

asking more from chemistry



**SOLVAY**



As an international chemical group, Solvay assists industry in finding and implementing ever more responsible and value-creating solutions. The Group is firmly committed to sustainable development and focused on innovation and operational excellence. Solvay serves diversified markets, generating 90% of its turnover in activities where it is one of the top three worldwide. In 2012 the Group achieved net sales of EUR 12.4 billion. Solvay SA (SOLB.BE) is listed on NYSE Euronext Brussels and Paris (Bloomberg: SOLB.BB - Reuters: SOLBt.BR).

EUR  
**12.4**  
billion  
net sales

**111**  
sites and  
presence in  
**55**  
countries

**29 100**  
employees

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# SOLVAY

asking more from chemistry®

## *Choosing to be a pioneer in a changing world*

«Asking more from chemistry»: our new signature affirms our commitment to meeting high expectations in terms of safety, quality and innovation. We also assert loudly and clearly our pride in belonging to an industry that is determined to meet the challenges facing it and whose progress is also that of society at large. We believe that chemistry will help provide the long-term answers that industry, consumers and society are waiting for, and in so doing, contribute to the progress of mankind.

In 2013, Solvay begins a new chapter in its history. Affirming the Group's historical roots while also oriented toward the future, its new graphic identity and signature reflect Solvay's ambition, to become a reference for sustainable chemistry, with a solid culture of operational excellence and innovation.

## INVENTING A NEW MODEL OF SUSTAINABLE CHEMISTRY

Sustainability, responsibility: never have these issues been so crucial for mankind. All of us are looking for answers to the questions raised by an evolving world. How to respond to climate change? How to produce more with increasingly scarce resources? How to meet the needs of more than one billion new consumers? And how to achieve our aspirations for health and well-being?

For Solvay, chemistry is a part of the answer. It proves this by imagining and producing increasingly innovative solutions that meet the sustainable development challenges facing its stakeholders. Proud of chemistry, an expert in its businesses, welded into highly qualified teams, the Group combines operational excellence and continuous improvement to blaze a creative path of shared value.

In this way Solvay affirms itself as a committed and strong leader, ready to play its part in reshaping the global chemical industry.

# A NEW IMPETUS TO OUR COMMITMENT

Social and environmental responsibility calls on values that lie at the very heart of Solvay's identity: behaving internally and externally in a manner worthy of the Group's vocation, innovating, and serving progress.

These are powerful drivers that propel and guide our actions. Very early on they led us to recognize the reality of the challenges that the planet faces and to transform the requirements of sustainable development into market opportunities. The strategy of our Group, our attention to our customers and suppliers, and our relations with civil society and with our host countries are all energized

and enriched by this approach. The integration of the two groups, both committed for many years already on the path of sustainable development, has given a new impetus to our commitment. Throughout 2012, they worked together to combine policies, programs, objectives and respective indicators. Out of these exchanges was born Solvay Way, our new sustainable development policy.

Solvay Way is based on a continuous improvement reference framework, divided in four levels of progress. Solvay Way will allow our entities to evaluate their practices and identify their improvement plants on an annual basis. Multi-annual objectives, monitored regularly by the Executive Committee, aimed at improving Solvay's environmental and social profile.

Solvay Way involves each and every employee, regarded as a direct and essential player of the Group's social and environmental responsibility. We have to mobilize these employees in a common dynamic if we are to build the culture of broad-based responsibility that sustainable development requires. Equally important is maintaining dialogue with our environment: this is the objective of this sustainable development report produced for it, presenting our Corporate Social Responsibility (CSR) performance in detail, with comments, by theme areas (economic, environmental, human resources, company, product). Published annually, this report will allow our internal and external audiences to assess transparently our progress and our fulfilling of our commitments.

This approach is certainly a challenging one. But also exciting and motivating. In any case, one intended, by its objectives, to live up to the history of our Group and to its ambition to assert itself to become a model in sustainable chemistry.



**Jacques Kheliff**  
*Sustainable Development Group  
General Manager*

# OUR PRIORITY TARGETS BY 2020

## Sustainable Portfolio Management (SPM)

- > To have 20% of our turnover in the "Star" category according to the SPM assessment
- > To have 100% of our R&I projects in the "Star" or "Aligned" category according to the SPM assessment

*See «Sustainable Portfolio Management» pp. 38-45*

## Learning & development

- > To ensure one week of training per employee and per year
- > To train 100% of our employees to the Solvay Way reference framework

*See «Learning & development» p.78*

## Process safety

- > To have 100% of our sites with a risk analysis updated in the last five years

*See «Process safety» pp.94-95*

## People safety

- > To reach a Medical Treatment Accident Rate (MTAR) lower than 1.0

*See «Occupational safety» pp.90-93*

## Energy & climate

- > To reduce further by 10% <sup>(\*)</sup> the greenhouse gas emissions (in CO<sub>2</sub> equivalent), both direct and indirect, associated with our manufacturing activities

- > To reduce further by 10% <sup>(\*)</sup> our primary energy consumption

*See «Energy & climate» pp.55-58*

## Water

- > To reduce further by 10% <sup>(\*)</sup> the withdrawal of groundwater and drinking water
- > To implement a Sustainable Water Management in 100% of our sites under water stress

*See «Water ressource» pp.68-70*

## Emissions and effluents

- > To reduce further by 25% <sup>(\*)</sup> the air emissions of substances with an acidification potential (in SO<sub>2</sub> equivalent)
- > To reduce further by 10% <sup>(\*)</sup> the air emissions of substances with a photochemical ozone creation potential (in NMVOC <sup>(\*\*)</sup> equivalent)
- > To reduce further by 20% <sup>(\*)</sup> the water emissions of substances with an eutrophication potential (in PO<sub>4</sub> equivalent)

*See «Emissions, effluents» pp.58-66*

<sup>(\*)</sup>Base 2012, at constant activity perimeter  
<sup>(\*\*)</sup> NMVOC: Non Methanic Volatile Organic Compounds



**SOLVAY** way  
doing business, being responsible

# SOLVAY WAY, A STRUCTURED AND AMBITIOUS SUSTAINABLE DEVELOPMENT POLICY

Our new «Solvay Way» Sustainable Development Policy integrates the advances and best practices of Solvay and Rhodia, and sets ambitious goals at the Group level. Supported by strong governance, all our employees are today enlisted in deploying it.

**The Solvay Way reference framework gives managers of the various Solvay sites, Global business units and functions a grid with which to self-assess their progress at four levels: launch, deployment, maturity and performance. The aim is to induce a continuous improvement dynamic, with commitments periodically reviewed and made more ambitious.**



## BEING A RESPONSIBLE PLAYER: THE SOLVAY WAY

For Solvay, responsible chemistry respects people and their environment. It offers its employees a safe and secure working environment that encourages their professional development. Its environmental footprint is as neutral as possible for the planet. Priority is given to using renewable and recycled materials, with a constantly reducing consumption of energy, water and resources. Its products meet the sustainable development challenges that its clients face. The value created by such chemistry is recognized by its stakeholders and shared equitably with them.

## SOLVAY WAY, AN APPROACH TO PROGRESS BACKED BY A DEMANDING REFERENCE FRAMEWORK

Solvay Way is an integral part of a dynamic of continuous progress, based on a reference framework of commitments that enables all Group entities to self-assess their sustainable development progress on the basis of 48 practices. This approach is structured by stakeholders and incorporates the requirements of ISO 26000<sup>1</sup>.

1. ISO 26000 is a global standard which provides guidelines for organizations to operate in a socially responsible manner. The standard was published in 2010 after five years of negotiations among a large number of stakeholders worldwide. Representatives of governments, NGOs, industry, consumer groups and the world of work were involved in its development. It represents therefore an international consensus.

### SOLVAY EXTERNAL COMMITMENTS

Solvay commits to the «Responsible Care®» World Charter. Responsible Care commits participating companies to continuous progress, beyond the regulatory standards and requirements to which it is subjected and with which it complies.

# A DESIRE FOR OPEN SOCIAL DIALOGUE

Corporate Social Responsibility means maintaining a regular dialogue with our employees in an atmosphere of trust. This exchange is particularly important as they are the key players in our responsible performance.

## TOWARDS A GLOBAL AGREEMENT ON RESPONSIBILITY

In similar approaches, Solvay and Rhodia legacies each cleared the way to open a responsible dialogue with their employees at national and international level. Solvay and its European Works Council in 2008 signed a Sustainable Development and Social Responsibility Charter. Back in 2005, Rhodia signed a Corporate Social responsibility (CSR) agreement with ICEM, an international trade union federation. From that time, different federations from metallurgy, clothing/

textile/leather and International Federation of Chemical, Energy, Mine and general Workers Unions (ICEM) have merged to create industriALL (50 million workers in 140 countries). This agreement imposed the Rhodia legacy to respect its own commitments, the International Labor Organization (ILO) standards and the principles of the United Nations Global Compact (UNGC).

In 2013, based on these converging experiences, Solvay intends to create a new framework of dialogue with its global partners.



Solvay and Rhodia legacies had signed up to the UN Global Compact (UNGC) initiative. This commitment implies to adhere to the ten principles of the UNGC, to report and communicate on a yearly basis with key stakeholders on progress made to implement the principles (as so called «Communication on Progress» or «COP»).

From 2011, Solvay reported according to the criteria of the «Advanced reporting level» and consequently became a «Global Compliance Advanced» Company. See: Solvay Communication on Progress.



# CONCRETE COMMITMENTS TO OUR STAKEHOLDERS

The commitments of the Solvay Way reference framework aim to achieve an optimal level of responsibility towards our stakeholders. With them, we are constantly working to identify areas for improvement in our processes and practices.

## CUSTOMERS

To industrial customers facing increasingly stringent regulations and ever more demanding consumers, we offer controlled-impact solutions that are the fruit of collaborative innovation.

### Our commitments

- >Integrating our CSR commitments into customer relationships,
- >Controlling product-related risks,
- >CSR-integrating innovation;
- >Analysing and developing our markets, while integrating CSR.

### In action

#### Product transparency

In accordance with current legislation such as REACH in Europe, the Group informs all concerned stakeholders (employees, customers, consumers, authorities) of the properties of its products and their conditions of use.

The Group also provides its customers with product eco-profiles for their lifecycle analyses. As part of an initiative by the International Council of Chemical Associations (ICCA), the Group has already published 60 «Product Safety Summaries» (PSS) for a non-specialist audience. These describe in simple terms the main features of our products and the potential risks that their use can pose to the health and the environment.

## EMPLOYEES

The Group is committed to its employees in terms of safety and health at work, professional development, fair treatment and respect of human rights.

### Our commitments

- >Ensuring employees health and safety,
- >Respecting employees' fundamental human rights and guaranteeing their social rights;
- >Ensuring quality social dialogue;
- >Developing employability;
- >Motivating employees.

### In action

#### Work safety, our priority

Employees safety is a priority for Solvay, which is constantly improving its occupational accident frequency rate, among the lowest in the industry. The Group is keen to improve its performance in this area by setting a new target. It takes on and further develops new programs and practices that have proven their worth in the entities, such as the «behavioral safety» program that promotes safe and responsible behaviors by operating staff in their everyday tasks.



## OUR PLANET

The Group seeks to reduce the environmental footprint of its manufacturing processes and to improve energy efficiency.

### Solvay Way commitments

- >Promoting environmental management;
- >Conserving natural resources;
- >Limiting environmental impact, preserving biodiversity;
- >Exercising responsible influence.

### In action

#### Reducing the environmental footprint of a mining activity

Solvay has developed a process for recovering and using methane from its natural soda ash (trona) mining activities at Green River (USA). This method, known as MaRS, captures the methane released during ore extraction, preventing its release into the atmosphere. The thermal energy of the gas is now recovered by combustion.

This innovation reduces the greenhouse gas emissions resulting from the extraction and processing of the ore.



## INVESTORS

By submitting the Group's modes of governance, its results and its strategic vision in a regular and open manner, Solvay meets the requirements of transparency and rigor demanded by market regulators and expected by investors. It wishes to be recognized as a reference responsible industrial investment.

### Our commitments

- >Generating value responsibly;
- >Ensuring risk management;
- >Ensuring dissemination and compliance with good management and governance practices;
- >Communicating in an ethical and transparent manner.

### In action

#### The risk management process<sup>1</sup>

Our risk management system, embedded in our strategic and operational decision-making, allows us to identify and better manage opportunities while limiting the risks affecting our activities. This management tool is essential to achieving our goals in the short, medium and long terms.

## SUPPLIERS

The Group wishes to involve its suppliers in relationships of trust, based on shared ethical principles established with the goal of creating sustainable value for all.

### Our commitments

- >Defining prerequisites and integrating them into the supplier selection process;
- >Evaluation buyers' CSR performance;

1. Readers are referred to the annual report.

- >Managing and assessing suppliers' CSR performance, optimizing relationship.

### In action

In 2012, the Group took part in creating and implementing a global methodology, called «Together for Sustainability,» specific to the chemical industry supply chain. This methodology permits the evaluation and audit of suppliers' social and environmental responsibility.

## COMMUNITIES

The Group has established relationships of trust with its site neighbors, through strict control of risks and nuisances, dialogue and clear information.

### Our commitments

- >Ensuring the integration of entities within their territories;
- >Controlling industrial risks related to entities' presence in their territories;
- >Controlling supply chain risks and preventing accidents.

### In action

#### Strengthening our relationships with local communities

At the end of 2012, the Group launched an opinion poll among populations living close to 15 of its major production sites. This survey aims to assess the quality of relations with local communities, and more specifically their perception of the social, economic and environmental issues. The results and trends identified in 2013 will serve as a basis for the local management of sites.



# SOLVAY WAY, A SYSTEM FOR MANAGING THE GROUP'S SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

The Solvay Way approach serves the worldwide deployment of the Group's commitments and guides employees in the continuous improvement of their practices.

## BEST PRACTICES DISSEMINATED WORLDWIDE

Grounded in the realities of its businesses and inspired by the best practices of Solvay and Rhodia, the Solvay Way reference framework is ambitious in its objectives and pragmatic in its implementation.

The framework allows all the entities worldwide to apply common approaches to progress, based on 47 practices identified as priority, structured on a four-point scale.



## TOWARDS AN INTEGRATED REPORTING OF FINANCIAL AND EXTRA-FINANCIAL PERFORMANCE.



Solvay is convinced about the need to progress towards a more integrated reporting of its global performance. It would allow an easiest evaluation by its various stakeholders in a clear, concise, connected and comparable format. Such an Integrated Report should be an organization's primary reporting vehicle.

In this context, Solvay is an active member of the International Integrated Reporting Council (IIRC) and is committed to implement its main recommendations. This organization aims to facilitate the development of such integrated reporting over the coming decade and enable stakeholders among which investors, regulatory bodies and others to make better short- and long-term decisions.

### AT THE HEART OF OUR PROCESSES

The reference framework, applied to the entire lifecycle of products, questions each entity on the impact of its activity and each employee on their practices affecting their particular stakeholders. Integrated into our management processes - governance, risk management, public affairs, R&I, purchasing, supply chain, human resources, Health, Safety & Environment (HSE)- it offers complete coverage of our practices.

### STRONG MANAGEMENT INVOLVEMENT

The variable remuneration of the Chairman of the Executive Committee (CEO) and all Group managers (7000 people) will in 2013 reflect their contribution to the Sustainable Development process. Additionally, the Sustainable Development Group General Manager reports directly to the CEO.

### SELF-ASSESSMENT: A DRIVER OF PROGRESS

Each entity is responsible for the implementation of Solvay Way within its organization. The annual self-assessment of its practices, using the Solvay Way analysis grid and scoring system, enables the entity to measure the progress achieved and to adjust its progress plan. The Sustainable Development Management consolidates this assessment data and presents the results to the Executive Committee.

### A STRICTLY CONTROLLED PROCESS

Moved by our desire for accountability and to validate our practices, each year we shall submit the self-assessment and performance indicators to audit, both internally and by external agencies. The consolidated annual reporting of the Solvay Way reference framework will be presented to the employee representative bodies. Under the global CSR accord signed between IndustriAll and Rhodia, on-site assessment missions are undertaken to ensure the effective implementation of our commitments.



# SOLVAY WAY, AN EVALUATION GRID AND A GUIDE FOR MEASURING PROGRESS

Each year the Solvay's production sites, business units and research and innovation centers, purchasing, finance, legal, public affairs, communication, strategy and human resources departments all assess their practices in terms of corporate social responsibility.

The objective – for each part of the Group – is to identify its progress toward stakeholders regarding Solvay Way commitments. The entities can then define action plan to improve their processes and practices.

## 2013, DEPLOYMENT YEAR

Implementation of the Solvay Way calls for the broad involvement of employees in the assessment of practices, definition of objectives and implementation phases. The generalization of the approach, initiated in early 2013, promotes the integration of the new Solvay teams around unifying objectives. Coordinated by the Sustainable Development Management, it is directed via a global network of more than 200 «champions» and «correspondents» who ensure its

active deployment within the GBU or Functions. The Sustainable Development Department, attentive to the needs of the different stakeholders and responsible for supervising the approach on behalf of the Group, coordinates the work of this network and reports directly to the CEO.

EXAMPLE OF A SOLVAY WAY GOOD PRACTICE

STAKEHOLDER: THE PLANET  
PRACTICE: PRESERVING NATURAL RESOURCES

	1 LAUNCH	2 DEPLOYMENT	3 MATURITY	4 PERFORMANCE
<b>3.2.3. Reducing water consumption</b>	Determining the water consumption profile of the entity and its water footprint.	Defining an action plan to achieve the group's objectives and undertaking an environmental impact study of water intake.	Deploying the action plan and monitoring results. The entity has achieved the annual target set by the group.	Implementing the best available technologies in water consumption.
<b>Detailed requirements</b>	The site has developed a detailed water report covering 80% of its consumption of groundwater and surface water, and their uses. The site knows the water stress situation of its particular area.	Is there an action plan available to reduce water consumption? Has an impact study been conducted of the site's water withdrawals in the uptake environment (river or groundwater)? <i>NB: Requirement is not relevant if the site's consumption is low compared to the resource or if the site is not in an area of stress according to the group's classification methodology.</i>	The progress of the action plan to reduce water consumption is reviewed on a regular basis (at least quarterly).	The best available technology to minimize water consumption has been implemented for 50% of the water consumption. An impact study has been carried out for sites that are not in water stress areas. The site has taken into account the effects of climate change on water resources.

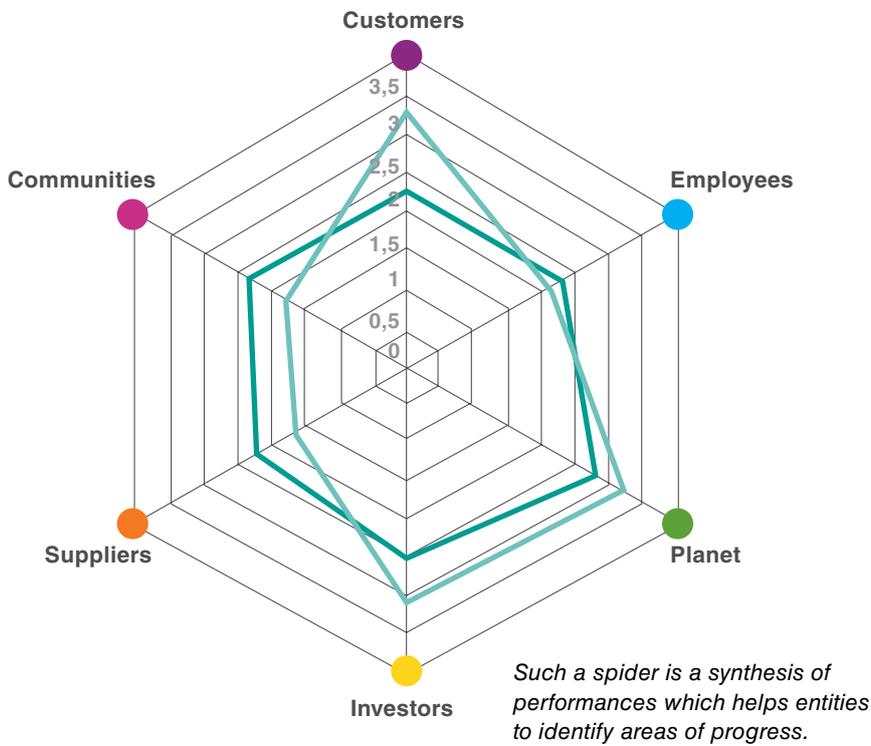
**A PROGRESS DYNAMIC IS TO BE MEASURED WITHIN THE FOLLOWING FOUR LEVELS**

- 1 **Launched:** the entity is essentially responsive to the expectations of stakeholders. An inventory is conducted;
- 2 **Deployment:** the entity implements a structured, internal progress dynamic with stakeholders; methods are used to set priorities; resources are deployed; managers are mobilized in action plans;

- 3 **Maturity:** action plans bring measurable progresses. Their implementation is carried out and audited throughout perimeter with lessons learned detailed; employees are mobilized in the deployment; and,
- 4 **Performance:** the entity is close to the benchmark of the profession. The improvement process is sustainable, the results are sustainable. The entity is recognized for its exemplary performance. All stakeholders adhere to the approach.

## EXAMPLE OF A SOLVAY WAY REPORT

A Solvay Way spider report is generated after each assessment, and gives to entities a global view of their progress in terms of sustainability towards their stakeholders



# PROVIDING INDUSTRY WITH AN INCREASING NUMBER OF SUSTAINABLE SOLUTIONS

Solvay develops high added-value, innovative and competitive solutions, tailored to the present and future demands of end users.



## CONSUMER GOODS

Solvay offers consumers increasingly more comfort in daily life, through a wide range of fibers, plastics, flavors and various solutions. Solvay products and applications are used in particular in cleaning, personal care, nutrition and human health products, textiles and sports equipment.

**28 %**  
of net sales



## AUTOMOTIVE

Solvay supports manufacturers as they advance toward sustainable mobility with a wide and varied range of high-performance products and applications. Its silicas make tires more energy efficient, while its engineering plastics and specialty polymers lighten the weight of vehicles. The Group also develops materials based on rare earths that reduce polluting emissions.

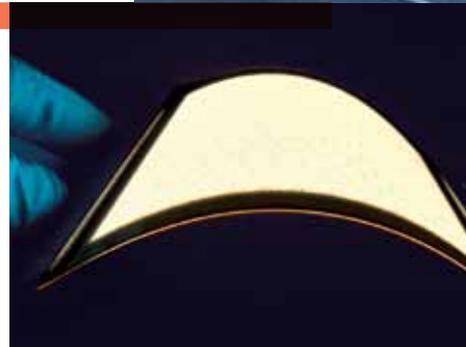
**15 %**  
of net sales



## ENERGY

For its industrial customers, Solvay devises cutting-edge solutions to increase energy efficiency in industrial installations or the amount of energy stored in lithium batteries. Its products are used to generate energy from renewable resources (solar and wind), and in fuel cells, gas-diffusion membranes and heat transfer.

**6 %**  
of net sales





## ENVIRONMENT

Solvay develops specific solutions that help protect the environment in daily life and in industry. These are used in air-emission control, soil remediation, water supply and treatment, gas-separation membrane technologies and water-purification membranes.

**5 %**  
of net sales



## CONSTRUCTION

The quality and reliability of Solvay solvents, fibers meet the needs of manufacturers of paints and coatings, thermal insulation, window frames, electrical wiring, cabling, and pipes and fittings for heating and cooling systems, as well as blowing agents and flame retardants.

**14 %**  
of net sales



## AGRICULTURE

For pesticides manufacturers, Solvay develops substitutes for conventional additives that are safe, easy to use, environmentally friendly and effective. Its silica and sodium bicarbonate are used in the manufacture of animal feed and animal-care products.

**4 %**  
of net sales



## ELECTRICITY AND ELECTRONICS

Solvay's high-performance products support the progress of these industries. Its formulations and solutions are used in conductive and photovoltaic materials, coatings for flat panel displays, semiconductors, medical imaging, digital cameras, optimizing the energy efficiency of electric lighting, electrical insulation components and organic electronics.

**7 %**  
of net sales



## PAPER

Solvay is a leading supplier to the world's paper industry. Its products are used at different stages of production: hydrogen peroxide for bleaching paper pulp, caustic soda for pulp production and soda ash for preparing the paper (opacification, coating formulation).

**2 %**  
of net sales



## OTHER INDUSTRIES

Providing environmental performance while remaining competitive is a major challenge for advanced industries. Solvay supplies them with process agents and intermediates for numerous applications.

**19 %**  
of net sales

# ACCELERATING OUR EXPANSION IN GROWTH AREAS

With a well-balanced geographic presence and solid positions in growth regions, Solvay is accelerating its geographic expansion through production capacity increases and targeted acquisitions.

In 2012, Solvay significantly expanded its production capacity in the region, by increasing capacity in India and consolidating its industrial presence in China and Thailand. The opening of a new Research & Innovation center in India makes Asia home to the group's second research cluster.

**ASIA PACIFIC REST OF THE WORLD**  
**28%** of net sales

**6 000** employees    **26** industrial sites    **3** R&I centers

**EUROPE**  
**42%** of net sales

**15,900** employees    **47** industrial sites    **7** R&I centers



Almost  
**40%**  
 of net sales are realized in high-growth countries, accounting for 1/3 of the workforce.

### NORTH AMERICA

**20%** of net sales



**3 400**  
employees



**29** industrial  
sites



**2** R&I centers

### LATIN AMERICA

**10%**  
of net sales



**3 800**  
employees



**9** industrial  
sites



**1** R&I center

**50%** of growth investments are being

made in the world's strongest-growing countries (Russia, China, India, Korea, Thailand, Middle East, etc.).

# INNOVATION, THE KEY LEVER OF GROWTH

Solvay's Research & Innovation has today a critical mass that will enable it to accelerate its development and enhance its leadership in its areas of expertise. Research and Innovation missions: to contribute to the Group's operational excellence, strengthen its leadership positions, identify future trends, and develop new technologies with which to expand the activities portfolio and open new markets for existing activities.

**13**  
major global R&I centers

**1900**  
researchers

**300**  
new patents

**€85**  
million investment in shareholdings and in risk capital<sup>1</sup>

**€261**  
million net R&I investment

## INNOVATION FOCUSED ON SUSTAINABLE DEVELOPMENT

Research & Innovation (R&I) carries Solvay's ambition to be a model for sustainable development. The demanding SPM (Sustainable Portfolio Management) methodology is applied to R&I projects right from the design stage to measure their environmental and societal impact.

## SIX INNOVATION THRUSTS ALIGNED WITH MEGATRENDS

Scarcity of resources, the fight against climate change, soaring consumption in high-growth parts of the world, new demands for environmental care, health and well-being, these are the trends that determine the main thrusts of our R&I policy.

>Coming up with new materials, that are more effective and eco-efficient, less resource-intensive, safer and lighter, by exploring the possibilities offered by the Group's expertise in plastics, soft matter and nanotechnologies.

>Developing renewable chemistry, opening the way for technologies that promote the use of renewable raw materials: new bio-based compounds, recycling processes.

### Supporting innovative SMEs in emerging sectors

*In 2012, Solvay invested EUR 5 million in Sofinnova Green Seed Fund, a seed fund to finance European SMEs that are innovating in industrial biotechnologies. We will be making our network of technology and market experts available to the fund and to the selected projects.*

1. In risk capital and start-up funds.

>**Contributing to the creation of sustainable energy solutions** such as photovoltaics and fuel cells as well as the development of new components for more efficient, lower environmental-impact batteries.

>**Producing more efficiently and responsibly**: reducing the environmental impact of our activities and optimizing resource utilization, increasing competitiveness and reducing the capital intensity of our industrial activities.

>**Supporting the growth of expanding markets**, for example in organic electronics.

>**Developing ever more responsible consumer products**, meeting consumer expectations and adapted to local needs for sustainable, healthier, safer and more efficient products.

### MAJOR RESOURCES TO POWER THE GROUP'S AMBITIONS

Our global network combines 13 R&I centers, eight advanced laboratories and 35 laboratories researching business-specific applications. Accelerated lead times for new products, reduced

costs and compliance with societal and regulatory expectations. These are some of the objectives that we share with our customers.

