Were used in flexible and rigid applications. This used to be the primary stabiliser system for flexible applications. The tonnage figures represent sales to EU countries plus Norway and Switzerland. The figures for lead and mixed metal systems, however, also include Turkey. In 2002 there was an increase in ESPA membership leading to the lead figures used in Europe being more accurate.
Formulated Solid Stabilisers containing Cd ²	242	6	0	
– Cd content	24	0.6		
Formulated Mixed Metal Solid Stabilisers eg. Ca/Zn systems ³	17579	17988	23946	
Tin Stabilisers ⁴	14666	15614	14756	
Liquid Stabilisers – Ba/Zn or Ca/Zn ⁵	16709	13351	13975	
Liquid Stabilisers containing Cd ⁶	146	0	0	
– Cd content	9			

3.2. Commitments on Cadmium

As reported last year, sale and use in the EU of all cadmium stabilisers has ceased. The industry is working with the European Commission and EU Member States to extend the current restrictions on cadmium stabilisers in the Marketing and Use Directive to a formal legal ban on the use of any new cadmium stabilisers.

The Commission and Member States, likewise, are working with Vinyl 2010 and other stakeholders to ensure that the recycling of Cadmium-containing PVC waste will remain allowed.

3.3. Commitments on Lead

ESPA members have worked together with the rest of the lead industry and the independent consultants appointed with the approval of the Dutch authorities to compile the necessary data for a full EU risk assessment. This report is due to be available in 2004; the work is reviewed step-by-step by the Dutch authorities.

ESPA members continue to work with their customers in EuPC in developing alternative systems to lead. The quantity of lead used has decreased by 6% in the two years starting Jan. 1, 2000, and so we are on target to meet our commitments on reduction.

4. Waste management: Sectorial projects of EuPC and its members

Our industry's commitment is to recycle 50% of collectable, available PVC waste from window profiles, pipes, fittings and roofing membranes in 2005, and 50% of flooring waste in 2008.

4.1. Window Profiles (timescale 2000-2005)

Despite a severe downturn in the construction sector – and thus in window frame consumption – the year 2002 saw a more than 19% increase in collected and recycled post consumer windows and related profiles waste volumes. Meanwhile, EPPA¹ (EuPC sector group for windows and related profiles) optimised existing or started collection systems and pilot collection initiatives in the following countries:

- **UK:** Completion of pilot collections from refurbishments and study proposals on waste auditing and processing; Contacts established with demolition companies, local authorities, research establishments and dedicated recyclers.
- **France:** The pilot phase of a joint PVC pipes and profiles programme has been started, involving private and public municipal building waste collection and sorting centres as well as waste management companies. More than 10 collection points have been established in 2002.
- **Germany:** Reorganisation of the existing market-driven collection system; establishment of REWINDO as a clearing house.
- **Scandinavia:** Increased volumes collected and recycled via WUPPI. The scheme could be widened to whole Scandinavia.
- **Netherlands and Austria:** volumes recycled have been maintained despite an adverse market situation.

In 2002, EPPA expanded its activities to the following countries :

- **Belgium** saw its efforts integrated in the PLAREMEC initiative, a platform for all partners in the recycling chain including authorities.

- **Spain:** A pilot collection test in Catalonia was carried out in cooperation with the Association of Cities and Regions for Recycling (ACRR).
- **Italy:** First draft business plan presented.

4.2. Pipes and Fittings (timescale 2000-2005)

Members of TEPPFA² (EuPC sectorial association for pipes and fittings) are actively implementing the Voluntary Commitment on PVC, both on collection and recycling.

Collection and recycling volumes for pipes in 2002 were higher than in the previous year despite a general downturn in the construction industry, which translated into smaller construction and demolition volumes. In Germany, however, recycling growth was lower than expected as regulators warned that the intensified collection-and-recycling system was not acceptable as envisaged under competition law.