In 2012, the Group introduced new resources to support customers in growth regions. Solvay is also strengthening its resources in Asia, expanding the research center in Shanghai, China, opening a laboratory and starting cooperation with the EWHA Women's University of Seoul (Korea), and setting up a new Research & Innovation and Technology center in India. In Brazil a new laboratory is under construction on the Paulinia site.

### «OPEN INNOVATION» ACCELERATOR OF PROGRESS

Solvay strongly believes that innovation means thinking differently, but also and increasingly, listening to and working with others. This openness allows it to be attentive to the megatrends of society, to identify new areas of growth, and to track down and analyze the breakthrough projects that deserve to be prioritized and accelerated.

This open innovation is based on close collaboration with the academic world. In France, Solvay

partners with the Centre National de Recherche Scientifique (CNRS) and universities in several programs in joint laboratories. In 2012 in Brazil, Solvay initiated a partnership with the National Bioethanol Science and Technology Laboratory (CTBE). In Korea, the agreement with EWHA provides for the future joint research center to cooperate with the university's Center for Intelligent Nanobiomaterials.

Solvay is also developing its innovation potential by investing in leading edge start-ups in biotechnology, photovoltaics and advanced materials. In addition, Solvay also invests in venture capital funds that provide seed money in specific sectors.



# ORGANIZING AND MOBILIZING AROUND A COMMON VISION

To adjust its management structure to the diversity of its businesses, Solvay has redrawn its organization, with a focus on simplifying and decentralizing its decision-making. Thanks to these changes, the Group is closer to its customers, more agile and better placed to seize opportunities and realize its growth ambitions.

## FIVE OPERATING SEGMENTS SERVING THE STRATEGY

Effective January 1, 2013, Solvay is organized into five Operating Segments, focused on the key success factors of the field of activity. Each segment brings together, with a specific business model, GBUs sharing common characteristics and similar competitive, technological and/or regulatory dynamics.

The new organization favors an entrepreneurial approach focused on value creation. Close to its customers and markets, each GBU has the requisite operating resources to implement its strategy

**>Consumer Chemicals** serves the consumer products markets. Its growing product offering is directed at the societal megatrends: the demographic growth, the increasing purchasing power of emerging markets, the appearance of new modes of consumption, and a demand for safer, more sustainable products and renewable materials-based solutions.

**>Advanced Materials** offers ultra high-performance applications for aerospace, high-speed trains, health, low-energy tires, automotive emission control, smartphones and hybrid vehicle batteries.

**>Performance Chemicals** operates in mature and resilient markets, where success is based on economies of scale, competitiveness and quality of service.

**>Functional Polymers** brings together the chlorovinyls chain and the polyamide activities to serve mainly the construction, infrastructure, automotive, electrical and electronics markets.

**>Corporate & Business Services** includes the Energy Services GBU and Corporate Functions such as Business Services and the Research & Innovation centers. Energy Services' mission is optimize energy consumption and reduce emissions.

Starting with Q1 2013, the Group's results will be presented by these five operating segments.

## AN EXECUTIVE COMMITTEE SUPPORTING BUSINESS AND GROWTH

Solvay's culture of delegation is based on two-level decision-making: the Executive Committee (Comex) builds the Group's vision and its mid- and long-term strategy, which the GBUs implement.

Acting as a collegial body, the Comex supervises the achievement of objectives and optimizes resource allocation across GBUs. It is collectively responsible for overall performance and for protecting the Group's interests.

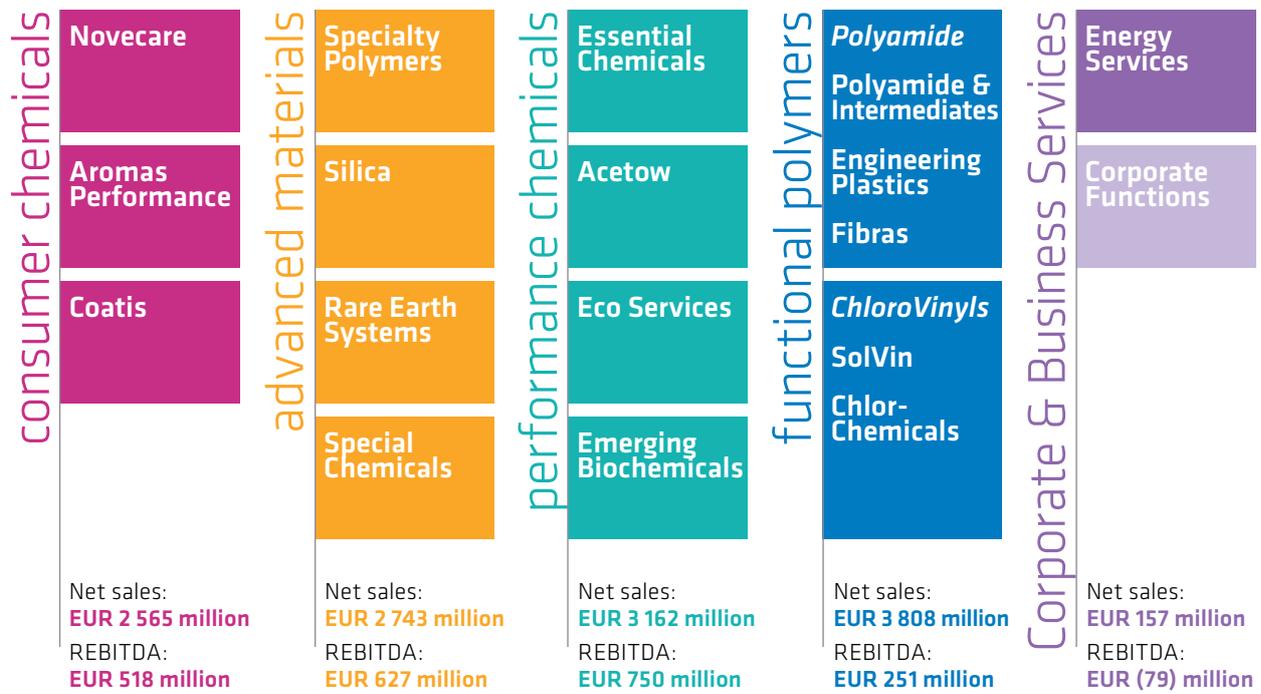
It is supported in its mission by transverse functions, which define common policies and ensure compliance to them.

## PROMOTING CULTURE CHANGE

Based on the principles of empowerment and delegation, the Solvay organization is structured to encourage initiative at each decision level. In order to anchor these principles in managerial reality and on the ground, the Group has transformed its culture model. The fruit of a collective effort and a vision by its teams, the new Solvay culture defines itself as one of responsibility and results. Reflecting the Group's tradition of excellence, it is built on two pillars: a management model and a «social» contract. Having employees take ownership represents a major challenge.



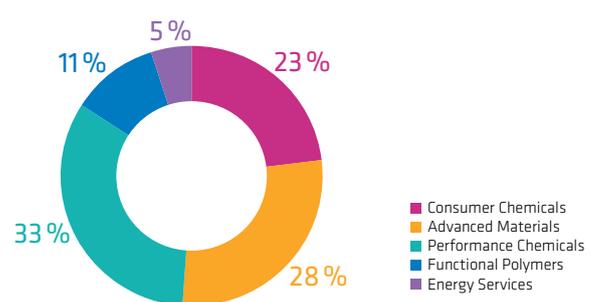
## OPERATING SEGMENTS<sup>1</sup>



### TALENTS TO MATCH THE GROUP'S AMBITIONS

The development of its employees – the driving force of its success – is a priority for Solvay. An annual assessment and performance interview allows all employees to evaluate their contributions with their managers and to construct development plans to maximize their potential. Training, mobility and international exposure are all for building a career. In 2012, to strengthen its attractiveness and its talent pool, the Group redefined its employer identity.

Adjusted REBITDA by operating segment



1. Restated figures as per new organization effective as from January 1st, 2013. Under the new organization, there are changes in the allocation criteria of formerly non-allocated elements and other structure costs between Corporate Functions and Operating Segments.





# Sustainable Development indicators 2012

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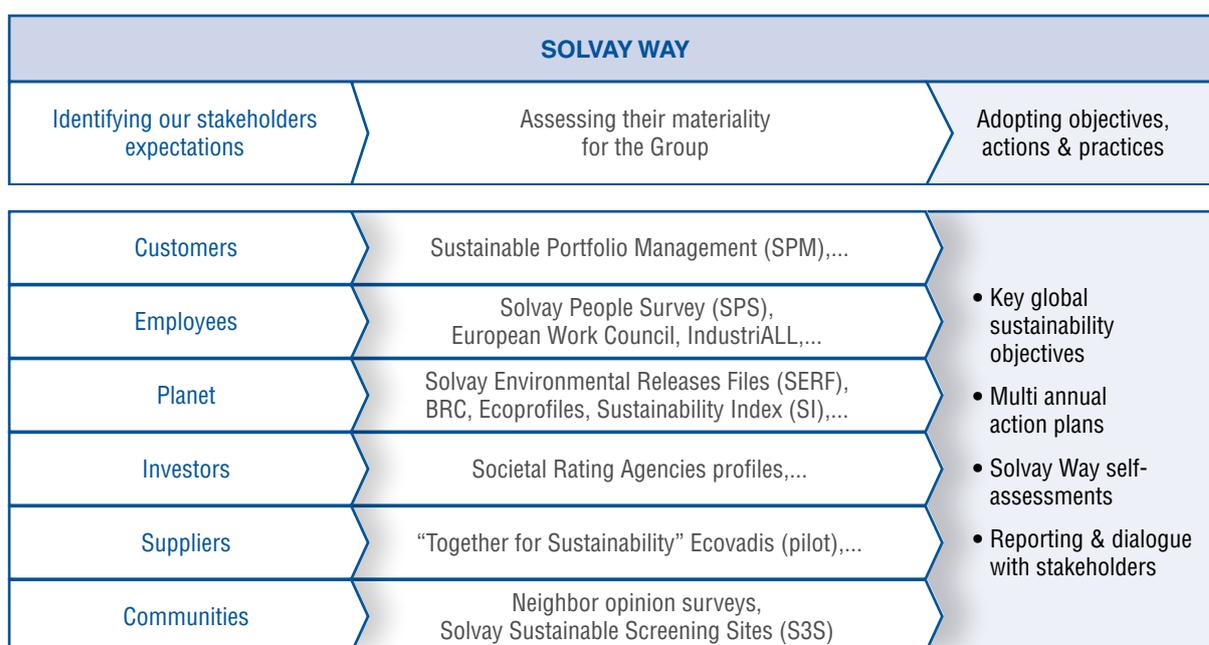
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# Materiality of challenges

Determining the materiality of key sustainability issues is a critical part of the strategy and of the reporting. The materiality criteria are identified from stakeholders' expectations and from Solvay's risk management, using a number of approaches and tools.

The results of this materiality exercise are then integrated in the company's management and sustainability objectives as well within the key company policies, processes and operational tools and in particular in the Solvay Way reference framework.



### A range of tools to assess the materiality and to adopt action plans

→ Sustainable Portfolio Management (SPM) and Sustainability Index (SI)

SPM and the SI are used to assess the sustainability of Solvay's portfolio. SPM identifies to what extent a given product in a given application is aligned with the solutions that stakeholders and society expect. (p.38-45)

→ Solvay People Survey

Solvay People Survey is a worldwide survey carried out by an external partner. On the basis of these results, managers organize feedback meetings with their team. The megatrends results are taken into account in the Corporate strategy. (pp.79)

→ Solvay Environmental Releases Files (SERF) and BRC

SERF is the depository of data about the environmental performance and impact of Solvay legacy entities and is used to assess the progress and to benchmark manufacturing units. BRC is the reporting database of the Rhodia legacy.

→ Societal rating agencies feedback

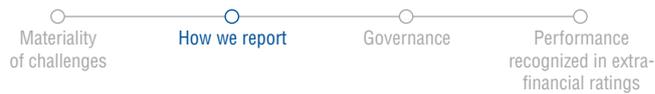
Extra-financial rating agencies and institutional investors give us their feedback on what they expect from the Group in terms of extra-financial performance. By such dialogue, the Group also reinforces its reputation in these matters (pp.38-45)

→ Opinion surveys in local communities

The aim is to get their feedback regarding their perception of the performance of the Group at local level on ethical (employment, social practices,...), health, safety and environmental management issues, its products, its local present and future activities. (pp.104-105)

→ Solvay Way self-assessment

The reference framework, applied to the entire lifecycle of products, questions each entity on the impact of its activity and each employee on their practices affecting their particular stakeholders.



## How we report

The Sustainability Development Report presents a wide and detailed series of indicators which, all together, reflect the deployment of the overall sustainability management so far, of the sustainability objectives pursued in the past years, and of key recent achievement.

**The extra-financial parameters and indicators reported in this document are organized according to the Global Reporting Initiative (GRI) guidelines reporting scheme.**

For the year 2012, 80 extra-financial parameters relating to sustainability performance are reported. The topics cover the strategy objectives set in the light of stakeholders' expectations.

Data and information related to the extra-financial practices and performances of the Solvay group are thus reported via two complementary documents:

- Solvay Annual report (including the risk management chapter)
- Solvay Sustainable development report and progress report



**Integration of most parameters/ indicators of Solvay and Rhodia legacies has been achieved in 2012.**

The integration of the sustainability management processes are well under way. The consolidated facts and figures reflect the global and integrated company performance. It includes, when possible or appropriate, a performance history track back to the reference year 2006.

Solvay also launched, already in 2011, a new extra-financial reporting process. The aim is to get more reliable and opposable indicators as well as relevant qualitative information with a defined periodicity and a higher level of clarity to have a concrete and trustable and opposable image of sustainability practices. This system will be based on a new IT reporting architecture and tool.

The Global Reporting Initiative (GRI) aims to drive and direct sustainability reporting.



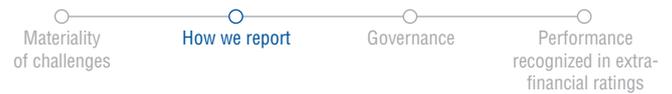
**An external verification processes for energy, greenhouse gas, and environmental emissions is made.**

In addition to the audit elements of previous years, E&Y certified the data consolidation in 2012. (> See: assurance report)

Since several years indeed, to ensure the reliability and credibility of its extra-financial reporting, both Solvay and Rhodia legacies commissioned external auditors to audit and ensure the reliability of key elements of their sustainability indicators and reporting system. Ernst & Young Company Auditors SCCRL (E&Y) for Solvay who audited in 2010 the energy and environment reporting procedures and rules extended the audit in 2011 to evaluate how industrial sites comply with the reporting rules.

**Sustainability objectives 2008-2012 of the Solvay legacy and their outcome: a synthetic review to be published soon**

A synthetic document will be published by June 2013 to review the results obtained four years after the launch of the sustainable development strategy and objectives.



## Indicators & performance

The Sustainable Development report 2012 is structured according to GRI guideline.

The indicators are those that best reflect the Group's performance regarding its practices and the objectives it has set in the governance, social, environmental or health & safety domains. For a majority of indicators, it was possible to consolidate the 2012 data of the two legacies, Solvay and Rhodia ("legacies" refer to the two individual companies, as these were before the integration of Rhodia within Solvay) and often also to consolidate the data of previous years, back to 2006 in the case of environmental and energy data for example.

In some cases however, this consolidation was not yet possible due to different reporting rules and criteria, or management approaches, that remain to be harmonized. In those cases and when appropriate, the data for both legacies are clearly and explicitly reported distinctly. This holds also true for the management approaches. They refer to how the two companies managed activities before integration took place, even if such management approaches are often highly convergent. The integration of the Rhodia legacy is now sufficiently completed and this situation will no more occur in 2013.

> *More information on Reporting boundaries, definitions and assumptions pp. 124-125.*

The following pictogram is used:



Ernst & Young Company Auditors SCCRL (E&Y) is commissioned to audit the reliability of key elements of Solvay's Sustainable development reporting.

> *See assurance report on pp. 132-133.*



# Governance

## Governance in line with best practices

Good governance is an integral part of the Group's strategy, as part of its values and a source of long-term value. Solvay has adopted the 2009 Belgian Corporate Governance Code as its reference code in governance matters. The Group informs its stakeholders annually about the application of the recommendations of this code in accordance with the "comply or explain" principle.

The governance of the Group applies to all its activities, including those of Rhodia acquired on Sept 16, 2011. In some areas, the integration of the Rhodia legacy in the Solvay group is not yet fully realized. During the integration period, different processes, but with similar purposes, will exist side by side, the objective being to align these within the governance framework of the Solvay group.

*For more information, see the Corporate Management section of the annual report p. 141.*

## Risk management and internal control

In order to identify, assess and manage opportunities successfully and at the same time limit risks which are potentially significant for the activities of the Group, Solvay has set up risk management systems. Risk management is integrated in the strategic and operational decision making process, seen as an essential management tool and as an aid for making the decisions to achieve the company's short, medium and long term objectives.

An Enterprise Risk Management (ERM) department within the Corporate Finance function develops tools, provides advice and proposes strategies to help entities manage their risks more systematically.

During 2012, Solvay continued its commitment to ensure that a common approach to Risk Management permeates all levels of the organization. The emphasis has been on the integration of the Rhodia legacy, defining a common policy, risk-profiling methodology, risk appetite, property-loss prevention process and internal-control process. Risk governance is strengthened by a reinforced ERM department and a Group Management Risk Committee.

For risks assessed as falling outside the defined risk appetite, actions are developed, implemented and monitored. Results are reported both to the ERM department and, together with the strategy, consolidated and further assessed to form a Group risk profile that is proposed to the Executive Committee.

### Risk description in 10 risk categories

1. Market and Growth – Strategic risk
2. Supply Chain and Manufacturing risk
3. Regulatory, Political and Legal risk
4. Corporate Governance and risk attached to Internal Procedures
5. Financial risk
6. Product risk
7. Risk to people
8. Environmental risk
9. Information and IT risk
10. Reputational risk



### Main extra-financial risks related to sustainability challenges.

For a detailed description of Risk management, see the Annual Report pp 131-140. Key risk areas are addressed with relevant dedicated policies and risk-control programs.

	Identified risks	Programs/tools
<b>Risks to people</b>	<ul style="list-style-type: none"> <li>• Accidents to employees or third party individuals on Solvay sites</li> <li>• Injury to neighbors or the public</li> <li>• Occupational-related diseases</li> <li>• Exposure to pandemics</li> </ul>	<ul style="list-style-type: none"> <li>• Safety initiatives including programs for behavioral safety and for increasing the safety culture of managers, employees and contractors</li> <li>• Sites having a dedicated management system for safety</li> <li>• Solvay's own expertise and active cooperation with external networks</li> <li>• High priority given to nano-materials and technology, endocrine disruptors and health-related applications of Solvay products</li> <li>• New safety initiative with targets set for continuous improvement</li> <li>• Global pandemic preparedness task force</li> </ul>
<b>Risks related to products</b>	<ul style="list-style-type: none"> <li>• Product-liability risk</li> <li>• Product-development risk</li> </ul>	<ul style="list-style-type: none"> <li>• Solvay's full Sustainable Portfolio Management (SPM)</li> <li>• Assessment of main strategic options, larger projects and geographic expansions in terms of profitability, sustainability and risk profiles</li> <li>• Proper design and testing of products and their production processes</li> </ul>
<b>Risks related to process safety</b>	<ul style="list-style-type: none"> <li>• Protection of people and assets against the consequences of process incidents</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform, centralized and best-in-class Process Safety Management (PSM)</li> <li>• Red lines, risk assessment matrix methodology for assessment and acceptability of risk, independent family of process safety engineers</li> </ul>
<b>Risks related to energy &amp; climate change</b>	<ul style="list-style-type: none"> <li>• Sea-level rise, increased frequency and gravity of hurricanes and typhoons, water scarcity, earthquakes, tsunamis and flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Programs to reduce energy consumption</li> <li>• Operating a range of industrial activities with a relatively low energy consumption</li> <li>• Policies and risk control programs</li> </ul>
<b>Risks related to environmental management</b>	<ul style="list-style-type: none"> <li>• Release of a chemical substance following plant-equipment failures or transport accidents</li> <li>• Production problems resulting in exceeding permitted emission levels</li> <li>• Several Solvay sites governed by regulations concerning major-risk installations</li> <li>• Soil contamination (environmental damage to land, water, natural habitats and protected species)</li> </ul>	<ul style="list-style-type: none"> <li>• Well-defined measures to prevent pollution and accidents</li> <li>• ISO 14001 or integrated HSE management systems equivalent</li> <li>• Policies and risk control programs</li> <li>• Historical soil contamination monitoring</li> <li>• Regular training in regulatory awareness</li> <li>• Appropriate provisions for monitoring and remediation</li> </ul>
<b>Dialogue on risks and in crisis situations</b>	<ul style="list-style-type: none"> <li>• Damage to corporate reputation</li> </ul>	<ul style="list-style-type: none"> <li>• Solvay's crisis management &amp; communication processes, systems, plans and programs</li> <li>• Crisis simulations organized on a regular basis in the different entities of the Group</li> </ul>

## Solvay Code of Conduct

Solvay seeks to ensure sustained growth and profitability as a world leader in sustainable chemistry while always acting responsibly, ethically and with integrity. The Solvay Code of Conduct reflects an agreed path taken together, as a Group and as employees, to attain these goals. With this Code, the Group continues its efforts to maintain and strengthen trust with its employees, shareholders, customers, suppliers, communities where it conducts its activities, governmental agencies and society at large.

The Code provides general guidance to all employees about how to behave in the workplace. It applies to every Solvay employee wherever Solvay operates or conducts its business. Third parties acting on behalf of Solvay are also expected to act within the framework of the Code. In joint ventures, Solvay will use its best efforts to ensure that the principles of this Code are respected.

*For a description of Solvay Code of Conduct, see the Annual report p.161.*



# Performance recognized in extra-financial ratings

A genuine dialogue with our stakeholders within a wide-ranging strategic framework is considered as essential in managing sustainability challenges, identifying their materiality and setting objectives and priorities.

Solvay's practice is to respond to all questionnaires addressed by rating agencies to corporate level. Businesses also respond to questionnaires directly addressed to them by their customers. The interest in responding to rating agencies is twofold:

- Firstly, to ensure that Solvay is properly recorded and that its practices and performance are valued by these agencies;

- Secondly, to use these ratings, comments and, in some cases, their benchmarks as levers to improve processes and performance, in particular through the practices of Solvay Way.

In 2012, SAM (for DJSI), the Carbon Disclosure Project (CDP), Oekom and Eiris (FTSE4Good) analyzed Solvay performance while Vigeo did not reassessed the chemical industry sector.

Note that four of these agencies have been selected in the "Rate the raters" survey 2012. Among other requests to which Solvay replied, were SustainAnalytics, Trucost, and STOXX which incorporated Solvay this year in the STOXX ESG indices. Solvay also updated its report to the UN "Global Compact" in the category "Advanced Level".

## Extra-financial notations obtained by Solvay in 2012

	Global result		Best scores	Weakest scores
SAM (reference for Dow Jones Sustainability Index)	Score* of 80% (in 2011 64% for the Solvay Legacy and 79% for the Rhodia legacy)	Percentile = 89 ("better than 89% of the companies of the sector")	<ul style="list-style-type: none"> <li>• Environmental Management</li> <li>• Innovation</li> <li>• Risk &amp; Crisis Management</li> <li>• Product Stewardship</li> </ul>	<ul style="list-style-type: none"> <li>• Operational Ecoefficiency**</li> <li>• Corporate Citizenship &amp; Philanthropy</li> <li>• Governance</li> <li>• Social reporting</li> <li>• Talent Attraction &amp; Retention</li> </ul>
Carbon Disclosure Project	Category B ("fast followers") with a score of 81/100	Integrated within the top 10 in the Benelux Carbon Disclosure Leadership Index (CDLI) in relation to the quality of reporting	<ul style="list-style-type: none"> <li>• Governance &amp; strategy</li> <li>• Reporting of emissions</li> <li>• Management</li> </ul>	<ul style="list-style-type: none"> <li>• Risk management and opportunities related to climate</li> <li>• Risk and opportunities related to Supply chain regarding climate challenges management</li> <li>• Engagement and performance verification</li> </ul>
EIRIS (reference for FSTE4Good)	Absolute score***: 3,4/5 Solvay included in FTSE4Good Index	Score relative to peers: 86%	Within the 1 <sup>st</sup> quartile of the "assessed universe" and "supersector" companies	<ul style="list-style-type: none"> <li>• Climate change</li> <li>• Human rights and working conditions policies</li> <li>• Governance</li> </ul>
Oekom	Global category C+	Category C+ regarding social matters, Category B- regarding environmental practices		<ul style="list-style-type: none"> <li>• Lack of detailed information on policies, standards and measurements on sustainable supply of renewable materials</li> <li>• Transparency on payments</li> <li>• Lack of data on remuneration of top management and (D-) for its link to extra-financial performance</li> <li>• Inadequate management of standards and working rights in the supply chain</li> </ul>

\* One point below the threshold to be integrated in the DJSI / Europe index. The score are 82% for the economic and the environmental dimensions, and 76% for the social dimension.

\*\* This criterion relates the performance of environmental indicators (mainly emissions) to an economic dimension, the CA in our case is caused by a lack of positive trend in our performance and the lack of targets in some cases.

\*\*\* 12th position in the sector



Each year, with the results and comments received from these rating agencies, a internal detailed analysis is carried out for 12 themes: Governance, Risk Management, Ethics, Human Rights, Human Resources, Health & Safety, Environment, Innovation, Product Safety, Energy & Climate, Supply Chain, Philanthropy. This review highlights the strengths and weaknesses in each area in order to adapt, a.o. through the Solvay Way, processes and to improve performance. Taking into account this analysis by all entities concerned should contribute significantly to further advance the Group's ratings in 2013.

The lessons learned from these different notations are substantial.

- **Progress is clearly linked to greater involvement on the part of the entities:** they measure the contribution of these better ratings in terms of managing their businesses. They must also be capable of measuring how the materiality of sustainability challenges and expectations of all parties involved are met;
- **Identification and analysis of strengths and weaknesses relative to competitors allows to better identifying priority areas for improvement.** The managers concerned will be asked to identify priority actions in order to improve their score:
  - mobilization on some issues, however, may still prove to be sometimes insufficient. Human resources and appropriate

operational should indeed be allocated to action. It is not yet always clear that because of their impact on the overall performance of the company, they should actually be considered as investments rather than full costs.

- the Group's proactive positioning in the debate on the non-financial reporting can only be favorable, especially the influence it can exert on the direction of the initiatives of the European Commission to impose and harmonize an approach this field at European level.

# 1. Economic performance

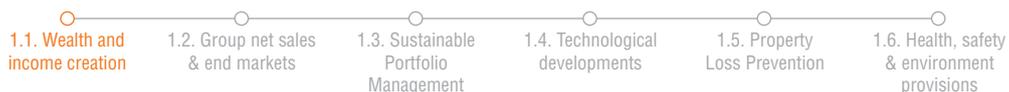
This section encompasses indicators that reflect the economical dimension of Solvay's sustainability management, both in terms of business opportunities, risk prevention and mitigation.

The redistribution of the turnover generated by Solvay activities gives an overall integrated picture of the economical sustainability for the different stakeholders (customers, suppliers, personnel, shareholders,...).

Further, the in-depth sustainability assessment of Solvay's activity portfolio combines the value of each market share with the outcome of the sustainability assessment.

In parallel, the sustainability assessment of the Research and Innovation (R&I) portfolio gives insight into the potential of Solvay's research and innovation pipeline as regards major sustainability megatrends. It combines the potential of each research project in this area with the investment effort made in each of them.

On the risk prevention and mitigation side, Solvay identifies its main risks and manages financial provisions to cope with possible events or litigations.



# 1.1. Wealth and income creation

## 1.1.1. Distribution of generated economic value (GRI EC1)

Solvay group, 2012



*Perimeter: Equivalent to the Group financial perimeter*

*Legend: (\*) excluding salaries & benefits and amortization and depreciation.*

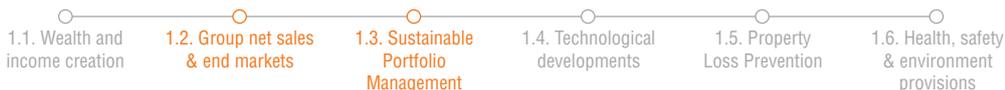
*The definition of the indicator has been modified in 2012 to be better aligned with the GRI definition.*

### Generation of the economic value

The economic value generated by the Group's activities (13 GEUR) includes the sales, interests on lending and short-term deposits, earnings from associates consolidated using the equity method, income from non-consolidated investments and discontinued operations.

### Redistribution of the economic value

About 2/3 of the economic value generated is used to cover the operating costs (mainly purchases of raw materials, goods and services, excluding salaries and benefits and depreciation and amortization); 18% is used to pay salaries and benefits; 2% for the current taxes; 3.5% is paid to the shareholders and the financial creditors; 10% of the economic value generated is retained mostly to invest in tangible and intangible assets.



## 1.2. Group net sales & end markets

### 1.2.1. Net sales



For more details see p. 25 of this report and p. 36 of the Annual Report.



### 1.2.2. End markets (GRI 2.2)



For more details, see pp. 18-19 of this report.



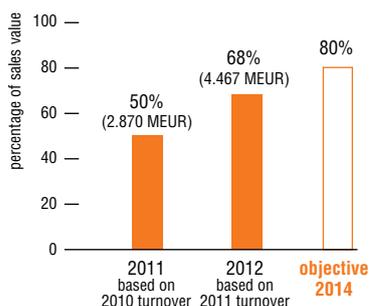
## 1.3. Sustainable Portfolio Management (SPM)

Understanding the sustainability related strengths and weaknesses of its activities is essential for Solvay, both in terms of the potential negative impact of its production activities and to enable an appropriate allocation of its resources to capture opportunities in the market place.

The Sustainable Portfolio management (SPM) methodology assesses the sustainability and the potential impacts of Solvay's product and market portfolio.

### 1.3.1. Sustainable Portfolio Management - SPM assessment program

Program to assess the markets portfolio with the SPM tool, Solvay legacy.



**Perimeter:** Deployment for the products of the Solvay legacy. Progress is expressed in terms of % of the total revenues.

**Legend:** Deployment for the products of the Solvay legacy is expressed in terms of % of its total revenues. Each PAC contributes to the overall portfolio assessment in proportion of the corresponding sales volumes of this product in this particular PAC. A more accurate estimation of the market value of each application has been used in this year's reporting, not directly available from the Solvay's ERP data. This explains why progress is different and lower this year than as reported in our previous year's reporting.

#### Commitment:

To evaluate Solvay product portfolio according to the SPM methodology, covering 80% of the portfolio in terms of sales volumes by end 2014.

The SPM tool has been widely deployed. In 2012, 68% of the overall product portfolio of the Solvay legacy has now been assessed and represents 35% of total Group sales. The refinement in classifying each sale in the adequate application (which is not directly reflected in Solvay's ERP data) explains why progress is lower this year (68%) than reported previous year, resulting from a more accurate estimation of the market values of the applications.

The objective pursued for the Solvay legacy is to cover the equivalent of 80% of the total sales value. The aim is to cover all major products in all major applications, plus all smaller "Product-Applications Combinations" (PAC), where sustainability trends may be expected to have positive or

negative impacts. The assessment must exclude market segments where Solvay sales cannot be attributed to a defined application, or applications are too small in terms of volumes.

The assessment of the portfolio of the Rhodia legacy has started (engineering polymers, polyamide & intermediates and Novecare).

The objective for the Rhodia legacy is to cover the 50% or more of its portfolio in terms of sales volumes by end 2013. By end 2014, all key applications with possible sustainability aspects, in all business lines, should be assessed, representing 80% of sales.

SPM is a proprietary methodology developed by Solvay with Arthur D. Little and the Dutch organization for Technological Research TNO. An in-depth verification covering the majority of "market alignment" results obtained and available in 2010 was carried out by Arthur D. Little.

> For complementary information, see 1.3.2. Sustainable applications and 6.2.1. Ecoprofiles of product.



### What is the SPM methodology made for?

The ambition of Solvay is to increasingly privilege products and market developments contributing to more sustainability. The SPM methodology allows to identify “Product-Application Combinations” (PACs) that are classified as “Star” and “Aligned” and feed this strategy. However, other PACs, for example flat displays, may be profitable and responding to growing expectations, and thus also represent an important asset in the Group’s portfolio, even without being supported by sustainability trends.

### The SPM process

In practice, the results of the SPM assessments are endorsed by the Executive Committee and a personalized feedback is given to Senior Managers and Global Business Units (GBU) entities to enable them to incorporate the results of the SPM assessments in their strategy.

In addition to the programme aimed at assessing the existing product portfolio, the SPM methodology is used:

- Systematically for the evaluation of the R&I projects;
- To justify every investment of more than 5 MEUR.

The governance of the SPM process in place includes a Steering committee at Board level (Comex members and Senior Executive Vice-President) and transversal processes managed by the Sustainable Development Management which operates in close cooperation with the business entities.

### The two dimensions of the SPM methodology

The SPM methodology materializes the sustainability and potential impacts of Solvay’s product and market portfolio. Each product sold by Solvay is assessed in each of its key application. A “Product-Application Combination” is assessed according two dimensions:

1. The risk related to the environmental impact of manufacturing: this is performed by monetizing the key environmental impacts related to the manufacturing of the product, such as energy consumption and associated greenhouse gases emissions, on the basis of detailed ecoprofiles.
2. The degree to which the product in this application is in line with the solutions consumers are seeking to address their own sustainable development constraints, in other words the alignment with the trends of this market in terms of sustainability. This may include for example an application allowing for the reduction of energy consumption, the reduction of exposure to harmful substances, the use of less non-renewable resources or greater use of renewable energy.

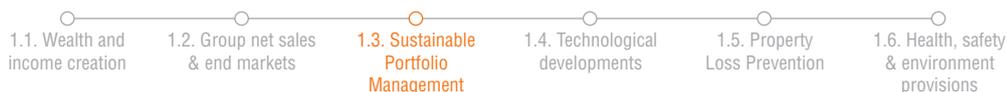
Thus, an SPM assessment allows to identify the manageable aspects of the environmental impact of manufacturing steps and, in parallel, helps to identifying which “Products-Application Combinations” best position Solvay to benefit from an increasing market demand for products that deliver sustainability benefits for the customer.

The results from the first dimension are mainly used to orientate large manufacturing investments and R&I. The results on the second dimension are used to orientate the Group’s portfolio and its R&I in the long term.

### Recognition by EFQM and external verification

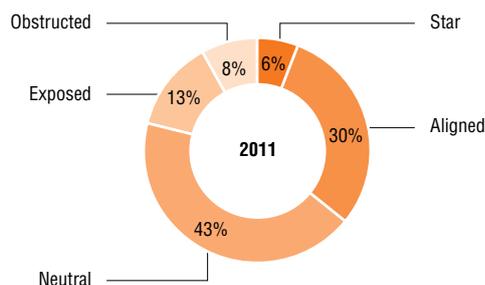
The SPM methodology received a “Highly Commended” award in the EFQM’s Sustainability Good Practice Competition. Matt Fisher, CEO, EFQM said at this occasion that *“the Jury recognized that this methodology represents a paradigm shift in the way organizations consider sustainability as part of their strategic planning process and the potential for this tool to be adapted and applied in other organizations and sectors.”*

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ECONOMIC PERFORMANCE



### 1.3.2. Sustainable Portfolio - Sustainable applications

"Product-Application Combinations" (PACs) classified as "star", "aligned", "neutral", "exposed", "obstructed" according to the SPM methodology



*Perimeter:* The assessed portfolio represents 68% of the sales of the Solvay legacy portfolio.

*Legend:* Classification of the assessed portfolio of "Product-Application Combination" portfolio in the 5 SPM categories. Each "Product-Application Combinations" contributes to the overall portfolio assessment in proportion of the corresponding sales volumes (based on 2011 sales) by Solvay of this product in this particular "product in application"

#### Commitment:

To reach, by 2020, 20% of "Product-Application Combinations" in the "star" category, i.e. in markets expected to experience substantial growth for sustainability reasons.



The assessed portfolio encompasses 30% of "Aligned" product-application combinations and 6% of "Stars". This makes 36% (compared to 28% last year) of "Product-Application Combinations" matching solutions sought by customers in order to be more sustainable and ultimately delivering environmental benefits to the end consumer.

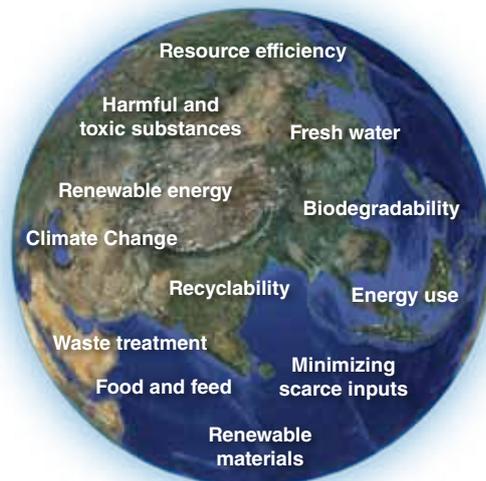
The assessment will be extended to Rhodia's legacy portfolio.

> For complementary information, see 1.3.1. on SPM assessment program.

#### Classifying a "Product-Application Combination" (PAC)

Each SPM assessment focuses on a specific combination of a product in a market, like for example PVC used in triple glazing window frames.

- **Star:** PAC for which there are positive signals resulting from sustainability trends, with anticipated significant revenue growth
- **Aligned:** for which there are positive signals resulting from sustainability trends
- **Neutral:** for which there are nor positive neither negative signal resulting from sustainability trends
- **Exposed:** PAC for which there are weak negative signals resulting from sustainability trends
- **Obstructed:** PAC for which there are strong negative signals resulting from sustainability trends.



#### Market sustainability criteria

##### How sustainability trends in the market are taken into account in the SPM methodology

The strategic goal fixed in 2008 is that Solvay will, by 2020, manage a balanced portfolio of activities regarding their sustainability in the market. This goal is based on the SPM classification of each "Product-Application Combination", reflecting its potential strengths and weaknesses in terms of sustainability expected from the external world.

To be classified as "star" or "aligned", products must serve markets and uses that demonstrate a clear benefit - and without obstacle in sustainability terms - for at least one of a defined list of sustainability added values.

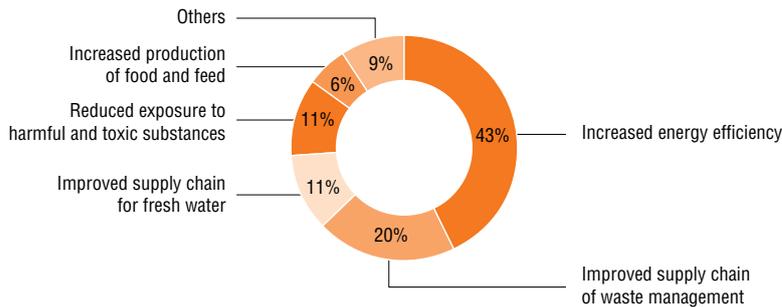


**1.3.3. Sustainable Portfolio - Products contributing to sustainability in key applications**

Aligned or Stars "Product-Application Combinations" (PACs) - SPM analysis

**Distribution by applications of Aligned & Stars PACs according to SPM analysis**

Representing 35% of overall assessed portfolio, 2011



*Perimeter:* All assessed PACs for the Solvay legacy, representing 68% of the overall portfolio of this legacy.  
*Legend:* Sustainability benefits of the "star" or "aligned" PACs. Each "Product-Application Combination" assessed is taken into account in proportion of its sales volumes (based on 2011 sales).



The assessed portfolio, so far focusing on a significant part of the Solvay legacy portfolio, exhibits 35% of "Product-Application Combinations" classified as "Star" or "Aligned".

PACs classified as Star or Aligned must have clear (eco)sustainability benefits - and without any sustainability obstacle\* - in one at least of the following markets:

- energy efficiency
- water scarcity
- exposure to harmful or toxic substances
- non renewable materials
- renewable energy
- resource efficiency and recycling
- food/feed production, etc

\* strong signal of a sustainability risk, affecting the final product as perceived by the consumer (ex: a photovoltaic panel, a personal car, a can of paint) because of the toxicity of one of the ingredients or because of restriction in use (ecolabel systems, OECD country ban,...).

**SPM within the Group strategy "to become a model in sustainable chemistry"**

**The SPM strategic sustainability objectives...**

- to have a balanced portfolio of activities in terms of sustainability.
- to increase the proportion of products in the "Aligned" and "Star" categories

**...combine with the Group's strategic objectives**

- to focus on Research and Innovation in bringing solutions to key societal challenges
- to reinforce investments in regions and markets segments with high growth potential
- to develop operational excellence in all areas in order to consolidate its competitiveness and leadership.

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ECONOMIC PERFORMANCE

**Aligned and Star PACs contributing to the increased energy efficiency**

	2011
Residential housing	50%
Other constructions	40%
Other areas	10%
<b>Total</b>	<b>100%</b>



**The major contributing market is construction & infrastructure, where a large range of Solvay products are in line with increasing demand for more sustainability.**

Key markets in this area are for example the use of PVC in profiles for window frames, and soda ash for double windows making. Fomblin® Y oil used in industrial lubrication (high efficiency, reduced friction), although with proportionally smaller sales, is also an example.

**PVC's increasing contribution to energy efficiency**

PVC is the most frequently used material in Europe for the manufacturing of window frames for buildings. The U-factor (heat conductance/m<sup>2</sup> of window, the lower the better) is the leading criteria for decision making for the consumers. State-of-the-art windows are more and more made of PVC and aluminum frames. Additional sustainability trumps are: resistance to UV rays and to bad weather conditions and to be almost maintenance free.

**Aligned and Star PACs contributing to improved the freshwater supply and the supply chain of waste management**

	2011
Freshwater supply	40%
Waste and waste water management	60%
<b>Total</b>	<b>100%</b>



**The major contributing market to this "Aligned and Star" segment is the use of Solvay products in tubes for the freshwater supply chain and for waste water collection.**

Key markets in this area are tubes and fittings for the distribution of water. In particular, PVC piping allows bringing water to users while significantly reducing water leakage compared to steel or concrete pipes (for example in Europe, losses by leak represent at least an average 30% of the overall conveyed water). The polymer PVDF also plays a key role in improving freshwater adduction.

In many countries, revamping water management systems with more effective and watertight is a key issue.

**Water quality of River Lea past the Olympic Stadium and Olympic Park.**

Solvay has been working closely with the United Kingdom's Environment Agency on a project to enhance the water quality of the River Lea which runs past the Olympic Stadium and through the Olympic Park in London.

Solvay's involvement in the River Lea project came to a successful conclusion when the first delivery of hydrogen peroxide was made, just in time for the opening ceremony. Solvay's hydrogen peroxide has been used as part of the long term treatment regime to enhance water quality and forms an important part of the Olympic Games legacy to the local community with improved urban waterways.

**Aligned and Star PACs contributing to improved prevention of harmful substances**

**A range of polymers manufactured by Solvay allow to reduce exposure to harmful substances, such as Amodel® (in particle filters for diesel exhausts), Acudel® (leading**

fitting solution allowing to prevent exposures to lead by avoiding weldings), Duradex® (avoiding bisphenol A in baby bottles and food services), etc.

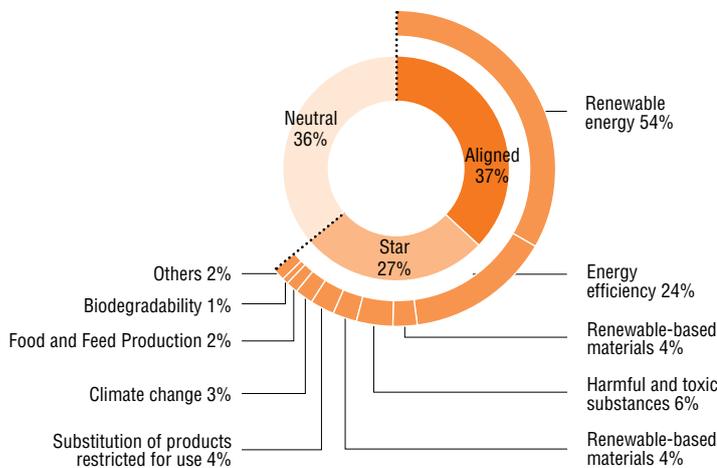


### 1.3.4. Sustainable innovation portfolio

Alignment of Research and Innovation (R&I) projects with sustainability megatrends, 2012

As from 2013, the innovation activities of the Solvay group will be assessed by the SPM methodology and integrate features of the Sustainable Index (SI) tools of the Rhodia legacy.

#### Alignment of R&I projects with sustainability megatrends and distribution to solutions - Solvay legacy - SPM analysis



#### Commitment:

To focus Research and Innovation on bringing solutions to key societal challenges.

A significant part of the R&I pipeline of the Solvay legacy (64% of assessed projects) are “Star” or “Aligned” according to the SPM assessment, focussing on products that will contribute to address key sustainability issues, in particular improved energy efficiency and renewable energy. Resource allocated to R&I projects classified as “Aligned” and “Star” regarding sustainability have increased as compared to previous year.

79% of the high priority innovation projects assessed bring significant environmental benefits along at least one of the considered environmental components, either at the production stage or at the product application level, as compared to the process / product of reference.

The R&I portfolio of the Solvay legacy (excluding R&I related to processes and to existing products) has a strong focus on solutions for energy efficiency and renewable energy.

- 50% of projects (in terms of direct expenditures) are aimed at solutions related to renewable energy: materials and solutions for alternative energy - active organic materials for photovoltaics (OPV), membranes for fuel cells, renewable energy storage - the development of renewable energies being highly depending on the emergence of efficient cost-effective storage solutions.

- 24% of projects (in terms of direct expenditures) are dedicated to provide solutions to the energy efficiency challenges: energy savings projects, new light weight materials, active materials for LED lighting, etc.

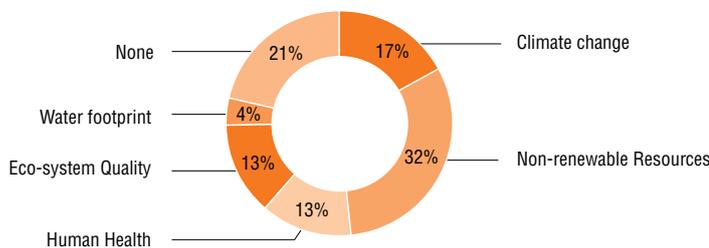
#### Perimeters:

- Solvay legacy: 62% of the R&I portfolio of the Solvay legacy has been assessed with SPM so far

#### Legend:

- SPM: Split according to resource allocation (direct funding) in R&I in the 5 SPM categories. Each “Product-Application Combination” contributes to the overall portfolio assessment in proportion of the corresponding funding. More on the 5 SPM categories.

#### Distribution by environmental benefit - Rhodia legacy - SI analysis



#### Perimeters:

- Rhodia legacy: 75% of the R&I portfolio has been assessed so far (86% of priority 1 projects)

#### Legend:

- SI: Sustainability Index, in terms of number of Innovation projects: breakdown according to 5 footprint categories assessed. Potential benefits as compared to the product of reference are either at the production stage or at the use phase of the developed product.



#### Six innovation thrusts aligned with megatrends.

Scarcity of resources, the fight against climate change, soaring consumption in high-growth parts of the world, new demands for environmental care, health and well-being, these are the trends that determine the main thrusts of Solvay R&I policy.

- **Coming up with new materials** that are more effective and eco-efficient, less resource-intensive, safer and lighter, by exploring the possibilities offered by the Group's expertise in plastics, soft matter and nanotechnologies.
- **Developing renewable chemistry**, opening the way for technologies that promote the use of renewable raw materials: new bio-based compounds, recycling processes...
- **Contributing to the creation of sustainable energy solutions**, such as photovoltaics and fuel cells as well as the development of new components for more efficient, lower environmental impact batteries.
- **Producing more efficiently and more responsibly**: reducing the environmental impact of our activities and optimizing resource utilization, increasing competitiveness and reducing the capital intensity of our industrial activities.
- **Supporting the growth of expanding markets**, for example in organic electronics.
- **Developing ever more responsible consumer products**, meeting consumer expectations and adapting to local needs for sustainable, healthier, safer and more efficient products.

#### The Sustainable Index (SI) tool developed by the Rhodia legacy.

This methodology and the structure of the Sustainable Index tool have been reviewed by PwC that considered SI as a well-suited tool for an eco-design approach. This tool enables assessments to be reviewed at every gate crossing. From the earliest steps of a R&I project, SI delivers, on a multi-criteria basis, key features of the footprint of the future product: CO<sub>2</sub> footprint, consumption of non-renewable resources, impact on human health and eco-system quality as well as water footprint, and provides recommendations for orientating the project towards more environmentally friendly solutions. The use of this tool was a founding element of Rhodia legacy's good practices for R&I management. The SI assessments also provide strong roots for a full lifecycle assessment of the future product or process, that can then be submitted to a critical review for compliance with the ISO 14040-44 standards, and support product promotion.

#### Highlight on sustainable innovation in 2012

- **Investment in Sofinnova Green Seed Fund to support innovation in industrial biotechnologies.**  
This fund, currently holding a fund raising round which first closed at 22.5 MEUR, is intended to finance European SMEs active in industrial biotechnologies. Solvay will make its network of technological and market experts available to the fund and to the selected projects.
- **Succesfull start in Lillo (Belgium) of a fuel cell with an unmatched power of 1 megawatt (MW).**  
The Proton Exchange Membrane Fuel Cell converts coproduced hydrogen into electricity. Fuel cells represent a key technology to produce clean energy for a wide variety of applications in the field of sustainable mobility.
- **The National Bioethanol Science and Technology Laboratory in Brazil** have signed an agreement to develop chemical routes and processes to obtain molecules of a high added value from sugarcane biomass, in what is known as bio-based chemistry. Partners will work together on the development of chemical blocks currently used in different applications and markets that the Solvay group operates in, with a view to replacing non-renewable sources with biomass in these substances' production processes.
- **Increased collaboration with OLED manufacturers (organic light emitting diodes)** by the company Plextronics, in which Solvay is the largest private shareholder, for the development of innovative technologies in organic light emitting diodes and organic photovoltaic cells;
- **Industrialization of a technology to produce fluorine gas at the customer premises** ("F2 on-site"), allowing a substantially reduction of greenhouse gases emissions by the photovoltaic and semiconductor industries. A partnership has been established with Air Liquide to build, own and operate such "delocalized" fluorine cleaning gas units, offering them an economic, reliable and environmentally-friendly product for cleaning applications.
- **Launch of new specialty polymer grades (PVDF) for batteries to be used in electric cars** (BLUECAR® of the Bolloré group, France); also, the Global Business Unit (GBU) Aroma Performance will supply the Bolloré Group affiliates with specialty lithium salt grades (LiTFSI) for their lithium-metal-polymer® batteries. LiTFSI is the preferred option for such batteries developed by Bathium and BatScap.



- **Record efficiency reached with Organic Photo-Voltaics** for inverted solar cells, which have the advantage of better stability, developed in cooperation with Polyera (USA) and IMEC (Belgium).
- **Start-up in Thailand of a new plant implementing Solvay innovative Epicerol® technology** and its latest improvements for the production of bio-sourced epichlorhydrin; and decision to establish a similar plant in China.
- **Recognition as the new industry standard of Rhodia's legacy paint additives** for enhancing performance in low- to zero-VOC (Volatile Organic Compounds) waterborne coatings. This can power paint formulators' drive to create next-generation, eco-friendly coatings.
- **Rhodia Acetow GmbH and Accsys, members** of the Solvay group, have signed a licence agreement for the production and sale of Accoya, a high performance modified wood,

based on Accsys' cutting edge technology. It converts sustainably grown softwoods and non-sustainable hardwoods into "high technology wood"

- **Project of recycling rare earths** contained in magnets, components largely used in windmills, electric vehicles and hard disks. After low-energy light bulbs and nickel metal hydride (NiMH) rechargeable batteries, this third project is a further step in the Group's strategy to secure and diversify its rare earth sourcing. The Rare Earths GBU has received the ICIS Award 2012 for Best Innovation for Sustainability.
- Use of new bio-sourced solvent as vanillin crystallisation medium. This food-safe and sustainable technology allows to convert several steps of the manufacturing process in order to use food grade bio-ethanol as a solvent.

- **Production of a new di-acide from a by-product of the Polyamide 6-6 chain.** The project concerns the eco-efficient transformation of a chemical co-product of polyamide manufacturing by reusing it in other applications, enabling CO<sub>2</sub> emission reduction and green products development. This co-product is currently burnt with emissions of nitrogen oxides.
- **Introduction of recycled polymers in automotive parts**, without compromise on the performances. The environmental benefit of using recycled polyamide for automotive applications has been validated by a Life Cycle Assessment jointly led with Valeo, one of the world's top automotive suppliers, and PSA Peugeot Citroën.

## 1.4. Technological developments

### Four milestones in the Solvay innovation process

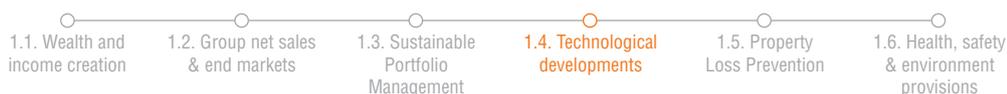


The key drivers of the efforts invested in Research and Innovation (R&I) leading to a product portfolio of products aligned with societal megatrends, include primarily:

- the intellectual property obtained, that directly drives the Solvay's future differentiation;
- the adequate tapping in employee creativity to maximize the pooling of ideas;
- the creation of a sufficiently extended network of open innovation (through partnerships) to maximize its efficiency and, most importantly, tapping in the creativity and competencies of the outside world.

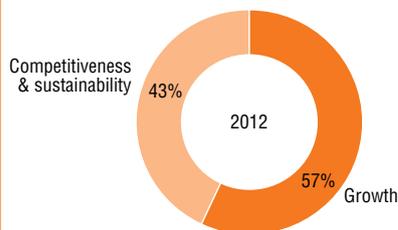
All these drivers fuel the Company's move towards excellence in the sustainability of its operations and more sustainable solutions proposed to the markets for customers that will in turn improve the sustainability of their own products and solutions.

Examples are in printable electronics, organic LEDs, sustainable energies, nanotechnologies or renewable based chemistry.



### 1.4.1. Expenditure efforts in innovation

EUR million, Solvay group



**Perimeter:** Equivalent to the Solvay financial perimeter.  
**Legend:** R&I expenses include all expenses, whether related to the support of existing products or production processes or to the development of new products or processes, as well as to exploratory projects. These include actual labour material costs and outsourced R&I but also, infrastructure, depreciation of R&I equipment, intellectual property costs and are net of R&I tax credits and subsidies. This indicator does not include investments in start-up companies nor capital expenditures.

**In 2012, the R&I expenses of the Group amounted to 261 million EUR, i.e. 21% above 2011 expenses.**

Among these R&I efforts, 30% are oriented towards the development of specialty polymers with high added value, providing unique solutions to major societal challenges, in particular in the field of energy savings, alternative energy generation, digitalization techniques, health improvement, water preservation, etc.

The Group has also dedicated 18% of the total R&I efforts to corporate activities, with the clear intention to maintain long term development projects aiming at either building

know-how and competencies in emerging technologies or at developing diversification and new business development opportunities through breakthrough innovations.

Those are organized around seven major platforms: sustainable energy, Li-Ion Battery, renewable chemistry, printable organic electronics, eco-processes, nanotechnologies and advanced materials and formulation.

The global expenditure analysis clearly underlines that more than half of the R&I investment are targeting growth, in line with the number of partnerships concluded.