Demand for rigid recycled PVC in the pipe industry nevertheless continues to outstrip supply. In order to develop synergies, Vinyl 2010 and its partners have decided to cooperate with the European PVC Window Profile and Related Building Products Association (EPPA) and with the planned Recovinyl SA consortium in collection-and-recycling systems wherever possible. In 2003, we expect continued progress on joint projects in Germany, Scandinavia and the UK. (cf. section 5.2.1.) Existing cooperation projects in Denmark and France are showing that it is possible to reduce cost and therefore increase collection and recycling possibilities.

4.3. Roofing Membranes: "Edelweiss" project (timescale 2000-2005)

ESWA³ (EuPC sectorial association for roofing membranes) started a study in 2002 on the Collection and Recycling of end-of-life PVC roofing.

Dubbed "Project Edelweiss", the study looked into projecting theoretical waste streams through 2015. This made it possible to evaluate the conditions for further development of recycling operations at the premises of AfDR during the transition years 2003 and 2004. (AfDR, or *Arbeitsgemeinschaft für PVC-Dachbahnen-Recycling*, is a mechanical cryogenic recycling unit located in Germany. It is owned and operated by ESWA members since 1994).

At present collection is organised by AfDR and ESWA members. After an initial selection, contacts were made with waste management companies and offers for test projects in 2003 received.

The present recycling capacity will not be sufficient to implement the Voluntary Commitment after 2005. ESWA is currently examining three possible routes for boosting capacity: An investment into added AfDR capacity, or agreement with partners on two different solvent-based recycling units by 2005. A final choice is expected in 2003.

¹ EPPA : The European PVC Window Profile and Related Building Products Association

² TEPPFA : The European Plastics Pipes and Fittings Association

³ European Single Ply Waterproofing Association

4.4. Flooring (timescale 2000-2008)

The European PVC Flooring Producers represented in EPFLOOR⁴ (EuPC sector group for vinyl flooring) have been developing applications for recycled material and co-operation in the collection and future processing of post-consumer waste.

EPFLOOR is currently developing with the German flooring recycling facility AgPR and the R&D department of member companies a workable recyclate called Recinyl[®]. The recyclate is obtained using the Vinyloop[®] solvent-based technology. Recinyl[®] can be used for calendaring and coating. Possible foaming usage is under evaluation.

AgPR has been supplying waste to the Dow/BSL feedstock recycling facility. EPFLOOR is also developing a partnership for using Vinyloop[®] to recycle post-consumer flooring in a plant to be built in Germany.

4.5. Coated Fabrics (timescale 2002-2010)

The EPCOAT⁵ (EuPC sector group for coated fabrics) project started in 2002 with a study to look into contributing to the recycling targets of Vinyl 2010.

Converters' attitudes to collection and recycling were investigated in several European countries. Figures collected in Germany and initial European estimates indicate that truck tarpaulins and advertising posters could be the highest contributors of collectable waste.

Test collection projects will start in 2003 in Germany and France. In the German test, post-consumer waste will be collected and transported by a partner waste management company. In France, waste will be forwarded in tailor-made 'big bags' from all over Europe.

A separate study, meanwhile, has been initiated on artificial leather.

From an evaluation in 2002 of the available technologies it appears that feedstock as well as solvent-based mechanical recycling offer the most promising solutions for treating PVC coated fabric wastes.

5. Waste management: Pilot projects and R&D

Vinyl 2010 is involved in several different recycling technologies and projects. They all aim to develop the best end-of-life treatment for each type of waste stream.

5.1. Cooperation with ACRR (timescale 2001 and beyond)

The associations represented by Vinyl 2010, the plastics industry resin producers (APME) and recyclers (EuPR) signed in September 2001 a Partnership Agreement with Association of Cities and Regions for Recycling (ACRR). The objective is to improve the recycling of plastic waste collected by local authorities.

Three activities were planned:

- Define a communication strategy and develop communication tools to improve the collection of selected types of plastic waste. Initial phase to involve collection of data on public/private communication strategies and good practice for collection and sorting of plastics, in partnership with plastics recyclers
- Establish pilot communication campaigns in two cities, assessing the results and producing guidelines for future actions
- Follow through pilot projects in these cities to increase the recycling of waste streams selected on the basis of existing best practices

The development of a communication strategy includes the identification of best practices and the analysis of public and private communication campaigns. Work started in 2002 on the preparation of a Best Practices guide for local authorities.