### 1.4.2. Research & Innovation staff

Solvay group

	2011	2012
Number of persons (full time equivalent) employed	1 793	1 907

**Perimeter:** Equivalent to the Solvay financial perimeter. Employees include research engineers and scientists, technicians, laboratory and pilot operators, and employees dedicated to R&I facility management and R&I center support.

**Throughout the Group, about 1 900 people work in R&I. Solvay's 12 major R&I centers are located in Europe, Asia, North and Latin America.**

**In 2012, Solvay has considerably increased its R&I capacities in Asia, with:**

- The inauguration of the new R&I center in Savli, Vadodara (India). This R&I center will focus on material science, development of new polymers, as well as of new products from renewable resources.

- The extension of the Shanghai (China) R&I center launched to host in particular a polymer processing platform and a food laboratory, which will be in operation by July 2013.

- The start of construction of a new R&I center in Seoul with EWHA University. This research center dedicated to Lithium-ion battery development will regroup existing laboratories in Onsan and Seoul in one major R&I center. Construction will be finished by end 2013.



### 1.4.3. Generation of innovation

#### Tapping in employees' ideas

##### Solvay legacy

	2010	2011	2012
Ideation by employees via idea box - Number of ideas	10 340	9 622	9 673
Number of accepted ideas	1 550	1 900	2 136
Number of challenges	35	43	13

Perimeter: Equivalent to Solvay legacy financial perimeter.

In terms of ideation, the objective is that a bottom-up innovation process encourages employees to submit ideas. It is mainly organized through electronic idea boxes system (called Innoplace) with more than 100 such idea boxes through the Solvay legacy.

This process is also used to launch "thematic challenges" inviting employees to come up with ideas and proposals within specific fields of interest for Solvay legacy, and hence, channelling the creativity of the employees.

As to the monitoring of ideas, the number of accepted ideas and number of challenges referred to hereunder cover only the data coming from Innoplace. This does not include other additional adhoc systems of ideation that may be used in specific areas.

The figure may be exacerbated by the Innovation Trophy event at the Group level like for example in 2009 that took place on that year. Among the challenges, 20% of them related to Sustainable development on themes such as energy savings or CO<sub>2</sub> reduction.

While 2011 & 2012 were comparable in terms of ideation and creativity level, the teams were more focused in 2011 on launching specific challenges and in 2012 where priority has been to improve process by implementing accepted ideas.

#### Partnerships

##### Solvay group

	2010	2011	2012
Intellectual Property (IP) agreements & cooperation agreements	1 506	1 597	1 570

Perimeter: Equivalent to Solvay financial perimeter.

Innovation comes from numerous channels. It can be conceived internally, derived from collaborations with partners in public research or industry, or be nurtured and acquired through equity relationships with start-up businesses.

Open Innovation is key for the Group's innovation approach, and Solvay enlarged and deepened its partnerships in 2012.

Solvay through the Rhodia legacy has a long tradition of collaborations with the National Scientific Research Center (CNRS) of France. Teaming up with several Universities, Solvay and CNRS operate five Joint Research Units in France, the USA, and in China.

Solvay further strengthened its scientific co-operations in the field of renewable raw materials by signing a partnership agreement with CTBE, the National Scientific and Technological Laboratory in Brazil for developing high added value molecules from sugarcane biomass.

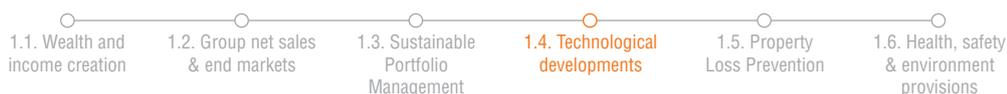
Solvay is engaged in about one hundred collaborative research projects, including new partnerships set up within the framework of French Government initiatives promoting industries of the future. For example, Solvay is co-founder of the technological platform Axel'One in the Lyon district. Axel'One which has the mission to host collaborative R&I projects and support their development in the areas of clean processes and innovative materials, decided to construct its Innovative Materials Platform at the site of Solvay's Lyon R&I center.

Innovation opportunities for Solvay can be created via partnerships with startups such as Plextronics, Polyera, Eight19 or ACAL. Investing in startups give Solvay access to new and complementary high-tech expertise in fields identified as strategic for the Group, such as renewable chemistry, printable electronics, renewable energies or advanced materials and formulations.

Another way of getting access to innovation outside the scope of existing businesses and technologies is participation in venture capital (VC) funds, which are designed to finance a group of young enterprises in their development phase. End of 2012, Solvay announced a 5 MEUR investment into Sofinnova's Green Seed Fund. The fund is intended to finance european small and midsize enterprises active in industrial biotechnologies. Today, Solvay participates in a total of eight venture funds.

Solvay's Global Business Units run a number of co-developments with their respective customers or other partners

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ECONOMIC PERFORMANCE



Solvay is in the driver seat leading the start up of the EIT Foundation: a group of like-minded organisations dedicated to promoting a culture of innovation and entrepreneurship in Europe.

The goal is to enlarge the impact of the EIT (a body of the European Union), by inventing the future and bringing together some of Europe's brightest minds at events, in youth talent programmes and similar initiative.

As an independent non-profit organisation, the EIT Foundation Community, currently gathering 11 leading companies, decide, implement and finance concrete actions:

- A paid internship program, addressed to talented people to work in highly entrepreneurial and innovative frameworks;
- An executive entrepreneurial/leadership training program: the 'Young Leaders' Group';
- An annual Innovation Forum. Its first edition will take place on March 2013 on the topic of "Data-Driven Innovation: The New Imperative for Growth.

As said by Mr Jourquin, former Solvay CEO and Chairman of the Foundation, this is a duty for Europe and the next generations.

Solvay supports also the Foundation by seconding the Secretary General position for two years.

website: <http://eitfoundation.org>

#### 1.4.4. Innovation output

Patents & new sales ratios

##### Patents

Solvay group

	2009	2010	2011	2012
Patents (first filling)	205	254	322	300

*Perimeter: Equivalent to the Solvay financial perimeter.*

*The 2011 figure for patent filing does not include the 20 "first fillings" made by TRP-IAM for Inergy. By contrast, the figures for 2009 and 2010 do include the number of first fillings made for Inergy.*

The New Solvay Intellectual Property (IP) strategy, driven by efficient R&I efforts, is leveraged through strong partnerships between the Intellectual

Assets Management Department and both the Businesses and Corporate R&I. The number of patents filed, although slightly decreasing from the

exceptional result achieved in 2011, confirms the Group's strong trend towards more patented innovations since 2009.

##### New sales ratios

Solvay group

	2011	2012
New sales ratios	22%	23%

*Perimeter: Equivalent to the Solvay financial perimeter*

The new sales ratio includes in two components:

- New product/services/applications ratio: the ratio of the current annual sales of new products, new applications and new services; created less than five years ago, on the total annual sales.

- New Technology Ratio: the ratio of the current annual sales being produced through implementation of new technologies for existing products, applications, and services; implemented less than five years ago, on the total annual sales.

> See 1.3.4. Sustainable innovation portfolio.



## 1.5. Property Loss Prevention

### 1.5.1. Property Loss Prevention

#### Commitment:

**All manufacturing sites implement a property loss prevention management system.**

Property Loss Prevention consists in preventing assets and profit losses in Solvay manufacturing sites. In all sites, specific management systems are in place to prevent accidents and their consequences.

A Solvay internal tool identifies the criticality of the sites according to economic performance: assets and business interruptions. About 40 sites are considered as very critical and require special attention and protection against physical and business interruption losses. Programs are carried out to bring recently acquired plants up to the level of the Group's standards.

#### Deployment of Property Loss Prevention and the role of the corporate teams

Property Loss Prevention is under the responsibility of sites, and elements of prevention are deployed under the joint support from:

- the Group's Services ERM & Insurance entity;
- their network of external risk engineers and consultants, who identify risks, make recommendations and facilitate risk reduction and follow up on action plan and KPI's.

The external networks of risk engineers are in charge of auditing Property Loss Prevention systems. They assess systems and the process safety culture with particular focus on:

- Mechanical Integrity of physical plant and equipment;
- Skill and expertise in place to manage loss prevention with dependence on internal or external support;
- Asset Process Safety Management system and framework in place;
- Loss prevention and safety culture of management, supervisory, operating and maintenance personnel.

#### Towards Highly Protected Risk (HPR) certification

The top standard adopted by the Solvay group is set at the Highly Protected Risk (HPR) level and practice. This certification, given by an external Risk Engineering Company, means that:

- All human element recommendations issued by the external risk engineers are completed;
- All recommendations associated with a Loss Expectancy scenario above 10 EUR million are completed;
- All recommendations linked to the fire systems reliability are completed.

From an organization's point of view, the HPR certification places the site at the center of this "Hearts and Minds" culture. It welcomes, encourages and rewards reporting "bad news"; it establishes a proactive attitude towards risk evaluation and risk reduction; it helps people to be prepared to expect the unexpected and it promotes constant anticipation of what could go wrong.

The HPR certification target sets for all the sites is based on the global economic Group performance and is discussed with each Global Business Unit. The sites are prioritized according to their economical criticality from the GBU's and the Group perspectives.

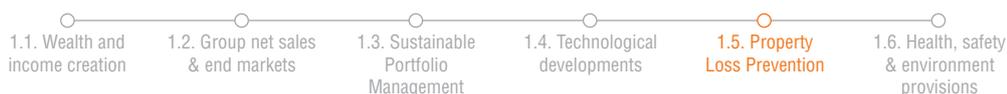
#### Human element recommendations - Asset protection

**The Property Loss Prevention program kicked off in mid 2009. By the end of 2012, 442 cumulative human element recommendations had been issued by external risk engineers, of which 167 (38%) were completed in 2012.**

The human element recommendations are recommendations on improvement of human procedures (operating

procedures, safe work practices, asset integrity and reliability, contractor management, training, management of change, emergency) to reduce the likelihood of a loss.

The objective for 2013 is to reach 50% of human element cumulative recommendations completed (representing 10% additional completion).



### Human element recommendations

	2009	2010	2011	2012	Objective 2013
Human element completed	-	2%	15%	38%	50%

*Perimeter:* Equivalent to manufacturing perimeter under operational control. Rhodia included as from the first of January 2012.

*Legend:* Percentage of cumulative Human element recommendations completed (out of total Human element recommendations issued by the network of external risk engineers).

### Physical protection recommendations

**At the end of 2012, cumulative recommendations related to physical protection represented a potential cumulative loss expectancy amounting to 25 538 EUR million.**

Recommendations related to physical protection of manufacturing installations prescribe capital intensive engineered systems tailored for the control and mitigation of consequences inherent to industrial losses, to reduce the severity of a potential loss.

Of these recommendations, 22 have been completed by the industrial sites concerned in 2011, representing a reduction of 1 020 EUR million cumulative loss expectancy (5% of the cumulative loss expectancy for the Group identified by the risk engineers). In 2012, 88 of them were already implemented representing 5726 EUR million of loss expectancy reduction (26% of the cumulative loss expectancy).

The external risk engineers issue physical protection recommendations based on risk scenario's whenever the scenario identifies the potential to reduce loss expectancy by a minimum of 5 EUR million in assets and/or profit. The annual objective on physical protections is flexible and aligned on the overall Group and GBU economical strategy for the year that determines level of criticality of the site and the consequent protection efforts. It is fixed in year - Q1.

	2009	2010	2011	2012
Reduction of potential cumulative loss expectancy	-	1%	5%	26%

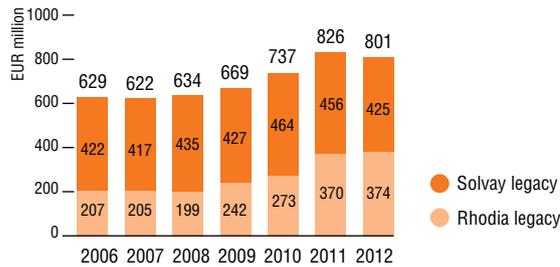
*Perimeter:* All sites owned by Solvay (>50%) or where Solvay has the operational control.

*Legend:* Potential cumulative loss expectancy is a statistical metric of the simultaneous occurrence of all predictable hazardous events associated with the issued loss prevention recommendations. It is thus the sum of the loss expectancies of all open recommendations.



## 1.6. Health, safety & environment provisions

### 1.6.1. Health, safety & environment provisions (GRI 1.2)



*Perimeter:* Equivalent to the Solvay financial perimeter.

*Legend:* The provisions are reviewed on the basis of the IFRS norms. The events which might potentially take place after 20 years are not taken into account. More details on the economic performance of the Solvay group are to be found in the Annual Report.

The relative stability over time of the financial provisions for health, safety and environmental risks reflects the rigorous policy, the systematic risk management and the solid financial reporting processes. The acquisition of Rhodia has not increased the provisions dis-proportionally.

The decrease of the provisions on 2012 is mainly due to the reclassification of Solvay Indupa, vinyls South America activity, as “assets held for sale”.

The increase of provisions in 2011 is mostly due to the application of IFRS 3 “business combinations” accounting rules for Rhodia acquisition. This has lead to measure Rhodia identifiable HSE provisions at fair value including contingent provisions which were not previously recognized.

The financial exposure from health, safety and environmental risk is managed by insurance programs and financial provisions.

## 2. Environmental performance

Solvay strives for continuous improvement in environmental protection. The key sustainability targets 2006-2012 defined for the Solvay legacy have been reached. Special attention was given to robustness of environmental management systems. Key new targets will be defined for 2012-2020 for Solvay's new perimeter.

Protection of environment is for Solvay a key condition for doing business, as part of its sustainable development policy and of its repeated commitments to the Responsible Care® Global Charter, first signed in 1992 and resigned in 2007.

### **Policies and management approach**

Solvay applies Environmental Management Systems that are based on the principle of continuous improvement and aligned with international standards such as ISO 14001. Group standards, programs and tools support and frame sites local management systems, covering risk analysis, monitoring of performance and compliance to regulations and permits, follow-up of the corresponding corrective actions, review of performance and improvement plans. The Group has policies in the environmental areas. In particular Group "level 2 policies" have been redefined: for Environmental Management, Waste Management, and Water Management.

### **Organization & responsibilities for Health, Safety and Environment**

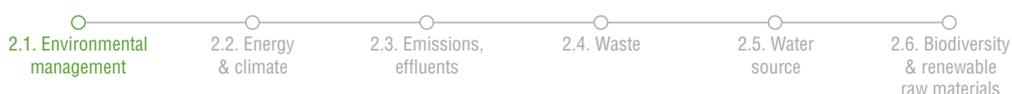
Solvay strives for continuous improvement in environmental protection. The 2006-2012 sustainability targets defined for the Solvay legacy have been reached. The year 2006 was taken as reference year when the objectives were fixed in 2007.

Special attention was given to the robustness of environmental management systems. New key targets will be defined for 2012-2020 for Solvay's new perimeter. Protection of environment is for Solvay a condition for doing business, as part of its sustainable development policy and of its repeated commitments to the Responsible Care® Global Charter, first signed in 1992 and resigned in 2007.

The management of HSE matters is now under the umbrella of the Group Industrial Direction: Environment issues are overseen by the Corporate Process Manager for environment, reporting to the Group HSE Director.

The HSE General Manager has six missions:

1. defining a strategy, policies, procedures and rolling them out;
2. auditing and control;
3. rolling out the Group's strategy by implementing programs and processes worldwide;
4. providing support and expertise to the sites, businesses and functions;
5. operationally managing the HSE family as a whole; contributing to the Group's strategic development.
6. overseeing environmental performance and compliance.



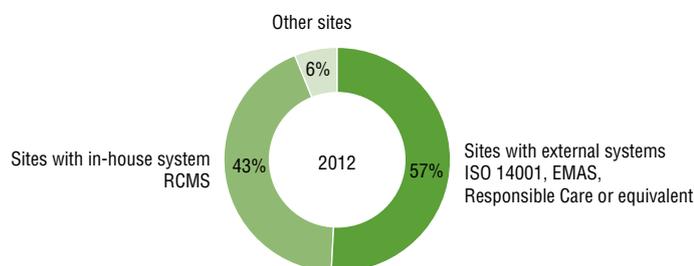
## 2.1. Environmental management

Solvay applies recognized Environmental Management Systems (EMS) that are based on the principle of continuous improvement. The detection and follow-up of compliance with operating permits and laws, and for environmental performance documentation is an intrinsic part of the systems.

EMS are the basis for the deployment of key elements such as risk analysis, monitoring of performance, follow-up of corrective actions, and review of performance, including improvement plans, by the site Management.

In 2012, Solvay did not report any significant environmental accident.

### 2.1.1. Environmental management systems



		2009	2010	2011	2012
Solvay legacy	Sites with system in line with Group standard (ISO 14001, EMAS, Responsible Care or equivalent)	69%	81%	89%	89%
	Sites with system externally certified (ISO 14001, EMAS)	49%	56%	64%	58%
Rhodia legacy	Sites with system in line with Group standard RCMS				100%
	Sites with system externally certified (ISO 14001, EMAS)				29%
<b>Total number of sites in perimeter</b>		<b>69</b>	<b>73</b>	<b>73</b>	<b>137</b>

*Perimeter: Equivalent to Solvay group manufacturing perimeter under operational control.*

**Commitment:**

**All Solvay industrial sites to implement HSE Management Systems in, line with Group standards<sup>(\*)</sup>.**

**The Solvay sites were required to maintain or establish, by end 2013, environmental management systems of ISO 14001-type or equivalent at all sites, and to have them certified in respect of activities incurring significant risks of adverse environmental impact.**

**The Rhodia legacy sites rely on an in-house management system, deployed worldwide. For the future, all sites will be required to have an HSE Management System in line with Group standards.**

<sup>(\*)</sup> In line with Group standards: SCMS (Solvay Care Management System) or equivalent: ISO, EMAS, Responsible Care)

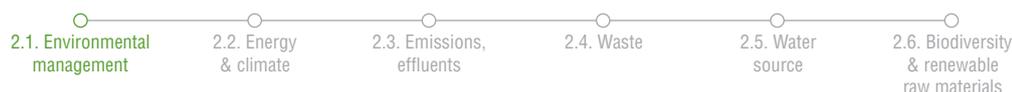
These systems include provisions for the verification of legal compliance and for performance documentation.

For the Solvay legacy sites, EMS of ISO 14001-type or equivalent are implemented at 89% of manufacturing sites, with 58% verified. Environmental management systems generally used in Europe are of the ISO 14000-type, and comparable management systems elsewhere. In the US and in Argentina, for example, the management systems generally stem from the national Responsible Care® programs. The breakdown by EMS type amongst Solvay legacy sites is:

- ISO 14001: 68%
- Eco-Management and Audit Scheme (EMAS): 2%
- Other (mainly Responsible Care®): 30%

Since the 1970s, a voluntary policy had been developed by the Rhodia legacy in the domains of hygiene, health, safety, products and transport, and environment that leads to the implementation at all sites of a single frame of reference frameworks: the Rhodia Care Management System (RCMS). This single framework, which includes the requirements of the standards ISO 14001 and OSHAS 18001 and the primary international regulations, comprises 115 requirements, stemming from the prior frames of reference established by Rhodia.

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE



For the future, a new Group HSE Management System will be defined in 2013. It will be equivalent to the various management systems used for many years as reference by the Group: OHSAS 18001, Voluntary Protection Programs, ISO 14001, US Responsible Care Management System. The new system will build

on RCMS which incorporates the requirements of the above-mentioned systems. All Solvay industrial sites will have to progressively implement this system in building on their existing management system. On this basis, sites will continue to seek or maintain external certification under these various verification schemes.

### 2.1.2. Improvement programs and Best Available Techniques (GRI EN18)

Improvement programs in sites and Best Available Techniques benchmark

**Commitment:**

**To deploy Group environmental programs and standards, particularly for**

- (1) **emission control and reduction;**
- (2) **avoiding environmental infringements;**
- (3) **compliance with environmental quality standards;**
- (4) **assessing compliance and seeking alignment with the environmental requirements related to best available techniques;**
- (5) **impact assessments programs;**
- (6) **eco-toxicity assessments;**
- (7) **appropriate and effective business-specific voluntary commitments.**

**Within the frame of their commitment to deploy an environmental management system (ISO 14001 or equivalent) Solvay sites carry out annual management reviews of compliance status and environmental performance. From those reviews environmental improvement programs are decided and deployed, notably as a result of the Group strategy to reduce its environmental risks and footprint.**

Solvay legacy has carried out programs focusing on the commitments and targets defined by the Group in 2008.

Rhodia legacy has focused on the deployment of its in-house Rhodia Care Management System, of its sustainability reference framework "Rhodia Way" and on the impact reduction targets defined in 2010.

Compliance with Best Available Techniques	Sites with assessments (%)	
	2011	2012
Solvay legacy (vertical + horizontal BATs)	100%	100%
Rhodia legacy (vertical BATs, Europe)	0%	100%

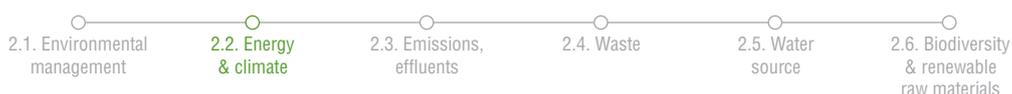
The program decided in 2008 for the Solvay legacy, to benchmark all manufacturing plants to the environmental requirements of Best Available Techniques (BATs) and BREFs<sup>(1)</sup> is now completed, with more than 500 assessments carried out in 2010-2011. Within the framework of this program, the Rhodia legacy has benchmarked in 2012 all European plants with respect to all "product specific" BATs, the so called "vertical BATs".

These in-depth assessments are a strong lever to further progressively align environmental performance to the best benchmarks for all similar manufacturing units.

In Europe, compliance with BATs will be further sought, taking into account, as prescribed, the economic feasibility, assessment of the local situation and potential impacts.

In particular, the business management will be in the position to anticipate the investments needed to timely comply with the environmental conditions included in the Industrial Emissions Directive IED (former IPPC).

<sup>(1)</sup> Ref: Best Available Techniques Reference documents. According to Article 14(3) of the IED, BAT conclusions shall be the reference for setting the permit conditions to installations covered by the Directive.



## 2.2. Energy & climate

Solvay has two main objectives regarding energy consumption and greenhouse gas emissions: on the one hand to improve the energy efficiency of production processes through realistic solutions that are compatible with the specific energy requirements of a heavy industry; on the other hand, to reduce its greenhouse gas emissions as far as technically and economically feasible and, of course, in line with existing or expected regulations.

Ensuring long-term energy supply is also a permanent concern. Diversifying energy sources and developing alternatives to fossil fuels wherever sustainable in ecological, economic, industrial, and social terms is a strategic goal. This materializes in heavy technical investments or in partnerships and contractual arrangements extending over long period such as the Excelcium or Blue Sky consortia.

In the Rhodia legacy and regarding energy efficiency, the goal was to decrease the consumption of non-renewable resources per ton of products by 1.5% per year between 2010 and 2015 (8% over the period). Joint actions between the industrial management and the Research & Innovation have allowed to develop processes and technologies along this line.

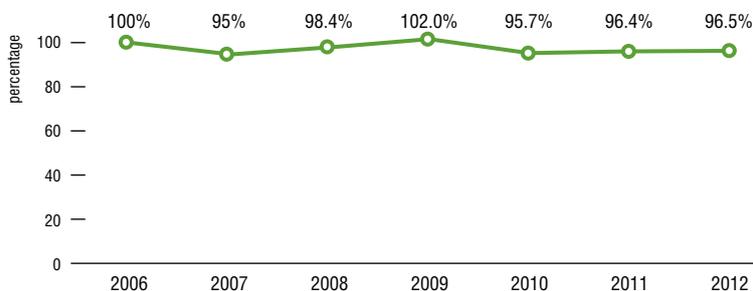
A structured reporting system, externally verified, and the response to rating agencies such as the Carbon Disclosure Project helps the Group to align its efforts on the materiality of its energy and climate challenges.

### 2.2.1. Energy consumption (GRI EN3 – EN4)

Primary energy of fuels (coal, gas, fuel oil ...) and of purchased steam and electricity

#### Energy index

Trend at constant (corrected) activity perimeter since 2006



#### Commitment:

**In 2008, the Group committed to reduce its energy consumption by 20% by 2020 as compared to 2006, at constant activity perimeter. A new objective has been defined for the Group.**

**The Group has reduced its energy intensity by 3.5% since 2006. Indeed, key projects contributing to this progress are the implementation of new electrolysis technology for producing chlorine, and the “Solwatt” projects aimed at improving the energy efficiency of manufacturing processes.**

Three parallel approaches are followed:

- After contributing to the deployment of energy-efficient cogeneration power plants within a program extending from the 90’s to the 2000’s, a new series of cogeneration projects are now being considered, in Europe, and the US.
- The internal pole of excellence in energy efficiency Solwatt aims at identifying and implementing energy savings in existing manufacturing units, via technology improvements and management behavior. This project will be extended to all concerned sites that will be evaluated by end 2015.

#### Energy consumptions

Without correction for changes in activity perimeter

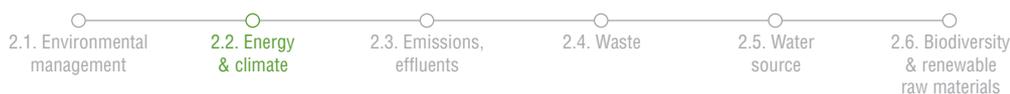
	2006	2007	2008	2009	2010	2011	2012
Petajoules (low heating values)	251	240	231	205	227	227	222

Perimeter: Solvay historical financial perimeter.

Legend:

- Energy index “at constant activity perimeter” reflects the change in energy consumption on a comparable basis after correcting the historic perimeter to take into account sites movements and introducing corrections for changes in production volumes from year to year.
  - Solvay’s energy reporting is in line with the WBCSD “Guidelines for Measuring & Reporting Corporate Value Chain GHG Emissions in the Chemical Sector”
  - Since last year, the reporting perimeter has been adjusted to the financial perimeter. The primary energy consumptions of the companies included in the financial perimeter represents 81 % of the total primary energy consumption of all companies in the operational perimeter.
- > More information on the definition and scope of energy indicators, see: Energy, greenhouse gas, and environmental emissions monitoring and reporting – Definitions and assumptions in this document.

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE



- New or revamped plants are optimized regarding energy consumption and generation.  
For example,
  - Two new membrane electrolysis plants, one in Lillo (B), the other in Tavaux (F), representing major investments and energy savings of around 17%, started at the end of 2012.
  - In 2012 the new epichlorohydrin production plant at Map Ta Phut (THA) started up, based on the Epicerol® process which has an optimized energy efficiency.
  - Other smaller improvements are in progress such as the revamping of the co-generation unit in La Rochelle (FR), the new gas engine at Ferrara (IT), or the new co-

generation at Rheinberg (DE) dedicated to SolVin.

For the future, technological breakthroughs will improve the global energy efficiency of Solvay's operations:

- In soda ash (sodium carbonate) manufacturing plants, via the operational excellence program.
- Once operational, RusVinyl in Kstovo (RUS) will be the first world-scale site for the production of PVC (330 000 t per year) with a maximum energy efficiency and minimal raw materials consumption.

### Solvay Energy Services

Solvay Energy Services makes use of the expertise of Solvay, Rhodia and Orbeo to optimize the energy purchases of the Solvay group, which amount to EUR 1.2 billion per year, as well as helping the Business Units and production sites to manage their energy requirements and CO<sub>2</sub> emissions.

Solvay Energy Services has been managing energy purchases in France for several years, also for industrial third parties. These activities have been extended to other countries.

For example in Brazil, Solvay Energy Services has developed and operates a biomass-fired cogeneration unit using sugar cane bagasse.

Solvay Energy Services' mission is also to optimize energy production assets. In this context, energy efficiency actions focusing on improving the operation of cogeneration installations (installations allowing for both thermal energy and electricity to be produced with gas turbines) have been undertaken.

Solvay Energy Services is also a founding member of consortia of electricity-intensive industries such as Blue Sky and Exeltium, aimed at securing long term supply to Solvay plants at competitive conditions.