An important weak point identified in the plastic recycling loop is collection. There are four main sectors generating plastic waste that can be managed by the local authorities: households, the agricultural sector, the trade and the Small and Medium Enterprises (SME) sector, and the construction and demolition (C&D) sector. For these sectors the project has identified examples of private and public collection schemes.

Pilot projects are underway in Catalonia and the region of Porto with preliminary results expected in 2003 and 2004 respectively.

Meanwhile, ACRR members in Italy, Spain, Portugal and Belgium have the intention to launch a follow-up project with the plastics, construction and demolition industries to research and promote the collection and recycling of plastic waste from buildings. The partners in this new project have applied for funding from the EU's LIFE programme. *

5.2. Development of Mechanical Recycling Projects

5.2.1. EuPR Recycling Study and Recovinyl Initiative

In 2002, EuPR conducted a study on PVC mechanical recyclers in the EU (EuPR project step 1). The aim of this study was to better understand who these independent third party recyclers are, what their business is, how they recycle post-consumer PVC waste and whether they are ready to invest in additional capacities.

Many European plastics recyclers – around 500 – claim to be recycling PVC. The study showed, however, that this is a core business for no more than 30 companies which have the expertise and willingness required to deal with post-consumer PVC waste (washing, grinding and micronising).

The main problem with post-consumer waste is to ensure a steady supply of secondary raw material to these recyclers in order to justify their investments. In an effort to help ensure steady supply, recyclers and other interested parties have agreed to set up a consortium called Recovinyl SA (Result of EuPR project step 3) that will facilitate the collection, dispatching and recycling of post-consumer PVC waste across Europe.

⁴ European PVC Floors Manufacturers

⁵ EuPC PVC Coated Fabrics Sector Group

(*) For more information about LIFE, please visit <http://europa.eu.int/comm/environment/life>

Putting together the business plan for Recovinyl, the gathering of shareholders and the development of tools such as an internet business platform took most of the second half of 2002. The company is scheduled to be incorporated by mid-2003.

The Recovinyl e-business platform (www.recovinyl.org) will be open free-of-charge to cities and regions in Europe, allowing them to offer their PVC waste for recycling. The website, which will be available in English, French, Italian, German, Spanish and Dutch, is scheduled for launch during the summer of 2003.

5.2.2. Vinyloop Ferrara (timescale 2001 and beyond)

The Vinyloop® plant in Ferrara, Italy, went on stream in February 2002. The installation of a new bottom for the filter in July and new filtering procedures as well as other technological improvements permit the facility progressively to achieve a monthly recycling capacity of about 250 tonnes. All efforts – including the installation of specifically designed new equipment and the optimisation of production procedures – are currently put into motion to attain a capacity of 750 tonnes per month by the second half of 2003.

By December 31, the Ferrara plant had sold more than 412 tonnes of PVC recycled from post-consumer electrical cable waste.

5.2.3. Taxyloop Project (timescale 2001 and beyond)

The project proposed by the French company Ferrari for recycling PVC-coated fabrics started in 2001. Currently in promising development on a pilot scale, this concerns a specific treatment for recycling fibres and PVC compounds. Known as Taxyloop® it is based on the Vinyloop® technology.

In February 2003 Vinyl 2010 approved a plan in two phases. This entails to start building a market development unit of 1,000 tonnes per year in 2003, to be followed by a 10,000-tonne-a-year commercial plant in 2006.

5.3. Development of Feedstock Recycling Projects

5.3.1. Tavaux Pilot Plant (timescale 1999-2002)

An industry partnership under the leadership of ECVM has built a pilot plant at Tavaux, France, based on the slag bath gasification technology developed by Linde in Germany.

The trial project, which started in 2001, continued into 2002. A critical point was reached in the autumn: The project team had to decide whether to try to complete the Tavaux project as originally planned, or alternatively to re-focus towards other, more promising gasification technologies which had progressed in the meantime.