### Energy Efficiency in Buildings

Solvay has signed the WBCSD Manifesto for Energy Efficiency in Buildings. This manifesto and its accompanying implementation guide aim at mobilizing WBCSD member companies to improve the energy performance of their buildings.

## 2.2.2. Greenhouse gas emissions in relation to manufacturing activities (GRI EN16)

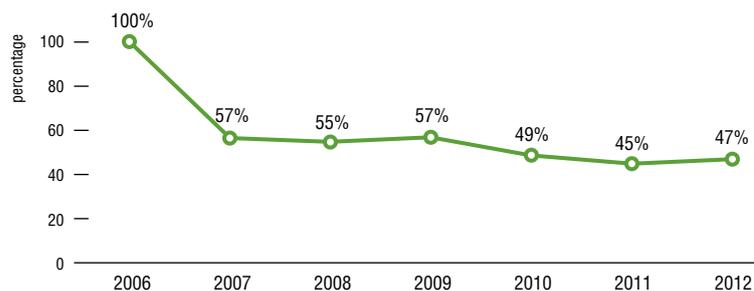
Kyoto Protocol – Scope 1 + 2 (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, PFCs, HFCs) – other greenhouse gases

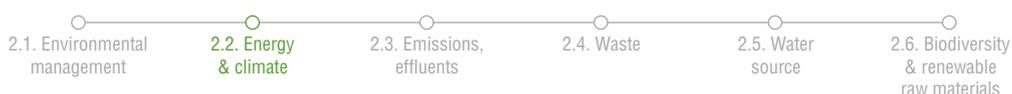
### Greenhouse gas index

Trend at constant (corrected) activity perimeter since 2006

#### Commitment:

**In 2008, the Group committed to reduce its greenhouse gas emissions, both direct and indirect (attributable to purchased energy) by 20% by 2020 as compared to 2006, at constant activity perimeter.**





### Emissions in tons equivalent

Without correction for changes in activity perimeter - Mt CO<sub>2</sub> equivalent

	2006	2007	2008	2009	2010	2011	2012
Direct & indirect CO <sub>2</sub> emissions (Scope 1+2)	14.3	13.7	13.0	11.6	13.0	12.8	12.4
Other greenhouse gases (Kyoto Protocol) (scope 1)	18.9	5.9	4.9	4.6	3.0	2.3	2.5
<b>Total greenhouse gases (Kyoto Protocol)</b>	<b>33.2</b>	<b>19.5</b>	<b>17.9</b>	<b>16.2</b>	<b>16.0</b>	<b>15.1</b>	<b>14.9</b>
Other greenhouse gases (non-Kyoto Protocol) (scope 1)	1.2	1.2	0.8	0.2	0.2	0.2	0.1

**Perimeter:** Equivalent to Solvay financial perimeter. The greenhouse gases emissions of the companies included in the financial perimeter represents 81% of the total primary energy consumption of all companies in the operational perimeter.

**Legend:** • The greenhouse gases emission index "at constant activity perimeter" reflects the change in emissions on comparable basis from year to year by correcting the historic perimeter to take into account sites movements and introducing corrections for changes in production volumes from year to year.

• Solvay's Greenhouse gases reporting is in line with the WBCSD "Guidelines for Measuring & Reporting Corporate Value Chain GHG Emissions in the Chemical Sector"

> More information on definition and scope of emissions reporting, see: Energy, greenhouse gas, and environmental emissions monitoring and reporting – Definitions and assumptions in this document.

**The Group has reduced its greenhouse gases emissions by 53% since 2006, at constant activity perimeter. Progress largely exceeds the objective defined by the Solvay legacy, resulting from Rhodia's significant progress made before the integration within Solvay. Between 2011 and 2012, a slight increase is observed while absolute emissions decreased, due to a decrease in production volumes in the same period.**

This was in a large part achieved by sharp abatements of nitrous oxide emissions from polyamide intermediates processes in several plants. Decreases were also made possible by purchases of lower carbon electricity, use of recycled wastes as fuel in Bernburg (DE) and reduction of emissions of fluorinated gases in Bad-Wimpfen (DE), Frankfurt (DE) and Salindres (FR). Projects contributing to improved energy-efficiency of manufacturing processes also significantly contributed to progress in the past 6 years.

Following this important achievement, a new target will be set for the Group.

#### Key achievements

- At Chalampé (FR), Onsan (KR), Paulinia (BR), abatement of nitrous oxide generated by the manufacturing processes, resulting in approximately 14 million avoided CO<sub>2</sub> teq
- At Jemeppe (B), Tavaux (F), Martorell (ES), and Rheinberg (D), substitution of the R22 refrigerant
- In the trona mine at Green River (USA), partial recovery of the methane emitted during extraction of the trona, and its incineration, avoiding emissions equivalent to 100 000 t CO<sub>2</sub> since 2011. In 2012

the heat from the combustion of the recovered methane is recovered in the manufacturing process, bringing additional energy and CO<sub>2</sub> savings. However, on the other hand, additional methane emissions also result from recent extension of the mining area.

- At Bernburg (DE), reuse of regional recyclable waste to produce energy, on-stream since end 2010, avoiding 350 000 t of CO<sub>2</sub> emissions / year.
- In France, nuclear electricity supply via Exeltium.

As regards non-Kyoto GHG, the main improvements were obtained in a series of sites: Jemeppe (BE), Martorell (ES), Tavaux (FR), Rheinberg (DE) Rosignano (IT), Salindres (FR), where CFC's were either eliminated or incinerated.

The Salindres (FR) incinerator induced significant emission reduction as from its startup in 2008.

For the future, a series of approaches will be followed to further curb emissions resulting from Solvay's operations

- Access to renewable fuels continues to be explored, with a project in Dombasle (FR) currently being studied by French authorities. This would allow the combustion of renewable fuels with only minor adaptations of existing boilers.
- A letter of intention has been signed with the Port of Antwerp to investigate constructing a major biomass power plant.
- Solvay is also contemplating other partnerships in Brazil to produce electricity from hydroelectric concessions.

#### Via WBCSD (\*), Solvay takes part in world-scale streamlining of chemical industry's sustainability accounting

As members of WBCSD, world large chemical companies are working together to adopt common, stronger rules for sustainability accounting. The aim is to adopt and recommend similar calculation assumptions across the world sector, and to make reportings fully comparable. Three guidelines are being established:

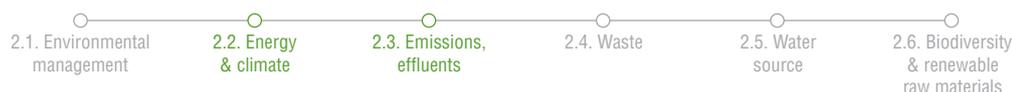
- Guideline on accounting for scope 1-2-3 greenhouse gas emissions by the chemical industry
- Guideline on accounting for and reporting GHG avoided emissions
- Guideline on life cycle metrics for LCA published by the chemical industry.

(\* ) World Business Council for Sustainable Development

#### Photovoltaic panels

Solvay has fitted 12 000 square meters of photovoltaic panels to the roof of its Belle-Etoile facilities in Saint-Fons and Feyzin (France). This project, one of the largest roof solar panel project in France, is a partnership with companies involved in solar power production.

The facility produces 2 million kilowatt-hours per year. This corresponds to the annual electricity consumption of a town of 2 000 inhabitants. Ultimately, the electricity produced will avoid releasing 1000 tons of CO<sub>2</sub> each year.



### 2.2.3. Greenhouse gas emissions from car fleet

	2012	2012 vs 2006
Number of cars	1 251	-9%
Million kilometers	29.6	-19%
Tons CO <sub>2</sub> / year / car	3.7	-36%
Total annual - Tons CO <sub>2</sub>	4 621	-41%
g CO <sub>2</sub> / km	156	-28%

*Perimeter: CO<sub>2</sub> emissions data available for 61% of the fleet in 2012 (1251 out of a total of 2052 vehicles). Most companies not included are cars from the Rhodia sector in Europe.*

*Legend: The data have been provided by Eurofleeting and the fleet managers for Germany and for US. Technical emissions are as defined by the Original Equipment Manufacturers (OEM).*

**The objective defined in 2008 to reduce by at least 30% the CO<sub>2</sub> emissions related to the car fleet has been largely reached, via a significant reduction in the European & American fleets. This achievement results from Solvay's car policy and from truly improved vehicles' efficiency leading to fuel economy, lower emissions and from the sale of the pharma sector.**

The reduction obtained in European countries (especially in BE, FR, IT, PT, ES, and DE) is mainly due to the change in the fleet structure, with a higher proportion of status cars with lower annual mileage.

#### Eco Fleet Management

The Eco Fleet Management concept aims at better selecting, managing, and monitoring the fleet along both its ecological and economic dimensions.

The "Drive low CO<sub>2</sub>, drive less, drive better" includes:

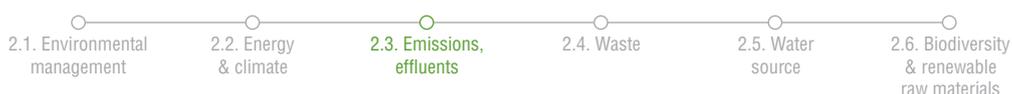
- Incentives (Bonus/Malus system);
- Technical monitoring of real car emissions;
- Support tools in European countries (operating the major fleets) encouraging drivers to choose cars with a lower environmental footprint;
- Team work to identify further potential progress.

## 2.3. Emissions, effluents

The control and reduction of the environmental impact of Solvay's activities is a constant drive, in line with its commitment to the Responsible Care® Global Charter. Globally the emissions to air, water, and soil were dramatically reduced during the last twenty years.

Improving environmental performance has been achieved along five main axes:

- Developing management systems (ISO 14001 or equivalent) with a focus on permit compliance and accident prevention;
- Implementing projects targeting significant emissions reduction: -20 % between 2006 and 2020 for global air and water indicators for the Solvay legacy, -40 % for SO<sub>x</sub>+ NO<sub>x</sub> and for COD, -20 % for NMVOC for the Rhodia legacy between 2005 and 2015;
- Pursuing the reduction targets defined for energy consumption and greenhouse gas emissions: -20% for both parameters between 2006 and 2020 for the Solvay legacy, -66% for greenhouse gas between 2006 and 2015 and - 8% for energy consumption between 2010 and 2015 for the Rhodia legacy;
- Complying with voluntary branch commitments regarding environmental performance – a.o. European chlorine manufacturers (Eurochlor) or European Council of Vinyl Manufacturers (EVCM) charters and commitments
- Seeking high performance in new and acquired activities.



### 2.3.1. Environmental impact indicators (GRI EN 19 + EN20)

Ozone depletion, Acidification (air emissions), Eutrophication (air and water emissions), Photochemical Ozone Creation Potential

#### Commitments:

**To protect the environment, including by reducing emissions; To pursue the goal of doing no harm to people or the planet.**

**The consolidated performance of Solvay and Rhodia legacies exhibits steep progress along key environmental impacts indices. This results from many action plans by each legacy in the framework of the targets independently defined.**

Progress has gone beyond the pre-defined targets: between 2006 and 2012, for the Solvay and Rhodia legacies together, -58% for emissions in terms of ozone depletion potential was achieved, -42% for acidification potential, -33% for eutrophication potential and -23% for POCP.

Slight increases between 2011 and 2012 in eutrophication potential and POCP expressed at constant activity perimeter are due to a 4% decrease in production volumes in the same period, while real emissions are stable or decrease. New targets are currently being defined for the new Group.

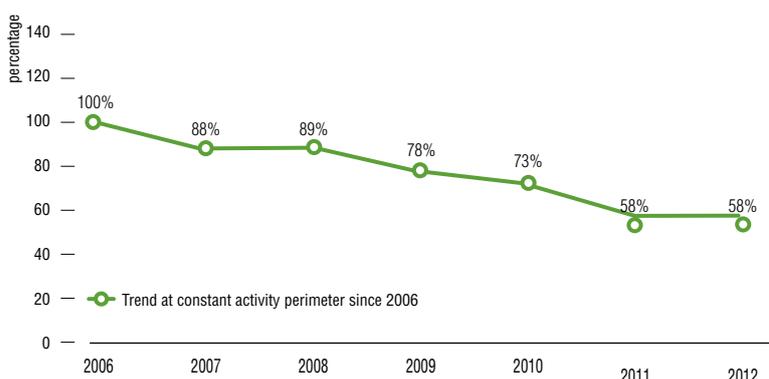
In the Solvay legacy, the “Global Water Emission Index and “Global Air Emission Index” were monitored to give an overall image of trends for all main relevant pollutants.

The target defined in 2008 was to reduce these global indexes by 20% at constant perimeter (2006 baseline). This was achieved already in 2011 for water emissions, with a reduction of 29%. The Global Air Emissions Index decreased by 28% over the same period, also at constant activity perimeter.

The Rhodia legacy also pursued a range of environmental targets and achieved large reductions for many parameters, for example a 56% reduction in 2011 as compared to 2005 of absolute acidic (SO<sub>x</sub> + NO<sub>x</sub>) air emissions.

#### Acidification potential (teq SO<sub>2</sub>)

Trend at constant (corrected) activity perimeter since 2006

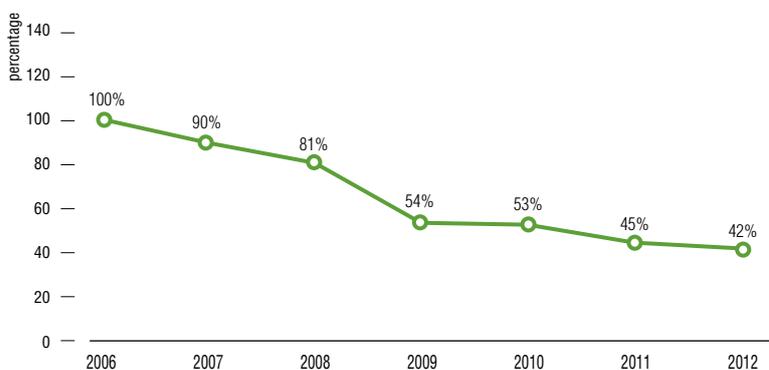


Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.  
> More information on definition and scope of environmental reporting.

Legend: Acidification (emissions to air): consequence of acids (mainly combustion gases such as NO<sub>x</sub> and SO<sub>x</sub>) emitted to the atmosphere and subsequently deposited (through acid rain, for instance) in surface soils and water. The acidification indicator published quantifies the effect of terrestrial acidification due to acidic emissions to air on forests at the European scale (ReCiPe database). Other effects such as acidification of lakes or damage to buildings are not covered by this indicator.

#### Ozone Depletion Potential (teq CFC-11)

Trend at constant (corrected) activity perimeter since 2006



Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.  
> More information on definition and scope of environmental reporting.

Legend: Ozone Depletion Potential: Indicator quantifying the destruction of stratospheric ozone due to the emission of ozone depleting substances (mainly refrigerants from the HCFC et HFC families) – Reference ReCiPe. Reduction were mainly obtained by installations to destroy CFCs.

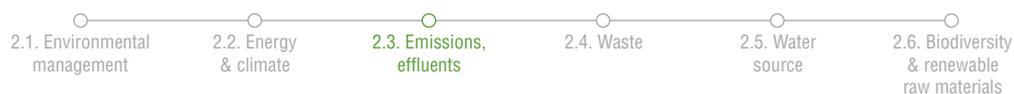
#### Acidification potential and Ozone Depletion Potential

Without correction for changes in activity perimeter

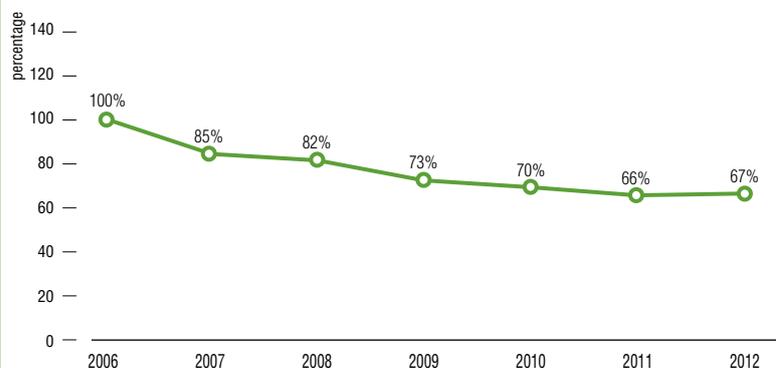
	2006	2007	2008	2009	2010	2011	2012	Performance vs 2006
Ozone Depletion Potential (ODP) - teq CFC-11	30.33	28.41	24.94	14.27	15.09	13.97	12.42	- 59%
Acidification potential - teq SO <sub>2</sub>	41 533	37 586	36 493	28 116	28 669	25 803	24 780	- 40%



## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE

**Eutrophication Potential (air and water) (teq PO<sub>4</sub>)**

Trend at constant (corrected) activity perimeter since 2006



**Perimeter:** Solvay manufacturing perimeter equivalent to financial perimeter.

> More information on definition and scope of environmental reporting.

**Legend:** Eutrophication (emissions to air and water): Environmental impact indicator quantifying the eutrophication in freshwater and marine water systems due to the combined emission of nitrogen and phosphorus compounds to air and water.

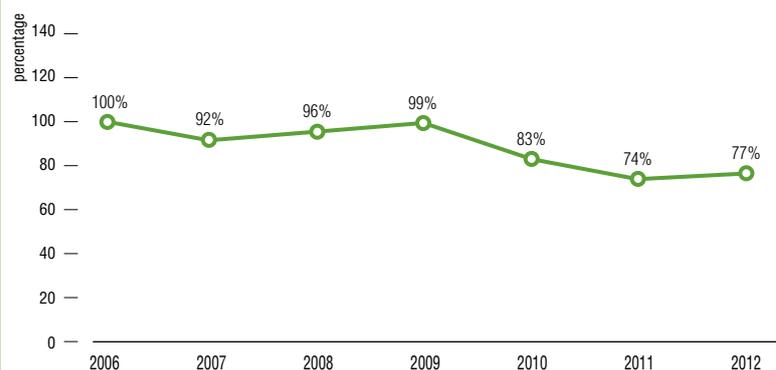
**Emissions in tons equivalent**

Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Performance vs 2006
Eutrophication Potential (EP) (air & water) - teq PO <sub>4</sub>	6372	6467	6064	4817	5000	5820	5669	-11%

**Photochemical Ozone Creation Potential (kt NMVOC)**

Trend at constant (corrected) activity perimeter since 2006



**Perimeter:** Solvay manufacturing perimeter equivalent to financial perimeter.

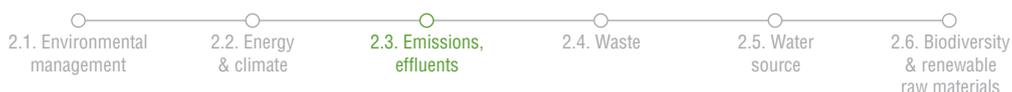
> More information on definition and scope of environmental reporting.

**Legend:** Photochemical Ozone Creation Potential (POCP): Radiation from the sun and the presence of nitrogen oxides and hydrocarbons in the lower layers of the atmosphere (troposphere) can lead to the formation of aggressive reaction products, one of which is ozone. Ozone leads to the formation of summer smog, damages vegetation and is toxic for humans. The POCP of a substance, expressed as teq NMVOC, is its relative ability to contribute to this effect.

**Emissions in kt tons equivalent**

Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Performance vs 2006
Photochemical Ozone Creation Potential (POCP) - kilotons equivalent NMVOC	21,20	21,40	21,71	19,59	18,56	17,16	16,91	-20.24%



### 2.3.2. Emissions to air - Additional specific parameters (GRI EN20)

Sulfur oxides, Nitrogen oxides, Non-methanic volatile organic compounds NMVOC, Dust, Heavy metals

**Commitments:**  
 To protect the environment, including by reducing emissions;  
 To pursue the goal of doing no harm to people or the planet.

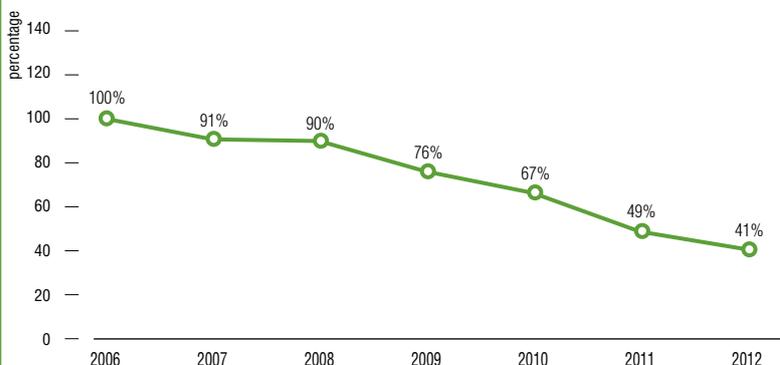
Since 2006, the SO<sub>x</sub> emissions have been reduced by 59%, at constant activity perimeter.  
 In the same period, the efforts of both legacies resulted in a NO<sub>x</sub> reduction of nearly 35%.

SO<sub>x</sub> and NO<sub>x</sub> emissions are the main contributor to air acidification. Since 2006, SO<sub>x</sub> emissions were reduced by 59% and 35 %, at constant activity perimeter.

These results were achieved through numerous improvement projects developed at most of the Solvay sites targeting primarily the combustion equipments (use of cleaner fuel i.e natural gaz, use of efficient burner, installation of catalysts). In 2012 the main contribution (- 2200 t of SO<sub>x</sub>) comes from Baton Rouge (US, EcoServices) where a new abatement unit has been commissioned.

#### Sulfur oxides (SO<sub>x</sub>)

Trend at constant (corrected) activity perimeter since 2006

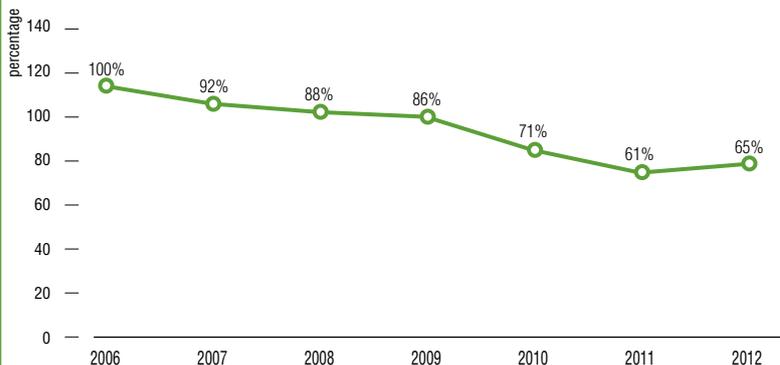


#### SO<sub>x</sub> Emission Reduction at Rhodia EcoServices

In 2007 Rhodia entered into an agreement with the US authorities to reduce SO<sub>x</sub> emissions by 19,000 tpy at the EcoServices sites in the US. To date, three scrubbers have been installed at the Houston, TX and Baton Rouge, LA (USA) sites which has resulted in >75% reduction of SO<sub>2</sub> emissions. The first scrubber was installed in 2009. In 2010/2011 the Baton Rouge plant completed the installation of two scrubbers. In 2012, an additional reduction by 2500 tons per year of SO<sub>2</sub> emissions was achieved since 2011. Further emission reductions are planned with the installation of a fourth scrubber at the Houston plant by Q1 2014.

#### Nitrogen oxides (NO<sub>x</sub>)

Trend at constant (corrected) activity perimeter since 2006



#### Emissions in tons

Without correction for changes in activity perimeter

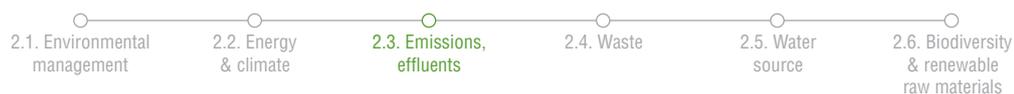
	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Sulfur oxides (SO <sub>x</sub> )	27 673	24 841	23 544	17 457	17 423	13 065	10 592	-62%
Nitrogen oxides (NO <sub>x</sub> )	13 182	12 624	12 636	10 685	10 016	8 954	9 220	-30%

Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.  
 > More information on definition and scope of environmental reporting.

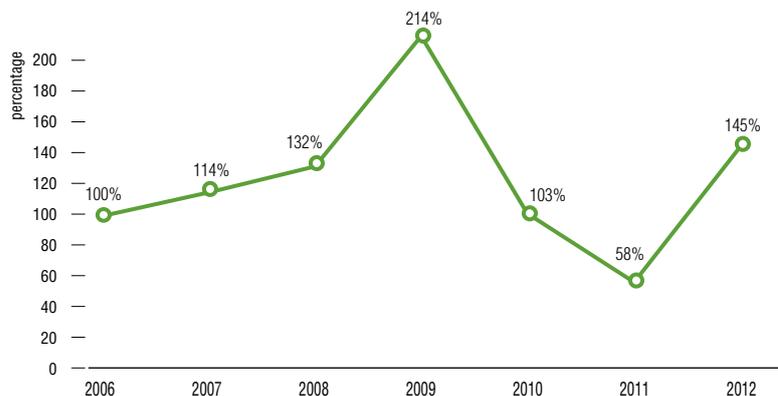
**Legend:**

- Sulfur oxides: Acidifying gases resulting from the combustion of sulfur containing combustibles (heavy oils, coal). The sulfur content of natural gas can be neglected. SO<sub>x</sub> contribute to acidification.
- Nitrogen oxides: Acidifying gases resulting from combustion processes. Thermal NO<sub>x</sub> (generated from the nitrogen contained in the air used for a combustion process) is generally the biggest contribution. Additional NO<sub>x</sub> can be formed from combustibles containing nitrogen compounds, such as coal.

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE

**Heavy metals to air - E-PRTR list<sup>(1)</sup>**

Trend at constant (corrected) activity perimeter since 2006



**These emissions of gaseous effluents are mainly due to emissions in dust from coal-fired power plants. Variations during the last four years are caused for a large part to variations in measured concentrations in coal. An action plan will be carried out to better control this variability.**

Reductions are obtained through a program to install more dust filters (a.o. electrofilters) on power generators for a better abatement of fly ash and their metal content and by shifting to gas as energy source.

**Emissions in tons**

Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Heavy metals	2.52	3.00	3.37	4.66	2.54	1.46	3.59	+42%

**Perimeter:** Manufacturing perimeter equivalent to financial perimeter – Solvay legacy. Emissions from power generation of the Rhodia legacy are minimal due to the predominant use of gas as fuel in the power plant generation.

> More information on definition and scope of environmental reporting.

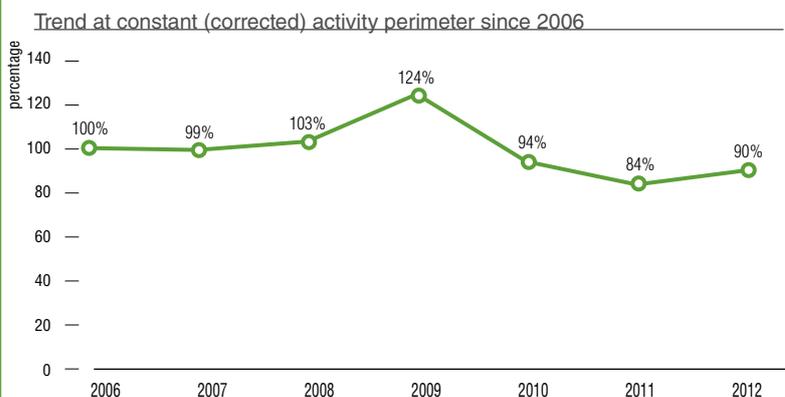
**Legend:**

Heavy metals to air (E-PRTR list): sum of releases of the 8 heavy metals subject to the E-PRTR<sup>(1)</sup> reporting: As, Cd, Cr, Cu, Hg, Ni, Pb, and Zn. "Heavy metals" are present in the fly ashes of coal-fired boilers. The measurement of the heavy metals released with dust emissions has been extended to more combustion plants operated by the Group, even when this is not required by operating permits.