The Tavaux pilot plant had some positive results to show: The principle of gasification of contaminated, PVC-rich waste with high yields of HCl and syngas had been demonstrated. In addition, the slag contained no organic matter and was leachate-free.

However, even with major modifications of the reactor design, feeding and control systems, the technology was not judged sufficiently robust for steady operation under industrial conditions.

The project team therefore decided to stop the project. The need for a low-cost, robust gasification process capable of treating contaminated and mixed, PVC-rich waste streams nevertheless remains. The industry has initiated efforts to assess alternative gasification technologies. The focus will be on technologies close to commercial implementation and hence this decision will have no impact on Vinyl 2010's recycling commitments.

5.3.2. DOW/BSL Project (timescale 2001 and beyond)

Dow operates a commercial feedstock recycling plant at its Schkopau site near Leipzig, Germany, since 1999. The facility is capable of treating high chlorine-containing waste. Initial trials demonstrated that the technology is robust and suitable to treat large quantities of most kinds of PVC waste products, including cables, flooring, roofing membranes, coated fabrics and others.

A 1,000-ton field trial was scheduled for 2001 but could not be completed, mainly for logistics reasons. The trial was re-launched in 2002 by introducing the German waste management company Ascon as "clearing house" to act as central agent between the waste suppliers, with Dow as the plant operator and Vinyl 2010 as the initiator and main source of funding. Ascon organised the supply of 1020 tonnes of mixed PVC waste by end-March 2003, which have been successfully processed and the recovered chlorine used on-site for new VCM/PVC production.

5.3.3. Stigsnaes Project (timescale 2001 and beyond)

Stigsnaes Industrimiljø AS in Denmark is the owner of a commercial 50,000-tonne hydrolysis plant. Its potential for conversion into a two-step process for the recycling of PVC waste products was the objective of a trial programme, initiated in 2001, and supported by the Danish Environmental Protection Agency, the Danish plastics industry and Vinyl 2010.

Phase 1 of the trial programme to identify modifications required in the existing hydrolysis unit was successfully completed in 2001, demonstrating that de-chlorination to well below 0.1% weight of chlorine can be achieved.

In Phase 2 of the trial programme for 2002, the performance of a newly installed pyrolysis unit to post-heat and separate the de-chlorinated solid fraction as produced by the hydrolysis plant was tested, again with positive results.

The research led Stigsnaes and parent company RGS90 to upgrade the plant to commercial scale with a capacity of 40,000 tonnes of PVC waste per year. The investment is supported by a grant from the EU's LIFE programme as well as by Vinyl 2010. *

5.3.4. Redop Process (timescale 2001 and beyond)

The Redop process targets the mixed-plastics segment of municipal solid waste. Mixed plastics waste streams normally contain 0.5% to 5% in weight of chlorine, which is less than what is contained in the 'PVC-rich' waste streams used for the feedstock recycling processes described in sections 5.3.1 to 5.3.3. Mechanical recycling of such mixed-plastic waste would only yield low-value products.

(*) For more information about LIFE, please visit <http://europa.eu.int/comm/environment/life>

The purpose of the promising Redop technology is to obtain a commercially viable product capable of replacing pulverised coal in steel production. The waste product is fed together with coal into blast furnaces. The waste, however, must first be de-chlorinated.

The project is managed in the Netherlands by DSM Research with participation of waste management companies, the plastics industry, a steel manufacturer and Vinyl 2010. Trials conducted in 2001 were very promising: the very low chlorine, zinc and lead content, granule size and high calorific values of the Redop product matched steel manufacturers' most demanding specifications.

In early 2002 the partners involved in Redop decided to go ahead with the production of larger quantities to conduct trials in a blast furnace on a commercial basis.

To undertake the de-chlorination step on such a scale, suitable equipment was identified, necessary modifications cost-estimated and engineered. Redop expects to complete these during the second quarter of 2003, followed by injection trials at a commercial equipment manufacturer and trials on an industrial scale at a steel plant.