<sup>(1)</sup> The European Pollutant Release and Transfer Register (E-PRTR) is the Europe-wide register that provides easy access to key environmental data from industrial facilities.



**Non methanic volatile organic compounds - NMVOC**



Since 2006, the total NMVOC emissions have been reduced by 10%, at constant activity perimeter.

This progress is due to several improvements, in particular reduction-at-source actions regarding the use of acetone as a solvent in the manufacture of acetate cables by the GBU Acetow, and reduced emissions of VOCs in PVC production plants.

**Emissions in tons**

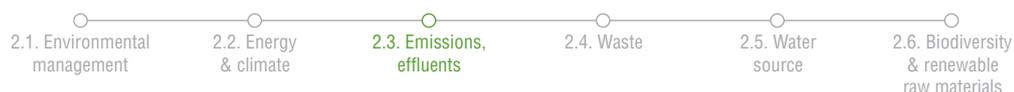
Without correction for changes in activity perimeter

Emissions in tons	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Non-Methanic Volatile Organic Compound (NMVOC) Defined according to European Directive 1999/13EC	8 511	8 419	8 734	8 931	7 745	7 058	7 032	-17%

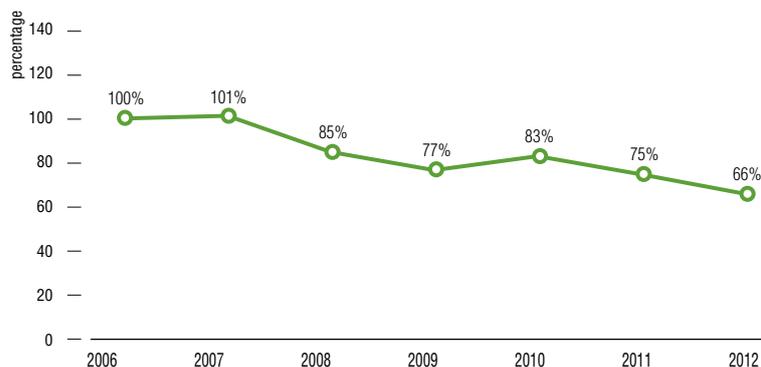
Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.  
> More information on definition and scope of environmental reporting.

Legend: NMVOC: compounds taken into account are those for which the normal boiling point is inferior or equal to 250 °C. This definition is based on the European Solvent Directive

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE

**Dust**

Trend at constant (corrected) activity perimeter since 2006



**Compared to 2006, dust emissions have been further reduced by 34%, at constant activity perimeter.**

These dust emissions are mainly associated with the combustion of coal in the boilers used to produce steam and electricity. As coal-fired boilers are progressively replaced by gas-fired boilers and/or equipped with dust abatement systems (electrofilters,...), further reduction of emissions will be possible.

**Cleaner air at Rhodia Silica in Collonges (France)**

A complete new installation successfully started in June 2012, enabling this plant to meet its objective of reducing its dust missions by 30% and CO<sub>2</sub> emissions by 2,5%. The installation was fitted to the glass furnace.

Bag filters are used. The total investment of 4MEUR allows for the recovery of the calories of smokes and will generate savings of 1,3 MW energy and avoid the corresponding CO<sub>2</sub> emissions.

**Emissions in tons**

Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Dust (solid particulates)	2 080	2 101	1 691	1 328	1 623	1 519	1 304	-37%

Perimeter: Solvay Manufacturing perimeter equivalent to financial perimeter.  
> More information on definition and scope of environmental reporting.

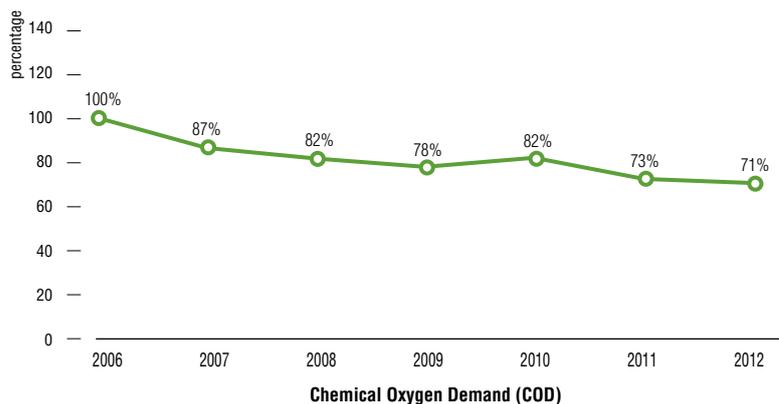
Legend: Dust: particulate materials in gaseous effluents treats.

### 2.3.3. Emissions to water – Additional specific parameters (GRI EN21)

Chemical Oxygen Demand, nitrogen, phosphorus, heavy metals, AOX

#### Chemical Oxygen Demand (COD)

Trend at constant (corrected) activity perimeter since 2006



Solvay has further reduced its COD discharged into water by 20% since 2006, at constant activity perimeter. This results from the improvement programs of both Solvay and Rhodia legacies to reduce emissions at the source or to improve existing treatment facilities. The main contribution came from the Chalampé (FR) and Santo Andre (BR) sites where processes were optimized in order to generate less organic effluents. In 2013 new projects like the improved treatment plant in Tavaux (FR) will be developed to further progress.

#### Emissions in tons

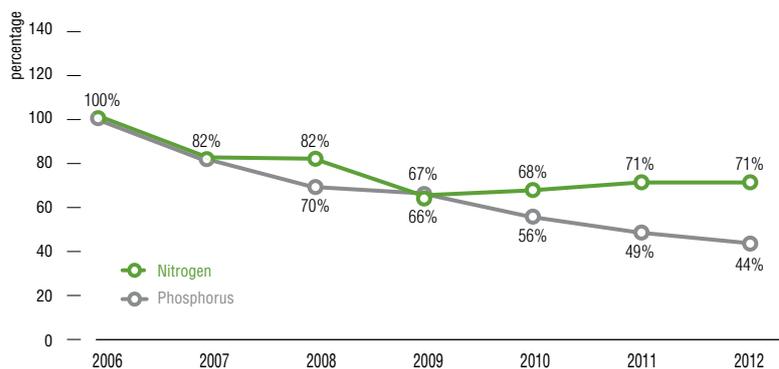
Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Chemical oxygen demand (tons)	13 396	13 393	13 024	10 549	12 530	11 458	10 708	-20%

Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.

#### Eutrophication

Trend at constant (corrected) activity perimeter since 2006



The progress obtained on nitrogen releases was mostly obtained at the same time and through the same project as the one developed to reduce COD emissions.

Phosphorus discharge reductions were predominantly linked to a different product mix at the phosphorus derivative site at Oldbury (UK).

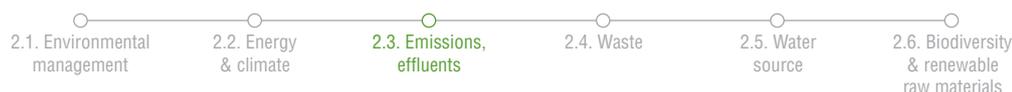
#### Emissions in tons

Without correction for changes in activity perimeter

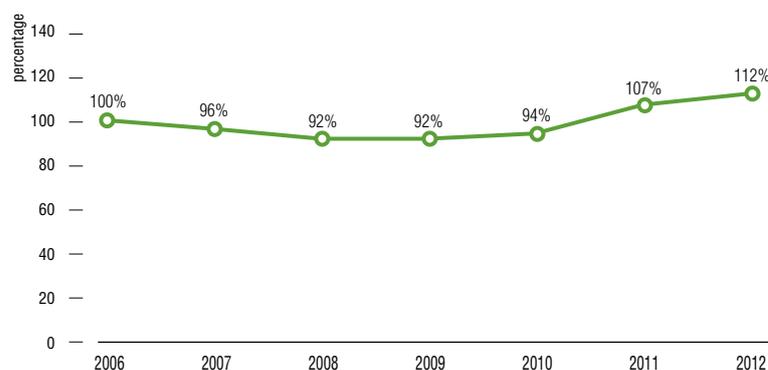
	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Phosphorus (tons)	493	460	397	329	311	278	244	-51%
Nitrogen (tons)	4 603	5 516	4 965	3 627	3 968	5 832	5 629	+22%

Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE

**Heavy metals**

Trend at constant (corrected) activity perimeter since 2006



The variations in emissions of heavy metals in water effluents are mainly due to variations in concentrations in the natural limestone used as raw material for soda ash production.

**Emissions in tons**

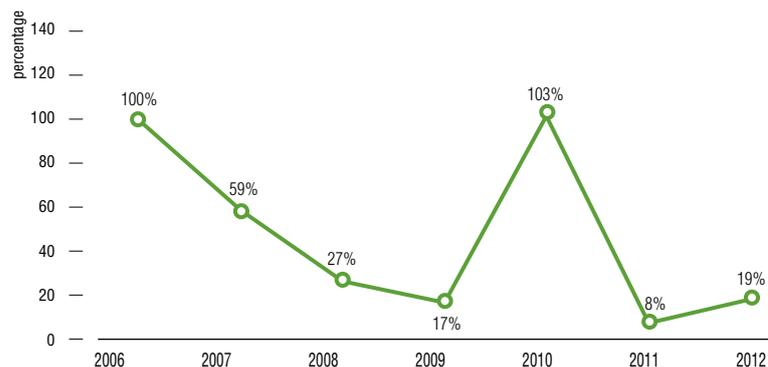
Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Heavy metals (*) (E-PRTR list) (*) E-PRTR list of heavy metals; As, Cd, Cr, Cu, Hg, Ni, Pb, Zn	64	67	61	55	64	79	80	+24%

Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.

**Adsorbable Organic Halogens (AOX)**

Trend at constant (corrected) activity perimeter since 2006



A significant downward trend have been obtained in the last ten years. The 2010 sudden increase is due to a process upset at the key contributing site of Salindres (FR). This increase did not incur an environmental infringement and non compliance with the permit.

It is conspicuous in the current reporting due to the fact that overall Group emissions for this parameter are already very low. The plant has put in place the necessary measures to avoid the recurrence of this event.

Discharges of organic halogenated compounds have been reduced by 81% over the period, at constant activity perimeter.

**Emissions in tons**

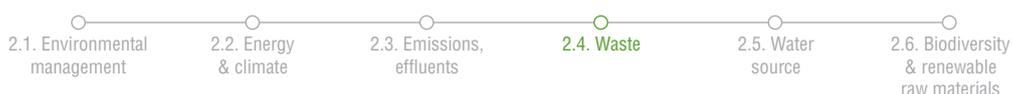
Without correction for changes in activity perimeter

	2006	2007	2008	2009	2010	2011	2012	Change 2006-2012 in%
Adsorbable Organic Halogens	72.62	44.93	19.56	11.49	77.26	6.41	13.48	-82%

Perimeter: Solvay manufacturing perimeter equivalent to financial perimeter.

**Legend:**

- Total Phosphorus: sum of all phosphorous containing compounds (organics but also inorganics such as phosphates...) in the effluent, expressed as their phosphorus equivalent
- Total Nitrogen: Sum of all nitrogen containing compounds, mainly inorganic nitrogen species (ammonium, nitrates,...) but eventually also organic nitrogen compounds (amines,...) in the effluent, expressed as their nitrogen equivalent. Nitrogen species contribute to the eutrophication of aquatic systems.



## 2.4. Waste

Regarding waste management, Solvay distinguishes industrial waste and other by-products – inert for the most part – stemming from its mining activities (limestone, salt, fluorspath, etc.).

The Group makes every effort to reduce industrial waste and in particular dangerous or potentially dangerous waste, with as a policy to reduce them to a minimum with a zero objective in the longer run. This will be further pursued via recovery, recycling, and heat recovery. For waste streams handled by third parties, Solvay policy is to contract only with registered and specialized waste management companies.

In many productions, such as in PVC processes, many hazardous waste are already recovered and recycled, either by recycling or by thermal destruction with energy recovery in high performance incinerators, often operated on-site.

### 2.4.1. Hazardous and non-hazardous waste and mining by-products (GRI EN22)

**Commitments:**

**To focus on the reduction of industrial waste, and especially hazardous or potentially hazardous industrial waste**

**To limit landfill of hazardous waste to a minimum, aiming at zero landfill in the long run, by recycling or producing secondary raw materials**

**To maximize the recovery and recycling of by-products, whenever technically and economically possible in order to improve resource efficiency (energy, water, materials)**

**Landfilled hazardous waste represents only 8% of the total hazardous industrial waste, a large part being recycled and recovered, most often internally by Solvay, and a large part destroyed via high performance incineration with heat recovery.**

Taking into account technical and economical feasibility, Solvay applies the following hierarchy in waste management:

1. by priority and when possible, use of intrinsically waste-free technologies or source reduction,
2. recycling and reuse,
3. then material recovery, energy recovery,
4. finally treatment before landfilling in absence of any alternative.

Many sites favor and promote internal reuse and recycling: regeneration of solvents and oils, recycling of catalysts, recovery of organic chlorinated waste, use of ammonium nitrate by-product as fertilizer, recycling of silica and silicate sludge in cement production, etc.

Teams of chemistry and chemical engineering specialists constantly improve the processes to make them cleaner and offer original routes for the recovery of waste and by-products (e.g. use as raw material for the manufacture of solvents with a lower impact on the environment).

Such approach was implemented in Chalampé (FR) in 2010 with a significant impact on hazardous wastes production (- 50 000 tons).

Concerning non-hazardous waste, soda ash manufacturing in particular (almost 5 million t/y of soda ash manufactured in Europe) generates large quantities of non-hazardous mineral inert waste.

The characteristics of this waste, mainly sands and clays, depend on the composition and type of the limestone (CaCO<sub>3</sub>) used as raw material which contain also some metallic salts. Some limestone not transformed in the process is also present in the waste as well as limited amounts of calcium sulfate (CaSO<sub>4</sub>). These materials do not represent an environmental or a health risk and, as their volumes cannot be reduced, are stored in areas close to Solvay's manufacturing sites.

Thereafter, these sites are rehabilitated with adapted plant species suited to calcareous soil and become in some instances (Belgium, France, Italy) protected natural reserves due to their biodiversity.

> See 2.6.2 *Natural areas & land rehabilitation.*

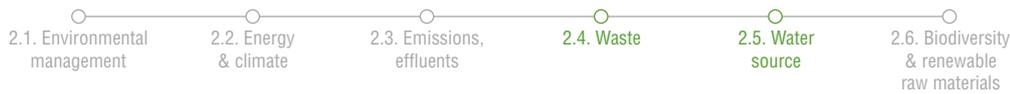
	2010	2011	2012
Hazardous Industrial Waste, tons	311 500	259 900	236 300
Trends at constant activity perimeter	100%	81.53%	76.95%
Non-Hazardous Industrial Waste, tons	1 645 200	1 348 800	1 434 700
Trends at constant activity perimeter, %	100%	80.1%	88.45%
Hazardous Ind. Waste landfilled, tons	16100	14600	17 800
Trends at constant activity perimeter, %	100%	88.49%	111.95%
Mining by-products, tons	2 946 800	2 388 100	2 787 500
Trends at constant activity perimeter, %	100%	82.4%	94.62%

*Perimeter: Equivalent to Solvay manufacturing perimeter under financial control.*

> More information on definition and scope of environmental reporting.

*Legend: Definitions have been fully aligned with EU Directive 2008/98/EC and with the Eurostat Manual on Waste Statistics-2010. Total waste is divided into four categories; i.e. industrial waste, construction and demolition waste, mining waste, and domestic waste.*

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The non-hazardous mining by-products are non hazardous waste mainly limestone fines, other minerals accompanying the fluorite and baryum strontium ores, and oil shale. They are not classified as industrial waste. The non-hazardous mining by-products are inert and are utilized most of the time to backfill the mining cavities. The variability of ores quality has a significant impact on the quantity of mining by-products generated every year.

In 2013 an extensive survey will be carried out to identify further improvement potentials. This will be the primary input to set targets for the new Solvay.

#### Organic chlorinated and fluorinated waste

This is managed internally and thermally destroyed on site in installations with very high environmental performance specifications, most of them recycling their fluorine or chlorine content as secondary raw material. Three units are also able to manage post-use (chloro) fluorocarbon products and SF6 recovered from customers. Policies exist promoting the development of collection schemes (SF6).

Product recycling: > See 6.2.1. An evaluation for Solvay products recycling initiatives.

## 2.5 Water resource

Access to water resources is a growing concern worldwide. Even if industry is not usually amongst the main users in a given location, industrial uses of water can become an issue particularly in dry regions or in heavily populated areas where water resources are scarce. The largest proportion of water abstracted by Solvay from the natural environment is used as cooling water, and returns back to the environment for the largest part.

Solvay also manufactures many products aimed at improving the efficiency of water management and protecting the water resource use such as filtration membranes and essential products for water disinfection and purification.

### 2.5.1. Water withdrawals (GRI EN8)

#### Commitments:

To protect the quality of the water resource and to limit the need of fresh water withdrawals linked to Solvay industrial activities.

To reduce fresh water withdrawals and especially where there is a constraint to water access for Solvay or for other needs (domestic, agricultural, industrial or environmental).

Freshwater withdrawals have been reduced by 3% since 2010, at constant activity perimeter.

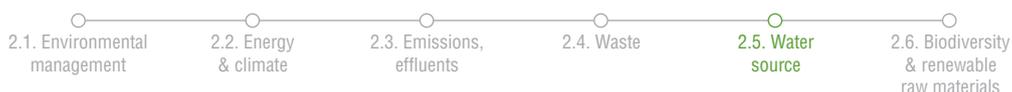
The impact on water availability of withdrawals by Solvay is low as a large part of water is used for cooling purposes and then returned to the same environmental compartment (surface to surface). Action plans to reduce water withdrawals focus in priority on groundwater abstraction and on the 35 sites identified as in potential water scarcity situations, current or future, due to climate change.

Trend at constant activity perimeter	2010	2011	2012
<b>Freshwater withdrawals</b>	<b>100%</b>	<b>98.4%</b>	<b>97.0%</b>

Withdrawals - 1000 m <sup>3</sup>	2010	2011	2012
Drinking water from public network	15 191	24 719	19 488
Surface water	397 708	393 668	348 408
Underground water	217 255	216 086	235 097
<b>Sub-total freshwater</b>	<b>630 154</b>	<b>634 473</b>	<b>602 993</b>
Estuary and sea water	154 908	199 381	133 810
<b>Total</b>	<b>785 062</b>	<b>833 854</b>	<b>736 803</b>

*Perimeter: Equivalent to Solvay manufacturing perimeter under operational control.*

*Legend: Quantities of abstracted water. Net consumptions are much lower, as most of the water abstracted from the natural environment, in particular cooling water, is returned back to the natural surface water. Estuary and sea water of the Rhodia legacy were estimated for years 2010 and 2011.*



At the end of 2012 all sites have completed their water balance, around 90% have identified improvement plans, 50% are already implementing them.

The Solvay Way sustainability management framework is aimed at providing manufacturing sites with a detailed methodology to reach a sustainable resource utilization ensuring a fair share amongst the different users.

This methodology encompasses the following main steps:

- Establishment of a robust water balance reflecting the quality and quantities of all discharges into the natural environment impact assessments of withdrawals vs the current or future availability of the resource taking into account third parties needs;

- Definition of improvement projects guided by the 3R approach (reduce / reuse / recycle) to best practices and technologies;
- In this field Solvay strives to reduce the net use of freshwater by promoting techniques to recycle used water, even from external sources, by using lower quality water, such as sea water, and by adequately treating the final waste water flows;
- Implementation of options presenting the best efficiency/ cost ratio in line with the site strategy to reduce its vulnerability to water availability.

**Developing water metrics further**

Solvay also takes part in a project within a world research platform on LCA (life cycle assessment) managed by Ciraig<sup>(1)</sup> (Canada) to develop water metrics further.

<sup>(1)</sup> Centre inter-universitaire de recherche sur le cycle de vie des produits, procédés et services

**KEY PROGRAMS FOR WATER SAVING**

**Solvay takes part in "E4Water"**

Under the umbrella of the European Union's FP7 program, Solvay is part of "demonstration projects" in the framework of the "E4Water"<sup>(1)</sup> initiative. The objective of E4water is to bring key water saving approaches up to the industrial scale level. Together with others partners, the 19 partners from the chemical industry (Procter and Gamble, Dow, Total, Solvay...) will demonstrate new possibilities of saving water.

<sup>(1)</sup> E4water: Economically and Ecologically Efficient water management in the European chemical industry

**SolVin, at the Martorell site (Spain), recycles effluents from PVC manufacturing**

A project is now under way to add post-treatments to recover and produce demineralized water, enabling recycling within the same manufacturing units. As much as 100m<sup>3</sup>/h (900 000 m<sup>3</sup>/y) additional recycling can be anticipated. This new "water loop" will add to the current internal recycling loops already in place for five years (used water from PVC batches filtered and recycled

in other, lower grade, PVC batches, representing around 130 000m<sup>3</sup>/year with recycling rates of 60%).

The demonstration could then be extended to other Solvay PVC plants. The project started mid-2012 and will last for four years.

**Panoli site (India) brings significant water savings**



An industrial scheme has been set up to reuse up to 80% of waste water

from the plant, more particularly as cooling water make-up and boiler feed water.

In parallel, the site has succeeded in significantly expanding its production capacity without additional effluents. The technical scope includes an upgrade of the biological treatment unit, several reverse osmosis units, a multiple effect evaporator, and a hardness abatement unit. The quality of the treated water enables multi-reuse. This is the first time that such a scheme has been put in place by Solvay.

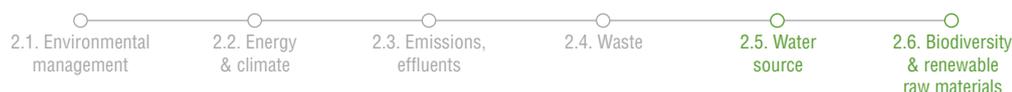
**Reuse of contaminated ground water at West Depford (Thorofare, USA)**

Ground water contamination by chlorinated and fluorinated volatile organic compounds is now handled by Pump & treat, and can now be reused as industrial water instead of reinjection.

**Monterrey, a Mexican site in a very arid area**

The site is located in a very arid zone. For this reason, a municipal waste water treatment plant water recycling project was supported and completed with the support and under the promotion of Solvay. 93.5% of the site industrial water requirement (109 000 m<sup>3</sup>/yr) is now supplied via this recycling project. Nevertheless, water issues must continue to be managed very efficiently in this area.

## SUSTAINABLE DEVELOPMENT INDICATORS 2012 &gt; ENVIRONMENTAL PERFORMANCE



### **Solvic, in Lillo (BE) to demonstrate new water savings by closing loops between partners.**

The project will involve Solvic's industrial neighbors in the industrial area of the Port of Antwerp (Belgium). Together, starting from an inventory of all water flows that are potentially recyclable, partners will select water streams that are the most suitable for recycling, and install the necessary additional treatment modules. This will make water "circular economy" a reality in this area.

### **Recycling scheme in Tuscany (IT)**

Since 2006 in Tuscany, the Aretusa (Azienda Servizi Ambientali, Termomeccanica) consortium enables to recycle wastewater from the local domestic municipal treatment plant as process water in Solvay installations, after adequate re-treatment. This leads to very high, recurrent savings (about 4 million m<sup>3</sup>/y) in water abstraction from groundwater in the region of Bassa Val di Cecina. However, in summer 2012, the plant was confronted with significant water shortages.

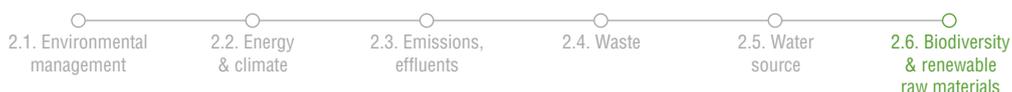
### **Water savings in Vernon (USA)**

The region is hydraulically stressed and the plant uses a large amount of water, which is supplied by the city. Wash water recycling was first investigated by R&I in 2010. The pilot showed promising results with more than 30% reduction in total water unit consumption (t/t product) while maintaining product quality and yield. The product washing step is where most of the water is used. Savings were achieved by defining washing conditions to use a minimum of water while still meeting product quality specifications. Wash water recycling was successfully implemented in the plant in 2012. The water saved this year is the equivalent to 18 years of potable water supply for the city of Vernon.

## 2.6. Biodiversity & renewable raw materials

Regarding biodiversity, Solvay is mainly concerned by the potential impact of aqueous effluents and by the areas that the Group owns and manages, such as mines, quarries, and storage areas for large volume of non-dangerous residues, for which there is a long history of green rehabilitation.

Solvay is also willing to favour a sustainable chemistry that respects biodiversity. This is particularly important when developing chemical processes based on biosourced raw materials. For more than ten years now, Solvay with SolVin also supports international scientific missions on biodiversity.



### 2.6.1. Renewable raw materials (GRI EN29)

Key bio-sourced raw materials (and combustibles) - Solvay and Rhodia legacies

**Commitments:**

**To explore and deploy the potential of bio-sourced renewable raw materials or energy, carefully assessing their acceptability in terms of biodiversity and ecosystem protection.**

**Wherever relevant, to ensure that bio-sourced raw materials are supplied from certified sources.**

	2012
Renewable raw materials	290 000

*Perimeter: Equivalent to the Solvay financial perimeter.*

Solvay has been active for more than 10 years in exploratory studies and industrial projects based on bio-sourced raw materials or combustibles. Solvay currently runs one of the world's largest "green chemistry" activities (excluding the bio-fuel industry) in terms of volumes of the bio-based chemicals produced, with its Epicerol process based on natural glycerin.

Various other green chemistry projects have been made reality relying on a range of renewable raw materials: wood pulp, bio-ethanol, C12-C14 alcohols, guar split, lauryl alcohol, hydrogenated coconut oil, glycerin, coconut fatty acid. Several industrial projects have also been thoroughly investigated in the area of wood-based energy sourcing. Solvay's policy is to promote certified suppliers of biosourced materials: key steps have been taken to tackle this requirement.

The objective is to take benefit of new raw material sourcing when economically, ecologically and socially viable. Such advantages may be:

- Substitution of scarce / costly raw materials;
- New chemical functionalities provided by the bio-sourced molecules;
- Reduction, in the long run, of fossil fuel consumption and related greenhouse gases impact of Solvay's activity (cradle to gate) due to raw material or energy sourcing.

> *More on recycling: see 6.2.2. Products recycling.*

**Bio-sourced raw materials used by Solvay currently represent a total of around 300 000 tons/year.**

Solvay and chemistry in general are not a key player in renewable raw material (the biodiesel industry represents 10,000 barrels per day oil equivalent(b/doe)). At world level, and excluding uses for food and construction, the vast largest part of biomass is and will continue to be used for energy sourcing.

The Rhodia legacy has increased bio-based raw material sourcing, which increased from 10.5% of its overall carbon-based raw materials to 12.5% in the past year. Examples are Augeo 191 solvent for coatings sourced from soybean oil, surfactant for shampoos and shower gels Rhodapex 70 NAT from sugarcane or palm kernel oil, plastic polyamide for automotive Technyl eXten® from castor oil, as well as the continuous development of guar gum for industrial viscosifiers.

**The Epicerol® process: one of the world largest "green chemistry" industrial projects**

Solvay's manufacturing units based on its proprietary Epicerol process probably constitute one of the world's largest "green chemistry" projects (excluding the biofuel industry), in terms of volumes of bio-based chemicals produced.

The Epicerol process indeed meets the 12 principles of green chemistry as defined by the US Environmental Protection Agency:

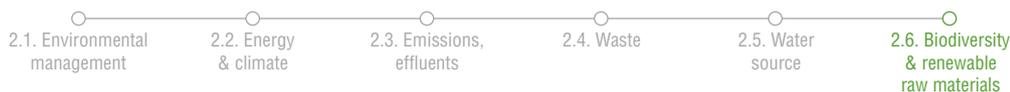
- From the extraction of raw materials to the output of our factories, the process reduces by 55% the consumption of non-renewable

energy and by 60% (of which 35% of biogenic CO<sub>2</sub>) the overall impact on climate change, compared to the conventional method based on propylene.