5.4. Development of Energy Recovery Projects

5.4.1. Incineration Projects

Vinyl 2010 is supporting a survey of state-of-the-art technologies for the reduction and/or detoxification of neutralisation salts from Municipal Solid Waste incineration.

The survey will cover processes developed by Solvay ("Neutrec" and "Resolest"), which are applied on a commercial scale in Italy and France, as well as competing technologies such as 'Halosep' developed by Watech in Denmark and others.

Vinyl 2010 has agreed to provide financial support to technology developments in this field. Watech's 'Halosep' process has been earmarked as a first funding candidate for the testing of a mobile demonstration unit.

5.5. Other Projects

5.5.1. UK Mixed PVC Waste Study

Due to its geographical location, the UK has to find suitable national solutions to treat its waste. PVC manufacturers from all sectors in the UK are coordinating their efforts to develop such solutions.

With help from the government-sponsored WRAP scheme, the industry has supported a project exploring the availability of post-consumer PVC waste and the available technologies to treat it. Aside from rigid PVC dealt with by EPPA and TEPPFA, a large fraction of the UK waste could come as a mixed stream. The investigation will continue in 2003 with pilot collection tests.

5.5.2. Eco-Efficiency Study of Recovery Options

All possible waste treatment options must be carefully analysed to ensure that they meet the criteria of sustainable development. So-called eco-efficiency studies look at all the environmental and economic aspects in a systematic way by applying standardised methodologies.

PE Europe GmbH, a spin-off of the Institute for Polymer Testing and Polymer Science (IKP) of the University of Stuttgart, was contracted by Vinyl 2010 in early 2002 to carry out such an eco-efficiency study. Titled "PVC Recovery Options: Ecological and Economical System Analysis", the study investigated various treatment options for mixed cable waste. Landfill was used as a base case for comparison with the following recovery technologies:

- Vinyloop : mechanical recycling using solvents
- Stigsnaes: feedstock recycling
- Watech: feedstock recycling
- MVR Hamburg: modern municipal solid waste incineration with energy and HCl recovery

The study concluded that all four recovery options are preferable to landfill from an eco-efficiency point of view. From the perspective of material and energy recovery, the study indicated that the Vinyloop® process achieved the best results, followed by the two feedstock recycling processes and MVR in third position.

The study showed, however, that selection of a recovery technology must take into account specific national or even local conditions because of differences in the applied environmental policies. The conclusions are scheduled to be peer-reviewed and published in 2003.

6. Social Progress and Quality of Life

The industry associations ECVI, ECPI and ESPA together with the European Mine Chemical and Energy Workers Federation (EMCEF) agreed to set up a social dialogue on important issues for all involved partners. This dialogue is a permanent and sustainable process between industry and unions, with regular meetings and consultations.

The dialogue includes the following issues:

- Development of European health, safety and environmental standards
- Employee training
- Transfer of standards to the EU accession countries
- Dialogue on European Works Councils

In 2002 consultation continued on the above and a meeting was held in Luxembourg to agree the basis further to develop the medical surveillance protocol for workers.

10 | Management, Monitoring and Financial Report

Vinyl 2010 is the legal entity set up under Belgian law to manage the Voluntary Commitment. It was approved by a Belgian royal decree on December 16, 2002. (*)

The General Assembly of 12 February 2003 elected the following board:



Vinyl 2010 seeks actively to work with stakeholders outside industry, to have their views and feedback. We have initiated contacts and dialogue. We are working to establish a Monitoring Committee within the structure of Vinyl 2010 to review progress on commitments. Representatives from EU Member States, the European Commission, members of the European Parliament as well as other interested parties are being encouraged to participate. The first meeting of the Monitoring Committee is scheduled for Quarter 2 2003.

(*) Vinyl 2010 was established by the European Council of Vinyl Manufacturers (ECVM), the European Plastics Converters (EuPC), the European Stabilisers Producers Association (ESPA) and the European Council for Plasticisers and Intermediates (ECPI). The latter organisation is, from a technical viewpoint, not legally a member because it lacks legal personality under Belgian law. But ECPI is fully involved in Vinyl 2010 on an operational level.