- In its own industrial perimeter, the Epicerol process reduces by a factor 8 the volume of chlorinated by-products, of 10 the water consumption and of 2 the chlorine consumption. It also significantly reduces the volume of liquid effluents.

**Better assessing the footprint of renewables in life cycle assessment**

Solvay has embarked on a 5-year research project by Ciraig (Centre Interuniversitaire de Recherche sur le Cycle de vie des Produits, Procédés et Services, Canada)-, a world research platform in life cycle assessments; bio-sourcing is one of the key research axis for this platform.



**STRIVING FOR RESPONSIBLE BIO-SOURCING**

**Bio-sourcing glycerin derived from the biodiesel industry**

The glycerin used as raw material in the Epicerol process is derived from vegetable oils mainly rapeseed, palm and soybean. Solvay strive to work with suppliers who share its sustainability commitment.

- Rapeseed - of European origin, it is covered by the European Directive on renewable energy which commits suppliers to various criteria of sustainability, including biodiversity.
- Oil palm - of Southeast Asia origin, suppliers are members of the Round Table for Sustainable Palm Oil (RSPO). Part of the supply by RSPO's members is certified according to RSPO's criteria on protection of biodiversity, soil, water,... and working conditions (no child labour).
- Soybean oil - of Latin America origin: the supplier is committed to environmental specifications excluding deforestation, child labour, or the irresponsible use of pesticides.

As part of efforts along such sustainability lines, an internal working group will be established to develop a responsible procurement policy. Solvay also encourages the emergence of a harmonized international certification of biobased oils, in the context of an need to ensure the sustainability of biofuels (RED, Fair trade, RSB, RSPO, RTRS,...)

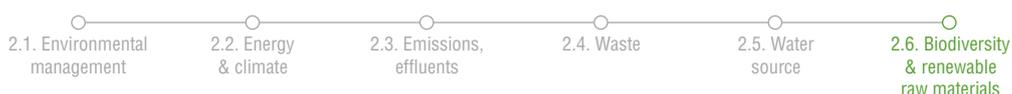
**Wood pulp sourcing for making cellulose**

In the relationship with the wood-pulp suppliers, their adherence to international highest environmental and social standards is contractually established, starting from their wood sourcing up to the production of the dissolving wood pulp sold to Solvay. In consequence all of the suppliers and their wood contractors have been certified by either the FSC, the PEFC or the SFI standards - or as for one case will be certified shortly. Their sourcing and production must be compliant with the following key principles: adherence to all applicable laws and international treaties, recognition and respect of indigenous people's, collaborators and forest workers rights, reduction of the environmental impact of logging activities and maintenance of the ecological functions, integrity of the forest and promotion of restoration and conservation of natural forests.

**Ethanol in Brazil for Coatis**



Suppliers of are engaged in the sustainable development. They are part of the UNICA Association that follows the Bonsucro program (Better Sugar Cane Initiative). This is a certification in the Brazilian sugar cane market, encompassing several sustainability aspects. Production units are audited by independent companies and they receive a stamp in the final of the process proving they are following these standards. The suppliers also have FSSC 22000, OHSAS 18001, ISO 9001 and 14001. This covers all contract suppliers. For the rest (spot purchases) best efforts are made to buy from companies with the same practices.



## 2.6.2. Natural areas & biodiversity (GRI EN11 and GRI EN13)

### Commitments:

**To rehabilitate natural spaces.**

**To keep impact of activities on biodiversity to a minimum by reducing water abstraction in regions and ecosystems under water stress and by controlling emissions avoiding in particular the release of persistent organic pollutants.**

**To check that bio-sourced materials respect biodiversity.**

Multi-annual, large-scale rehabilitation programs of natural areas are on-going in many Solvay sites. In particular, the biological rehabilitation of old dikes and quarries on Solvay's lands has been under way since decades.

Around 2000 hectares have been actively replanted, often with trees.

Some of the rehabilitated areas are even now recognized as nature reserves to be protected.

In addition, Solvay owns and maintains over 8000 hectares of land around its sites, where biodiversity is de facto protected from housing or roads and plays its role as a natural buffer.

The concerned sites manage these natural areas so as to contribute to biodiversity protection. They are working towards the recognition of rehabilitated areas as nature reserves to be protected. Solvay is committed to developing collaboration with NGO's and third parties in such areas around its manufacturing operations and fosters synergies with third parties around its sites, for example allowing farmers or others to use its lands.

In order to check the absence of impact on aquatic biodiversity, the Rhodia legacy has developed impact assessment methodologies based on biotic index and an overall effluent toxicity approach. This is part of the "Solvay Way" sustainability framework. The biotic index already used for several years in many plants will be extended to more sites. This will contribute to a better assessment of Solvay water effluents by checking the absence of effect of its activities on the local water biological life.

Finally Solvay explores and deploys the potential of bio-sourced raw materials or energy, taking into account the acceptability regarding biodiversity and ecosystem protection.

- > See 2.3. *Emissions, effluents.*
- > See 2.5.1. *Water withdrawals.*
- > See 2.6.1 *Renewable raw material.*

### Science: inventoring the biodiversity of rain forests

For more than ten years now SolVin and Solvay have been supporting international scientific missions aiming at inventoring the biodiversity of preserved areas of the world. The last mission took place in Mozambique in 2010. Other missions took place in 2012 in Laos and in Papua-New Guinea.

### Acting for biodiversity in Tavaux (Jura, France)

Replanting settling ponds in Tavaux is under way. Other replanting programs are ongoing with the firm Geophyte. The Prolipyt project has been selected by ADEME under the "eco-industrie" program of the National Agency for Research. A study of the fauna and flora of the nearby Aillon pond, which the plant effluent passes through, has been carried out by the CNRS of the University of Franche-Comté. After a test phase, the project was approved in 2010. Two steps are necessary to green the first 10 000 m<sup>2</sup>: adding an agronomically suitable soil and to sowing with a mixture of plant species specifically adapted to the situation. After this first phase, the full project, representing 60 000m<sup>2</sup>, will be deployed.

## 3. Human resources and labour practices performance

Solvay main challenge is to bring together a wide range of people in over 55 countries to serve the new ambitions of the Group. For the past months, working groups made up of employees and senior managers from across Solvay have defined a corporate culture aligned with the new strategy and giving expression to the Group's values.

### Solvay People Model

Reflecting the Group's tradition of excellence, the new Solvay culture is built on two pillars: a management model and a "social" contract. Having employees take ownership of it is one of challenges for 2013. The People Model established between the Group and its employees promotes a form of relationship based on dialogue, mutual respect and transparency.

What does the Group expect from its employees?

- Take charge
- Behave collaboratively as a Group citizen
- Act transparently

What can the employees expect from the Group?

- Inspire and lead people
- Develop people
- Respect people

### Organization & responsibilities

Human Resources (HR) issues (like diversity and equal opportunity, training and education, employment, labour relations) are overseen by the Group General Manager Human Resources, who is responsible for overseeing strategy, performance and compliance.

The HR organization commits to 1) act as a business partner, helping the GBUs to execute their strategic plans and to deploy the Model of Culture that has been defined, 2) pursue the Group in its ambition of grow by focusing on people development, which is a core HR competency, and by increasing the attractiveness of the Group as an employer. Dedicated teams are being built to focus on each of these aspects.

Occupational health and safety management are overseen by the HSE department which is part of the Industrial Function Management of the Group. Two specific departments, with one held by an Occupational Safety manager and the other by an Occupational Health manager, define the new strategy, procedures, programs and tools at global level.

### Policies and management approach

- The Solvay human resources policies which help the company to achieve the objectives while understanding employees' needs. Due to the integration phase, the Group will define new policies, new objectives and new implementing tools. The policies of both legacies, Solvay and Rhodia, remain validated.
- The Code of conduct provides general guidance to all employees about how to behave in the workplace, in Solvay's businesses and while representing Solvay in their communities. It encompasses aspects linked to human resources such as: health and safety in the workplace, equal opportunity and non-discrimination, career management, harassment free environment and human rights.
- Health and safety policies have been more precisely defined in 2012: occupational safety policy, occupational health & well-being policy and industrial hygiene policy.

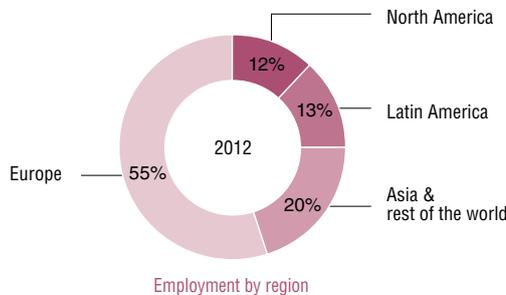
## 3.1. Employment

Solvay commits to develop people with exciting career paths, challenging opportunities and coaching: Solvay builds skills for the future.

Solvay will empower each employee to grow and develop his or her career by establishing clearly defined objectives and the tools for achievement. Employees are entitled to receive clear and honest feedback on expectations and performance. Yearly appraisals will be based on objective professional criteria and administered. The Group's success is dependent on its employees' collective achievement.

### 3.1.1. Employment by region (GRI LA1)

Full Time Equivalent (FTE), Solvay group



	2011	2012
North America	3 389	3 439
Latin America	3 797	3 803
Asia & rest of the world	5 692	5 920
Europe	16 244	15 941
<b>Total FTE (Total HC)</b>	<b>29 122 (30 272)</b>	<b>29 103 (30 252)</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

*Legend: FTE = Full Time Equivalent  
HC = Headcount*

**The Solvay group, headquartered in Brussels, employed at the end 2012, 29 103 full time equivalent (FTE) in 55 countries. The distribution chart shows that 45% of Solvay employees are based outside of Europe with around 20% in Asia and 35% in the rest of the world.**

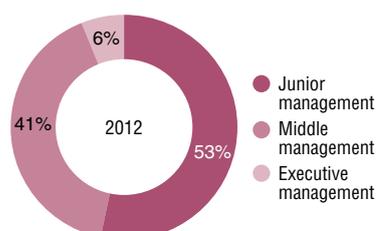
The Group's strategy aims at concentrating its deployment on a limited number of strategic projects, directed primarily at geographic expansion outside Europe in order to reinforce its presence in the fast growing countries and regions. In the same line, Solvay significantly expanded its production capacity in the Asia region, by increasing capacity in India and consolidating its industrial presence in China and Thailand. The opening of a new Research & Innovation center in India makes Asia home to the Group's second research cluster.

> See 1.4.2. R&I staff.



### 3.1.2. Distribution of managerial personnel by hierarchical level (GRI LA13)

Managers by job class (Hay system), headcount



	2011	2012
Junior management	3820	3896
Middle management	2929	2963
Executive management	480	470
<b>Total</b>	<b>7229</b>	<b>7329</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

#### Commitments:

**To ensure that all Solvay's employees understand their roles and responsibilities in their current functions while obtaining visibility on what is required to progress in their careers.**

**To make use of the job families throughout the Group.**

**To support its ambition to become a global group, Solvay has introduced tools to measure and compare jobs both internally and externally on a worldwide basis.**

At the end 2012, the Human Resources introduced a new global classification system for the Group. The job families classification is a tool that enables it to evaluate different positions/functions compared with the market and that is taken into account for the calculation of the evolution of the salary.

Both legacies were using the same evaluation function system called Hay, but each company had its own scales. A harmonized system and identical practices to ensure the functions classification were a necessity for the new Group and is now adopted.

Within the Solvay Human resources management framework, job families are an important "building block." These job families provide valuable references used directly or indirectly in Workforce Planning, Staffing, Career Management, International Mobility, Performance Management, the Reward process, Payroll and Data Management. This approach is an essential step in Solvay's efforts to have a clear and open HR process aligned with businesses and organizational processes and needs. The methodology uses objective criteria to develop the outputs (including job descriptions) and measure consistency across professions within the Group (functions, businesses, etc...). Each job family description follows a standard format and identifies:

- A mission;
- Key responsibilities;
- Expertise requirements;
- Competencies requirement;
- A career ladder with associated key differentiators.

### 3.1.3. Global turnover - voluntarily leaves (GRI LA2)

Solvay group, headcount

#### Turnover

Number of employees who leave the organization voluntarily or due to resignation

	2011	%	2012	%
North America	234	11%	203	10%
Latin America	359	16%	414	21%
Asia Pacific & rest of the world	405	19%	356	18%
Europe	1165	54%	990	51%
<b>Total</b>	<b>2163</b>	<b>100%</b>	<b>1963</b>	<b>100%</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

### Resignation

	2011	%	2012	%
North America	58	10%	57	12%
Latin America	123	22%	107	22%
Asia Pacific & rest of the world	179	32%	169	35%
Europe	200	36%	149	31%
<b>Total</b>	<b>560</b>	<b>100%</b>	<b>482</b>	<b>100%</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

### 3.1.4. Hirings (GRI LA2)

Solvay group

	2011	%	2012	%
North America	289	11%	223	11%
Latin America	415	16%	439	22%
Asia Pacific & rest of the world	700	26%	499	24%
Europe	1253	47%	882	43%
<b>Total</b>	<b>2657</b>	<b>100%</b>	<b>2043</b>	<b>100%</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

*Legend: The hiring rate based on region Headcount is lowest in Europe (5,26%) and highest in Asia & ROW (10,76%) and Latin America 8,50%). This is mainly due to the growing of Solvay in the area.*



## 3.2. Personal development

Continuous learning is at the heart of Solvay's business strategy, with the Solvay Corporate University (SCU) playing an important role in helping embedding the new Solvay culture worldwide. Founded in 2007, the SCU undertook a transformation during 2012 to combine Solvay's two legacies learning organizations into one. Today the SCU is tasked with delivering learning programs and activities that develop employees' capabilities and skills to help ensure Solvay's business success. It also provides employees with personal and professional development opportunities that help them realize their potential and achieve their career aspirations. In this way, the SCU also supports Solvay's integration efforts.

### 3.2.1. Learning & development (GRI LA10)

Solvay group, all employees

	2009	2010	2011	2012
Training investment per person - EUR	186	380	385	464
Average number of training hours per year and per person	27 (*) of which 16 hrs/employee internally	32 (*) of which 15 hrs/employee internally	38 (*) of which 19 hrs/employee internally	34 of which 17 hrs/employee internally

Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.

(\*) equivalent to Rhodia legacy financial perimeter.

#### Commitments:

**To deliver learning programs and activities that develop employees' capabilities and skills to help ensure business success.**

**To provide employees with personal and professional development opportunities that help them realize their potential and achieve career aspirations.**

**Originally founded in 2007, the Solvay Corporate University (SCU) maintained its prior commitments during 2012 and also began its own transformation to combine Solvay's two legacies learning organizations into one.**

Over the year, Solvay achieved an average of 34 hours of training per employee, delivering over 1 million hours across the Group. This amounted to a training investment of about 463 euros per employee. Nearly half of the training sessions were conducted by internal experts (49%), thereby helping raise the awareness, visibility and internal networking capacities of Solvay's specialists. This platform of internal experts has proven critical to enhancing the speed and quality of Solvay's alignment efforts.

Because Solvay's learning resources are designed around Learning Paths, learning activities address all levels, competences and zones of the organization. For example, the SCU offers Leadership & Management (L&M) programs that develop the competences of tomorrow's business leaders and people managers, from gaining knowledge about the business, to advanced management behaviors such as negotiation skills, and advanced leadership behaviors. Further training courses are also available for more technical skills related to a particular job or business function, such as finance for Finance professionals or non-Finance professionals, and Communication for Communication professionals and non-Communication professionals.

Solvay's learning activities by domain are as follows:

- Competences Development (L&M, Language, Culture, Values): 25%
- Expertise Development (Job related expertise and on-the-job-training): 40%
- Expertise Development (QHSE): 23%
- Others: 12%

Overall, a corporate learning organization is a natural place for people from different cultures, experiences, businesses and functions to unite in personal and professional development activities that enhance the speed of alignment and integration. The Solvay Corporate University is an example of this.

#### International Management Seminar (IMS)

In support of helping Solvay achieve integration alignment more quickly, the SCU also offers thematic training sessions. In particular, the SCU invited over 90 employees from around the world to join a training called the International Management Seminar (IMS): "Outlining the

Corporate Culture of the New Solvay". For five days, IMS participants participated in interactive discussions with Group managers on talent recruitment and retention of talent, the use of social media, and ways to generate a culture of performance and empowerment. The ideas generated from this seminar have been incorporated into the design of today's Solvay culture.

### 3.2.2. Personal development – Perception

#### Commitments:

**To have a worldwide mapping of quantitative and qualitative staffing requirements reflecting the Group's strategy and to be able to meet these needs on a sustainable basis.**

Over the year 2012, specific actions have been launched in order to tackle specific issues related to personal development. In Europe the increase in professional life expectancy is a real issue. In order to provide a European global view and to identify practical actions, Solvay initiated in 2012 a survey, with the University of Louvain in Belgium, on demographics-aging population. The aim of the survey was to identify what can be done inside the Group, in order to help the managers older than 50 years old to live out his extension of professional life.

The questionnaire was sent to the managers older than 50 years of the Solvay legacy only.

The results show that most seniors enjoy their job and their relationship with colleagues. However the workload is described as significant. Although most of them consider their work as rich and various, with learning opportunities, there is a clear perception of a career evolution ceiling. Significant lack of communication on career opportunities is pointed to. Although work is an important way to self accomplishment, worklife balance is sought.

For many years, Solvay legacy carried out every two or three years, a "Solvay People Survey" to evaluate and improve the satisfaction and engagement of its personnel. The survey was undertaken by an external provider; strict confidentiality on individual answers is ensured. The results of the last survey, which took place in 2011, show that perception about personnel development and cross-training to be moderately favorable and to have been relatively stable over the last years. The next survey, encompassing all Solvay personnel including those of the Rhodia legacy is foreseen in 2014, after the accomplishment of the integration process.



## 3.3. Diversity & equal opportunity

### 3.3.1. Diversity & equal opportunity (GRI LA13)

Gender, Hay system/job families, age, international mobility, headcount

#### Commitments:

**In its Code of Conduct, Solvay provides equal opportunity and encourages diversity at every level of employment. The Group aspires to be a truly diverse group, in terms of age, gender, nationality and culture.**

**All employees should respect one another and should move towards the Group's objectives collectively and collaboratively without regard to race, ethnicity, religion, national origin, gender, sexual orientation, disability, age, family status, or any other basis.**

The Group's Human resources policies specifically include encouraging diversity to strengthen the multinational, multicultural and multidisciplinary composition of the Group's population, ensuring that the principle of equal opportunity in employment is observed, and outlawing discrimination of any kind.

#### Gender distribution

Women & men breakdown - Solvay group

	2011		2012	
	Women	Men	Women	Men
In all personnel	20%	80%	20%	80%
In management	26%	74%	26%	74%

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

*Legend: The average proportion of 20% of female employees hides significant variations per functional domains.*

**In functional support areas (like Human resources, Finance, Communication, Innovation Center, Research & Technology), female workers represent about the half of the total headcount.**

The Group recruits and selects staff without any form of discrimination on the basis of job requirements (expertise and competencies) and the capability and willingness of candidates to adopt the underlying Group's Values.

#### Equal opportunity - Hay system

**The Solvay job classification system is based on the Hay system. By end 2012, the Hay system coverage for this population reached 100% for the exempt population (cadres).**

A compensation system (a corridor of 85-120% for remuneration within a given Hay class) ensures salary fairness amongst employees within the Company, and competitiveness and fairness vis-à-vis the external work market.

Since 2003, global job families have progressively been defined and introduced for the whole managerial population.

The job families (> see 3.1.2. *Distribution of managerial personnel by hierarchical level*) apply worldwide, providing standardized information about key responsibilities, competencies, and expertise required for each type of job. Each job family is associated to career ladders, with key differentiators. Each step on a career ladder is calibrated with the international Hay of job evaluation system.

Job families and their career ladders are accessible to common employees and management alike, ensuring significant transparency for all concerned. They are used – among others – during the promotion process.

**Equal opportunity - Women in management by job class (Hay system)**

**Solvay managers**

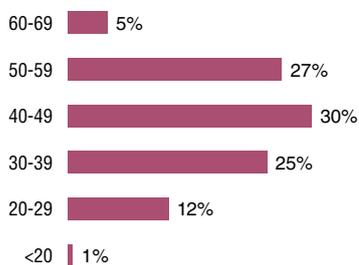
	2011		2012	
	Count	%	Count	%
Junior management	1216	32%	1248	32%
Middle management	592	20%	604	20%
Executive management	51	10%	55	11%
<b>Total women in management</b>	<b>1859</b>	<b>26%</b>	<b>1907</b>	<b>26%</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

Female employees represent 26% of the managerial positions. At the executive level, the percentage is 11%.

**Age pyramid**

**Solvay group population, 2012**



*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

Demographic evolution of Solvay employees is a topic of concern.

In 2011, a specific initiative was launched with the European Works Council (EWC). For two days, managers and members of the EWC discussed current trends and ways to improve. Recommendations discussed with the CEO included:

- Improving work-life balance;
- Adjusting (ergonomic) working conditions;

- Implementing strategic learning plans at site level;
- Fostering mobility (geographic and functional) with dedicated learning opportunities;
- Increasing young talent attraction (partnership with schools) and improving image of the Company in the market.

> See the result of the survey on demographic - aging population (3.2.2. Personnel development - perception).

**Employee mobility - International mobility**

**Number of employees on assignment in foreign countries, Solvay group**

	2011	2012
Business	235	292
Functions	158	187
<b>Total</b>	<b>393</b>	<b>479</b>

*Perimeter: Equivalent to Solvay financial perimeter continuing and discontinued operations.*

**The Group's strategy is to ensure that employees develop their skills and move across functions and countries in order to avoid the creation of geographical and/or business silos.**

Such moves are based on a variety of elements such as the competencies and the expertise of the person involved, his/her specific aspirations and the Company's needs. More than 90% of international moves are long term (i.e. three to five years).



## 3.4. Labor relations

### 3.4.1. Freedom of association (LA4)

#### Commitments:

**Respecting employees' fundamental human rights and guaranteeing their social rights.**

**Respecting freedom of association and collective bargaining, including the decision to organize or not to organize.**

**The Group is committed to maintaining trusting and constructive relations between the employees and their representatives on the one hand and management on the other hand to ensure ethics and compliance in the workplace.**

The regular dialogue with trade unions which are present in most of the sites around the world is an integral part of Solvay culture based on conviction that together everyone can better be prepared for economic, social and organizational changes. For the Group, the union adherence is 20% in Europe, 30% in South America, 10% in North America and 30% in Asia. Collective agreements are normally extended to all employees even if not part of a union. Thus coverage becomes 85% worldwide.

#### Towards a global agreement on responsibility

In similar approaches, Solvay and Rhodia legacies each opened the way to open and responsible dialogue with their employees.

A permanent dialogue dedicated to sustainability issues has been established since many years between Solvay and its European Works Council. A common Sustainable development and corporate responsibility charter has been signed in 2008, and inter-hierarchical forums on Sustainable development have been organized on company sites.

In turn, back in 2005, Rhodia signed a CSR accord with ICEM, an international trade union federation<sup>(\*)</sup>.

This agreement commits Rhodia to respecting the ILO standards and the principles of the UN Global Compact. Each year, an assessment is carried out on a site to monitor correct application at a grassroots level of the commitments. These assessments have already been completed in China, Brazil, the US and South Korea, and an annual review has been presented to an extra-national body representing the Group's employees (EWC).

In 2013, based on these converging experiences, Solvay intends to create a new framework of dialogue with its partners at global level.

<sup>(\*)</sup> From that time, different federations from metallurgy, clothing / textile / leather and ICEM have merged to create IndustriALL (50 million workers in 140 countries)

### 3.4.2 Performance and Development Appraisal (PDA)

Solvay group - annual reviews

**Commitment:**

**Solvay uses Performance Management to ensure that business objectives are cascaded down the organization and translated into measurable goals, hence aligning individual and team contributions with the Group's strategy.**

**It also aims at developing the full potential of the employees to ensure the Group's long-term sustainability.**

**In 2012, 99% of Solvay managerial staffs went through an annual and formalized Performance and Development Appraisal (PDA) review. It is estimated that approximately 70% of the Solvay non-managerial staff also go through this process. The long-term goal is to cover 100% of the personnel worldwide.**

In 2012, Solvay and Rhodia legacies continued to implement their own processes and tools in order to ensure that the Group has a competent, capable, and engaged workforce that delivers current business results and is prepared and ready to take on new challenges and opportunities.

In the Solvay legacy, for the managerial population ( $\pm 25\%$  of the entire population of Solvay's employees), the annual Performance and Development Appraisal (PDA) review is captured through an IT tool (e-PDA) which is completed by both the employee and the operational manager and discussed when in face to face meeting.

Performance appraisal also exists for non-managerial personnel. Where local procedures are used, managers can also use the formalized Group PDA review system which is progressively used even though not yet systematically captured in the e-PDA system. The practice of an annual PDA is already comprehensive in the United States for non-managerial staff. In the other regions non-managerial staff PDAs are currently discussed with employee representatives on a site by site basis.

In Rhodia legacy, the Annual Performance and Development Interview (APDI) nourishes the process of managing the training and mobility of Rhodia legacy. During this interview, the manager and employee perform an in-depth analysis of behavioral skills and techniques, to identify their strong points and tracks for improvement. This analysis discussed professional development and determines the lines of development necessary for individual performance in the current or future position. This development plan may be based on a panel of actions such as internal or outside coaching, participation in conventions or training actions. The individual training actions selected feed the training process. If professional development is envisioned, the employee will become part of Rhodia's process of career mobility and management process.



## 3.5. Industrial hygiene

As a cornerstone for occupational health, industrial hygiene aims at controlling and preventing exposure to health risks so as to protect health of the personnel and to prevent occupational diseases.

The occupational hygiene program of Solvay relies on:

- Assessing the risks related to work and exposure conditions at the workplace;
- Verifying compliance with local, international, and Solvay standards;
- Reducing exposure, informing, and training the persons in contact with occupational hazards whenever necessary.

Harmonization of approaches and standards at world level is key and has been continuously pursued for several decades.

### 3.5.1. Personnel well-being & stress

#### Commitment:

**To achieve a high-level of health and psychological well-being of employees, subcontractors and temporary workers.**

**The Group has recently redefined its Code of Conduct, which is very explicit about ensuring an harassment-free working environment. As part of the Group health and well-being policy, recently redefined, a group guidance on stress prevention allows each entity to launch its own programs on stress based on the principle “think globally, act locally”. This commitment on well-being is a key element in a multidisciplinary process, including personnel representatives.**

Being able to identify stress situations is the basis of any corrective actions program:

- yearly formal evaluations of every employee,
- the feed-back on stress-linked criteria via the answers to the bisannual Solvay People Surveys are instrumental in this,
- day-to-day management.

Operational managers, human resource managers and occupational physicians, have a key role in preventing and managing individual stress situations. The different steps to identify stress situations include: awareness and training, stress assessment, actions plan and monitoring and communication. Besides, the health care is also a mean to promote favourable working conditions.

The management approaches to promote well-being at work include:

- Work organization adapted to each individual with clear definition of roles and responsibilities and adequate training and resources;
- Assignment of balanced workloads and objectives. People should understand why and how they have to reach their objectives for their individual and collective benefit, via a.o. a yearly personal appraisal;
- Preparation and support for all changes in the organization;
- Rules for good quality of working relations a.o. through the Solvay People Survey process and the Code of Conduct;
- Opportunities for personnel development (through the yearly appraisal);
- Leadership and empowerment (key aspects of People & Management Model).

In the context of the merger between Solvay’s and Rhodia’s legacies, human resource and health teams have set up local schemes and actions to cope with real stress situations, resulting from cultural management changes and individual uncertainties, trying to find solutions. The Transition Coaching Programme launched at the headquarters level is aimed at helping managers to cope with the transition under way since the Rhodia acquisition.