Financial Report

Vinyl 2010 increases sustainable development funding by 74%

Total expenditure on waste management projects by Vinyl 2010 and EuPC member associations reached € 4.5 million during 2002. This represents a 74% rise from the € 2.6 million spent during the previous year.

The increase reflects new funding for projects initiated by Vinyl 2010 during the year. Funding of about € 1 million was made available for EPCoat (coated fabrics), ESWA (roofing), ACRR (municipal waste), EuPR (mechanical recycling) and an eco-efficiency study of waste recovery options. Financing was increased substantially on a number of programmes, such as the Vinyloop® Ferrara cable recycling facility and the Dow/BSL feedstock-recycling project.

It is important to keep in mind that the expenditures below only represent the waste management projects in which Vinyl 2010 and its members are active. Risk assessments, running costs, communications and other expenditure are not covered.

The 2002 accounts of Vinyl 2010 were audited and approved by KPMG.

VINYL 2010

WASTE MANAGEMENT PROJECTS

2002 accounts; figures in 1000s of Euros

name of project	expenditure current project phase*	contribution by Vinyl 2010 and EuPC members **	
		2002	2001
Vinyloop Ferrara	12500	1840	1000
Texyloop	1077	0	0
EPFLOOR	245	245	452
EPCOAT	363	363	0
ESWA - Edelweiss	172	172	0
Stigsnaes	261	58	183
Redop	0	0	1
Dow/BSL	181	181	19
ACRR	145	145	0
Eco-efficiency study/LCA	94	94	0
EuPR	229	229	0
TEPPFA	740	740	577
EPPA	443	443	361
TOTAL	16450	4510	2593

(*) Includes expenditure by Vinyl 2010 and private and public partners

(**) Expenditure by Vinyl 2010 and by EuPC sectorial associations

11 | Verification statement



Det Norske Veritas (DNV) is an autonomous, independent Foundation with the objective of safeguarding life, property and the environment.

Independent review by Det Norske Veritas

The PVC Industry's Voluntary Commitment (Vinyl 2010) sets out a 10-year programme aimed at meeting the challenges of sustainable development and continuous environmental improvement throughout the entire PVC-lifecycle.

DNV has performed an independent review of the 2003 Progress Report which presents the achievements in 2002 related to this programme. This report reflects the outcome of the review.

The work has been based on document review, interviews, meetings with Vinyl 2010 representatives, and information available on the internet, to assess whether the statements made are truthfully representative of the activities performed.

The verification process has consisted of the following tasks:

- Review of plans and project presentations.
- Review of progress reports for the projects.
- Review of minutes from project steering group and committee meetings.
- Interviews and correspondence with relevant personnel.
- Review of project contracts.

The following aspects are excluded from DNV's review scope:

- The underlying information or data on which the above-listed documents are based.
- The information regarding the studies described in Chapter 2.1 Stabilisers. This would require a separate detailed review. The existence of the studies is verified.
- The pie chart "Western European PVC consumption per application", and the table "Tonnes of stabiliser systems".
- The accounts for 2002.

Except for these exclusions, it is our view that the contents of the Progress Report truthfully represent the work carried out in 2002 towards fulfilling the Voluntary Commitment. We have seen enthusiasm and commitment amongst the Vinyl 2010 participants and consider that they are well underway towards implementing their 10-year programme.

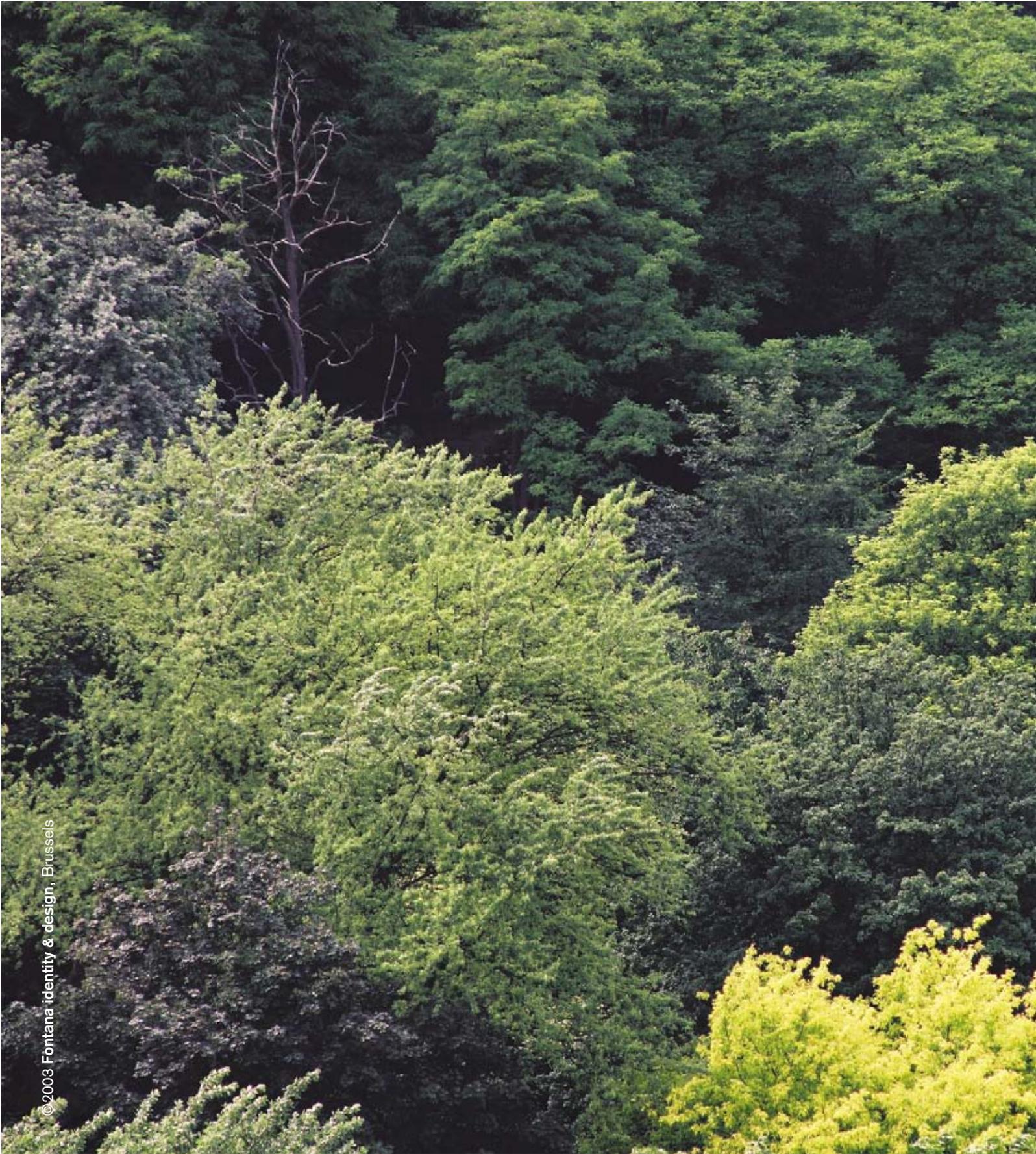
Høvik, 27 April 2003

Bjørn Faanes

Christen M. Heiberg

A photograph showing a person from behind, wearing a dark coat, standing on a rooftop. They are positioned next to a camera mounted on a tripod. The camera is pointed towards a vast, hazy cityscape below. The person's coat is blowing in the wind. The rooftop surface is visible in the foreground, showing some equipment and a railing.

Marie-Françoise Plissart, the author of the photographs illustrating this report, was born in 1954. She lives in Brussels, where she has become well known for her un conventionally 'vertical' and 'horizontal' views of her hometown (two pictures of which are shown in these pages.) She says about her work:
"I try to photograph life itself, in its many guises and everywhere it appears."



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