Anonymous helplines are provided at several Solvay legacy sites for employees to seek advice from external professionals in difficult life situations like work stress, divorce, or other at the expense of the company. The rationale is to avoid personal difficulties impacting performance.

#### Monitoring well-being and stress in the Solvay legacy through the Solvay People Survey.

As a formalized world process, the “Solvay People Survey” makes it possible to identify every 2 years a well-being and stress indicator at the level of each organizational entity.

This collective assessment process contributes to identify, prevent, and manage stressful situations. The last survey took place in 2011.

Eight themes constitute the cluster of indicators used to assess the overall perception of employees on well-being and stress. They address well-being,

freedom of speech, respect and fairness, workload, inter-individual cooperation, physical working conditions, performance requirements, organization. In 2011, the indicator was 65% favourable, 18% neutral.



### 3.5.2. Assessment of work stations for exposure to health risks (GRI LA8)

Hygiene risk assessments using Group validated methodologies

**Commitment:**

**For both existing operations and projects, to perform industrial hygiene risk assessments with methodologies validated by the Group.**

The emphasis of the Solvay legacy has been put in the past years on standardized assessments of the employee's working conditions using the Exposure Assessment Tool (EA Tool) for all workstations. All workstations were evaluated, both in manufacturing units and in R&I functions, while some evaluations remain to be done in maintenance activities<sup>(\*)</sup>.

In the Solvay legacy, for each workplace, compliance is checked against the local regulatory occupational limit values or the Threshold Limit Values (TLVs) set by the American Conference of Governmental Industrial Hygienists when the local standards are less stringent.

Data on occupational-hygiene conditions are progressively incorporated into the Hygiene module of the Medexis database (> See 3.5.3. Industrial hygiene standard).

The Rhodia legacy focused on identified "critical tasks" and on Carcinogenic, Mutagenic, Reprotoxic (CMR) substances, in line with Rhodia "red line"; a voluntary worldwide commitment for such substances. In 2012, 93% of these tasks had a "critical task analysis" since less than 5 years.

All Rhodia legacy sites are also required to carry out or update, at a minimum every five years, an evaluation of the health and safety risks for workers. This assessment is focused on "critical tasks" - identified as presenting particular risk for occupational health or safety following a risk pre-screening - and on possible exposures to Carcinogenic, Mutagenic, Reprotoxic (CMR) substances.

These evaluations are undertaken through the application of Rhodia's own worldwide guidelines, in particular the "Critical Tasks Analysis".

For the most significant risks, awareness campaigns and visible displays explaining the risks and the ways to reduce them must be introduced.

Current Group action lines aim at further deploying such Group-validated assessments at extending Medexis to all entities, and at further investigating and improving hygiene conditions at workstations that have been identified as critical during the assessment programs.

In 2013 a global policy will integrate in a single procedure the Substances of Very High Concern, CMR substances, Endocrine Disruptors (ED), and substances that are Persistent, Bioaccumulable, Toxic (PBT) and very Persistent and very Bioaccumulable (vPvB).

The CMR policy will be extended to Substances of Very High Concern (SVHC).

<sup>(\*)</sup> As regards maintenance workstations, the deployment of the standardized Exposure Assessment Tool (EA Tool). These workstations, representing a more limited number of persons, take more time to be assessed because of the diversity of the functions and of working situations.

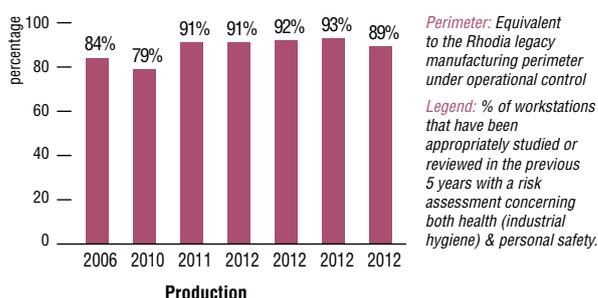
#### Standardized Exposure Assessment - sites covered (Solvay legacy)

Hygiene assessments	Production workstations				R&I and maintenance workstations				Objective 2012
	2009	2010	2011	2012	2009	2009	2010	2011	
% of sites covered	100%	100%	100%	100%	17%	82%	85%	95%	100%
% of all units assessed	100%	100%	100%	100%	100%	100%	100%	100%	

Perimeter: Equivalent to the Solvay legacy manufacturing perimeter under operational control.  
Legend: The assessment is considered as achieved when it is validated by a Corporate Hygienist.

#### Assessments for health risks & safety - functions assessed since less than 5 years (Rhodia legacy)

critical tasks





### 3.5.3. Industrial hygiene standards (GRI LA8)

Group Standards applicable to all sites and access to industrial hygiene data for health practitioners

#### Commitments:

To ensure a uniform high level of health and physical well-being of employees, subcontractors and temporary workers;

To apply Occupational Exposure Limits worldwide;

To update the hazard profiles of substances of very high concern.

Solvay legacy's industrial hygiene information system aims at ensuring efficient access by industrial hygienists and physicians to - and use of - all risk assessment data, individual risk profiles and Group hygiene procedures and standards.

With the deployment of Medexis Hygiene, health specialists have a broader access to international, local, and Group standards regarding occupational hygiene and assessment methodologies as well as to exposure assessments and hazards data of all workplaces. (see 3.6.1. Health management). At the end of 2012, Medexis Hygiene covered 80% of manufacturing and R&I sites of the Solvay legacy (representing 88% of workers) reaching thus the target of 80% set in 2007.

In 2012, two new standards and tools for hygiene management were further deployed in the Solvay legacy: one for noise exposure assessment and management, in which all hygienists have received training, and one for ergonomics.

Rhodia legacy's programme for hygiene, and the related standards and guidelines focus on all identified "critical tasks" and on Carcinogenic, Mutagenic, Reprotoxic (CMR) substances via "red line"; a voluntary commitment throughout the world.

Recently, two new guidelines were developed by the Rhodia legacy, one for improving the design and maintenance of ventilation systems, and one which is a methodological guideline on hygiene actions and checks at each step of an investment project.

For both legacies, the next important step will be to fully exploit the respective experiences and practices.

#### Acceptable Exposure Limits

Since 1989, Solvay legacy had a dedicated committee that establishes exposure limits (Solvay Acceptable Exposure Limits - SAELs) for all hazardous substances for which there is no defined occupational limit value, or for which the regulatory limit value is considered as outdated.

Rhodia legacy has also established a Rhodia Occupational Exposure Limit Committee (ROEL) to define its own professional exposure limit values for certain products, applicable to all its sites throughout the world.

#### The Medexis Information System: a world tool for hygienists and physicians

Medexis is aimed at managing all occupational exposure data of each worker at Group level together with the medical data. The main objective is to support a uniform and high level of prevention of health risks throughout the Group, through reliable information and a better evaluation of occupational hazards and risks of each individual person. The Medexis system enables a high quality medical follow-up tailored to each person's risks.

It also increasingly allows for excellent reporting about the health status of workers in relation to the various industrial hygiene conditions.

#### Medexis Hygiene

The Medexis Hygiene information system simplifies the assessment process and guarantees the quality of the data. Many developments have been carried out to increase user-friendliness and to enable occupational hygienists to assess all agents (chemicals, biological and physical agents) and ergonomic stressors. Different types of reports can be extracted while respecting strict confidentiality rules.

It is planned to further improve the quality of the tool and to progressively extend it to throughout the expanded Group.

#### Sharing with other companies

The combination of data on exposure assessments at the different workstations, obtained either via modelling or via measurement at the workstation is made possible.

The Medexis hygien tool permits better refining of assessments than was previously possible. This very positive experience made it possible to create an SAP industrial hygiene model (SAP-EHS "user's club") with other large peer companies confronted with similar challenges.

Deployment of Medexis Hygiene	2009	2010	2011	2012	objective 2012
Sites with module	19%	44%	63%	88%	80%

*Perimeter: Equivalent to Solvay legacy manufacturing perimeter under operational control. The deployment on a site is registered when the Medexis module for hygiene is implemented in this site.*



## 3.6. Occupational health

Solvay understands health of its personnel in the widest dimension, that is to say embracing a high degree of physical, mental, and social well-being. Health of employees results from their past and present working environment, in particular from occupational hygiene conditions.

To ensure a uniform, high level of occupational health worldwide, the Medexis project has been initiated five years ago. Medexis aims at enabling hygienists and occupational physicians in the Group all over the world to share common tools, standards, and data on worker's health status and exposures conditions during their career. This system will be progressively extended to the Rhodia legacy.

The Rhodia legacy has also for many years put a clear focus on a high level of health protection among employees.

### 3.6.1. Health management (GRI LA8)

Group standards and medical follow-up

**Commitments:**

**To support local medical services in implementing Solvay policies and standards related to health management and in the use of the Group health and industrial hygiene information system Medexis.**

**To carry out medical monitoring based on individual risk profiles, while respecting the professional ethics and independence of external and internal physicians.**

Group medical protocols are defined in order to promote consistent objective, standardized, comprehensive and reliable best practices in occupational surveillance throughout the Group for each health risk specifically linked to Solvay's activities.

In Solvay legacy, the target defined in 2008 was to implement the health module of the Medexis health database to 70% of the personnel (US not included) by end 2012. Deployment currently reaches 61%, with the module implemented at 25 plants in total, with 6 sites added in 2012: one in Belgium, 2 in Germany and 3 in Italy.

Site physicians in the concerned sites have been trained in the use of Medexis and have access to workers' exposure profiles and recommended medical protocols. Further deployment of Medexis Health depends on data availability in the SAP Human Resources database. It also heavily depends on legal approvals, required by the national regulations governing personal data protection. Getting the full understanding and acceptance by workers' representatives may also involve additional steps.

In Rhodia legacy, the Rhodia Care Management System (RCMS) is applied. It prescribes medical surveillance processes in compliance with applicable regulations, which requires the identification of those employees that must receive medical examinations and how frequently these are to be carried out; this is decided at site level, taking into account local legislation, the type of job and the level of risk. In 2012, the Rhodia legacy continued to deploy a web access IT tool to replace previous databases for medical surveillance in France.

It is planned now to assess how to integrate Rhodia's tool with the Medexis Health module. Current further development of Medexis is focused on improving user-friendliness and on the creation and follow-up of health KPIs on the basis of data progressively managed in Medexis.

**In-house medical protocols**

In addition to basic medical protocols, in-house protocols for medical surveillance are developed for chemical substances and other agents that are specific to Solvay activities.

This stems from a careful assessment by Group health specialists of chemical substances on the Solvay sites, in terms of potential health effects, resulting in the definition of such standards. In addition, for some of these substances, bio-monitoring requirements are defined when appropriate. Non chemical risk agents also covered by specific protocols include: ergonomics, Legionella, video visplay units, vibrations, forklift driver, welding, etc.).

Solvay protocols are based on updated scientific information, experts recommendations, best practices and regulatory requirements.

They are integrated in the Medexis system to facilitate the distribution of Group recommendations to sites health teams using the tool.

Deployment of Medexis Health	2009	2010	2011	2012	objective 2012
Sites with the module implemented (*)	8%	30%	48%	61%	70%

(\*) sites, taking account their employee population, where the IT tool Medexis Health has been implemented.

Perimeter: Employees of Solvay legacy sites worldwide, excluding USA, joint ventures and Rhodia legacy.

Legend: % corresponding to employee population in sites where health module of Medexis is deployed with respect to Medexis project perimeter.

### 3.6.2. Occupational diseases (GRI LA7)

Main types, notified and recognized cases

#### Commitment:

**To prevent occupational diseases and disability through a high level of risk management and control.**

**The reported cases of occupational diseases mostly find their origin in exposures that took place in the past (e.g. asbestos diseases). Future decrease is expected thanks to the important achievements in the risk assessment and management program. But on the other hand, an increasing trend of notifications of occupational diseases was observed due to raising awareness among employees about possible compensations even if not necessarily justified.**

For each incurring health problem that could be of occupational origin, an investigation is carried out, looking at both the working conditions and characteristics of the person affected, leading to preventive and

corrective measures and further improvements of working conditions and occupational hygiene.

As regards health surveillance, the Group aims at further unifying and sharing the medical protocols surveillance worldwide between all the sites of both legacies in order to ensure equivalent early detection of occupational diseases and medical follow-up, notably via the health module of the Medexis Information management system. (> See 3.6.1. Health management).

In the Solvay legacy in 2012, the number of occupational diseases notified to the public authorities rose from 22 to 36. This is mainly due to an increase of notified cases of asbestos related diseases, encompassing benign and malign lung diseases, notified mainly in France and Italy in connection with past exposures (30 to 40 years ago). This increase can be explained by

raising awareness among employees about possible compensation.

For the first time, no case of hearing loss disorder was recorded in 2012, as a result of effective risk management in this area. In addition a decrease of levels of hearing impairments is observed in many European sites.

There have been very few recognized cases in the past years because most notified cases are still waiting for a decision on the recognition (or not) at the issue of a procedure that still can take two to three years.

In the Rhodia legacy in 2012, 30 cases of occupational diseases were reported among which 18 are recognized cases, and 12 are still waiting for a decision by health authorities. To be noted is that some of the recognized cases were counted as "likely to be recognized" last year or in the previous years.

		Asbestos benign pathologies			Hearing disorders			Musculo-skeletal disorders			Other non-carcinogenic diseases			Asbestos cancers			Other carcinogenic diseases			All diseases		
		2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012			
Solvay legacy	Cases notified to health authorities <sup>(*)</sup>	7	6	17	5	4	0	12	1	7	0	4	2	6	4	8	0	3	2	30	22	36
	Cases recognized as occupational disease	2	2	2	3	2	0	9	0	0	0	1	0	2	2	1	0	0	0	16	7	3
Rhodia legacy	Cases recognized or likely to be recognized as occupational diseases <sup>(**)</sup>	13	11	2	0	2	1	4	3	9	1	2	1	12	10	10	3	2	4	33	30	30 <sup>(***)</sup>

Perimeter: Equivalent to Solvay perimeter under operational control, covering

- Western Europe, USA, and Mercosur (Solvay legacy)
- Western Europe, North & Latin America and Asia Pacific (Rhodia legacy)

Legend: The reported notified cases for 2010 and 2011 of the Solvay legacy have been modified since last year's reporting: refused cases were retroactively withdrawn from the notified cases. Reporting procedures still slightly differs between the two legacies, regarding both the operational perimeter considered as well as in the definition of an occupational disease. The concept behind the words "recognized or likely to be recognized" used by Rhodia legacy is different from the Solvay legacy's "notified" cases although the figures are of comparable magnitude. Indeed Rhodia legacy reports the recognized cases in the current year of recognition when Solvay legacy reports the recognized cases under the year of notification. An harmonized reporting is scheduled by 2013.

(\*) (Solvay legacy) Refused cases are excluded.

(\*\*) (Rhodia legacy) As defined in the Rhodia sector's internal procedure (DRC 28) on the process of occupational diseases management.

(\*\*\*) (Rhodia legacy) Including 3 additional pathologies of which nature is unknown.



With the exception of 1 case in Spain, 1 in UK and 7 in Brazil, all of these reported diseases were identified in France. The great majority of cases results from past exposures primarily to asbestos (about 50% of the reported cases). However a decrease in asbestos cases has been observed these last four years

and can be explained by early actions taken in France since 1976 in order to eliminate or substitute the substance when possible, as well as the implementation of precautionary measures when substitution was not possible.

An increase of musculo-skeletal disorders is observed. Several of them were recorded in Brazil.

**Reporting on occupational diseases**

Reporting data on occupational diseases (OD), although imperfect, is very important in the management of occupational health: the knowledge of notified cases of OD generates decisions for investigations on working conditions and characteristics of the persons affected, and leads to local corrective measures. It also feeds global management decisions at Group level to promote harmonized health protection in all entities, and allows identification of potential new trends or clusters which should be examined.

**The limitations of the reporting on occupational diseases**

The figures cover the cases of occupational diseases (OD) reported to health authorities. This indicator is based on the information provided by the occupational physicians and medical services and reflects notifications made in countries where provisions exist for such notifications. Underestimation of cases cannot be excluded because the employer is not systematically informed of notifications when filed via private channels, in particular after retirement.

Data about recognized cases of course depend on local regulations and systems for OD recognition, and on the existence of various compensation systems.

**3.6.3. Health awareness**

Health awareness programs at sites

**Commitment:**

**To implement local occupational health programs focused on improvement of working environments and awareness campaigns on health risks.**

In addition to addressing occupational risks assessment, management and control of occupational exposure, production sites deploy specific health awareness and prevention programs on an ad-hoc basis.

In 2012, more than 80% of Solvay legacy sites have carried out a specific health program on awareness and prevention of occupational risks (exposure to chemicals, hearing losses, musculo-skeletal disorders, shift work,) as well as on general health care education (tobacco, cardiovascular risk, obesity, cancer prevention screening).

Rhodia also has programs to increase health prevention awareness.

**Carbon monoxide exposure prevention: example of an integrated training module**

Soda ash plants produce high carbon monoxide (CO) concentrations in specific installations. A number of preventive measures are in place in the concerned working areas. A training module about CO related risk at work has been updated for the 8 soda ash plants in 2012, using harmonised risk management measures: from CO detection and exposure assessment to medical emergency and periodic protocols. This specific awareness module concern about 1000 people including contractors working at the Group's site.

**Employees training and improving the noise control on sites**

A software package will be progressively introduced at in a series of sites to train employees about noise prevention and to improve noise control.

The noise mapping technique simply consists in taking measurements in predetermined conditions. The tool helps the first line management to visualize the workplace areas with the associated noise levels. The software generates a map illustrating the distribution at a particular workplace. Potential noise exposure levels can be calculated for particular workstations. The tool can also calculate a reconstructed noise dose using data from an operator's past activity and anticipate the impact of new equipments.

Number of programs - Solvay legacy	2012	
	Count	Percentage
Prevention of specific occupational risks (musculo-skeletal disorders, hearing losses, etc.)	61	85%
Prevention of stress	15	21%
Prevention of general health: obesity, cardio-vascular risks, tabagism, etc.	36	50%

*Perimeter: Equivalent to Solvay legacy manufacturing perimeter under operational control.*



## 3.7. Occupational safety

Putting safety first is an integral part of the Solvay work ethics and commitment. Solvay has constantly improved its safety results, among the best in the industry. To further improve its performance, the Group set up new safety targets: to reach a Medical Treatment Accident Rate (LTAR) inferior to one by 2020 and to reduce by 30% the number of irreversible accidents and of accidents with chemical contact. The Group takes on and further develops new programs and practices that have proven their worth, such as “behavioral safety” programs that promotes safe and responsible behaviors in everyday tasks, based on a dialogue on safety practices at the level of each worker. Improvement of the leadership safety visibility and culture is also sought by implementing several new management practices under the banner of a New Safety Initiative launched in 2012.

### 3.7.1. Behavioral safety programs

Sites with a program in line with the Group's standards

#### Commitment:

**To deploy behavioral safety programs in line with the Group's standards at all sites.**

**Such programs, focusing on the behavioral aspects of safety, now cover 75% of the Solvay legacy manufacturing sites, which is beyond the set objective to cover 50% of sites by 2012.**

The Solvay legacy sites have deployed a behavioral safety program in line with the Group's standard, i.e. focusing on human factors in safety. Observation and dialogues with people at the workplace are aimed at increasing individual risk awareness, compliance with safety rules and creating opportunities for bottom-up exchanges on these matters. In 2012, the program was extended to 18 additional sites in the US and Italy.

The Rhodia legacy manufacturing sites have also deployed approved behavior-based methods in the past years. A specific focus at the sites in France has been the deployment of the STOP program and also with Vigilance.

The actions of the Rhodia legacy cover approved behavior-based methods developed and actions in the sphere of Human and Organizational Factors for Safety (HOFs). These include the “STOP” (Safety in the Workplace through Preventive Observation) program based on the Dupont approach which consists in preventive observations on safety in the workplace. The so-called “VIGILANCE” program, focused on sites in France (67% deployment), aims at training management in several key aspects of safety, in particular behavioral safety and task observation, at increasing awareness of supervisory and operational staff to individual safety attitudes and at giving operators a better understanding of factors influencing their behavior.

In 2013, the various safety programs of both legacies (HSE culture, Behavioral safety, Stop and Vigilance) will be assessed, in order to define the new orientation of the actions and the sites to be covered.

Solvay Legacy	2009	2010	2011	2012	objective 2012
% of sites with program	49%	63%	66%	78%	50%

*Perimeter: Equivalent to manufacturing perimeter under operational control.*

*Legend: The behavioral safety programs aligned on the Solvay's standards are based on a formalized safety dialogue at the workshop level, with the active involvement of the personnel.*

Rhodia Legacy	2009	2010	2011	2012
% of employees involved in a progress campaign for safety	90%	90%	92%	92%

*Perimeter: Equivalent to manufacturing perimeter under operational control.*

*Legend: SS, IGP: Scheduled Overall Inspections, HOSF programs (Human and organization safety factors: “Vigilance program”), BBS: Behavioral Based Safety, STOP, or other risk evaluation process of the ATC type, suggestion box, Rhodia Way, etc.*



### 3.7.2. People accidents at Group' sites (GRI LA7)

Accident frequency rates

**Commitment:**

**Towards zero occupational accidents, promoting best practices and an HSE culture in which all employees share Solvay's commitment towards safety.**

**The Group aims at achieving the highest safety level for Solvay's personnel but equally for contractors working on Solvay sites. Safety results integrating both Solvay and Rhodia legacies have been available since 2011.**

In 2012 work accidents with lost time per million working hours (LTAR) reached again a record low value of 0.8/year for the Group's employees and contractors. By comparison, the average LTAR for the EU chemical industry is currently around 5. The number of work accidents with medical treatment per million working hours (MTAR) reached a value of 2.6 at the end of 2012. The safety results are presented monthly to the Executive Committee.

One of the main drivers of the progress recorded in the past years is the Group's "Behavioral Safety Program":

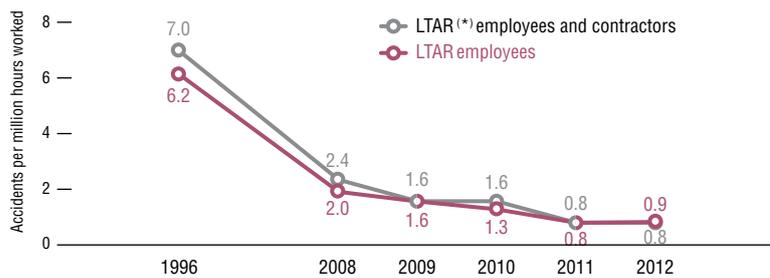
In September 2012, the Comex launched the "Safety Leadership Practices Initiative" that consolidates the best practices implemented within the Group, with a focus on "Management visibility" and involvement. The initiative sets new targets for MTAR, for Chemicals Contact Accidents and for Irreversible Accidents.

The safety leadership Practices Initiative pursues three main objectives:

- To reach a MTAR below <2 by end of 2014;
- To reduce the number of irreversible accidents by 30% by end of 2014;
- To reduce the number of accident with chemical contact by 30% at by end 2014.

The key management approaches in Safety Leadership Practices are:

- The Top Management (CEO, Comex Supervisor, GBU Managers) is informed of each Lost Time Accident (LTAR) within 24 hours;
- Business managers visit the site for each irreversible to review the circumstances of the accident and the corrective actions.
- Sites provides analysis of each irreversible accident and each accident with chemical contact, to issue a Group Lesson Learning Event, so reinforcing the process to increase awareness and avoid recurrence of similar events;
- Business or Function Manager Management Team member performs four safety visits/year within his/her perimeter. Each Comex member does also within the Group.



	1996	2008	2009	2010	2011	2012
Gravity Rate (GR) (**)	0.18	0.05	0.06	0.06	0.05	0.05
MTAR (***)	41.7	6.9	5.1	4.8	2.9	2.6

Perimeter: Equivalent to Solvay perimeter under operational control; includes Rhodia since 2011.

(\*) LTAR (Lost Time Accident Rate - number of work accidents with absence from work more than 1 day/1 million working hours) - employees and contractors.

(\*\*) GR = Number of lost days/1000 working hours

(\*\*\*) MTAR (Medical Treatment Accident Rate - number of work accidents leading to medical treatment other than first aid/1 million working hours) - employees and contractors

**A "Contractor Safety Management" program**

was also implemented at many Solvay legacy sites, in line with the Group's requirements. The key elements of the management of contractors safety are organized in five successive steps: qualification and pre-selection, work definition and risk analysis, contract definition (context, rules, penalties and acceptance), work execution, management and reception, HSE contractor evaluation, feedback and actions. This management also includes prevention planning, additional training for specific risks for health and safety risks, control and feedback during and after completion of work.

**Health Safety Environment Culture**

The program "Health Safety Environment (HSE) culture" consists in workshops for the Management and has started in a number of entities. It also contributes to the objectives of the new "Safety Leadership Practices Initiative". These workshops started at the level of the Executive Committee level in 2010.



### 3.7.3. Fatal accidents (GRI LA7)

Number of fatal accidents

**Commitment:**  
**Towards zero accident.**

**A fatality is by essence the worst and most unacceptable accidental situation.**

**No fatal accident was recorded in 2012. The last fatal accident occurred in 2011, when unfortunately one Solvay legacy employee died. A detailed analysis of this accident has been carried out and corrective actions taken.**

The prevention of fatal accidents, and more generally of any occupational accident is central in Solvay's HSE Management, which covers all domains of HSE and requires that each operational entity of the Group sets up systems to manage these domains.

In particular for every accident, a detailed analysis is made and corrective actions are taken when appropriate.

The avoidance of any fatal accidents is of course also covered by the new "Safety Leadership Practices Initiative" which focuses on visibility and the involvement of the Management in the safety practices.

Solvay will also take part in a multi-company workgroup on the prevention of fatal accidents.

	2008	2009	2010	2011	2012
Solvay Legacy	3	0	2	1	0
Rhodia Legacy					

*Perimeter: Equivalent to manufacturing perimeter under operational control.*

*Legend: Number of fatalities which occurred in Solvay related to occupational activities on site.  
Data of prior years unchanged (data corresponding to the perimeter for the concerned year).*



### 3.7.4. Management systems for occupational health & safety

Sites with management systems for occupational health and safety

**Commitment:**

**All Solvay industrial sites will implement HSE Management System, in line with Group standards from both legacies<sup>(\*)</sup>, covering occupational health & safety.**

**The objective of Solvay legacy more than reached. 46 sites have now an OHSAS or VPP system, with 40 having an external certification.**

**In addition, all sites of the Rhodia legacy sites have their own internal HSE management system. In 2012, the RCMS reference framework of the Rhodia legacy included 115 safety requirements on occupational health and safety.**

For the future, a new Group HSE Management System built on Rhodia's RCMS (Responsible Care Management System) will be defined and progressively implemented, building on the management systems which were so far the reference in the two legacies, including the Responsible Care Management System in the US. All Solvay industrial sites will be required to implement a Management System in line with the new Group standard and on this basis, seek or maintain external certification of their management systems under these various verification schemes.

(\*) based on OHSAS 18001, Voluntary Protection Programs (VPP) or an equivalent in line with the Solvay standard for such system, and on the Internal Rhodia Care Management System (RCMS) for the Rhodia legacy which complies with the requirements of the standards ISO 14001 and OSHAS 18001 standards. The sites will seek or maintain external certification under appropriate verification schemes.

**A recent certification**

In 2012, the Panoli plant (India) was one of the plants which was granted an OHSAS 18001 certification, with the final audit done by Bureau Veritas. This audit was integrated within the plant's Quality Management System and Environmental Management System. The two non-conformities were solved within 90 days. Between 2008 and 2012, the safety records of the site of Panoli were excellent with LTARs of zero, except in 2009 (LTAR of 0.8).

Sites with system	2006	2009	2010	2011	2012	objective 2012
Number of sites - Solvay legacy	14	24	23	30	46	30
Number of sites - Rhodia legacy					all sites with RCMS	

*Perimeter: Equivalent to manufacturing perimeter under operational control.*

*Legend: Number of sites with certified management system OHSAS 18001 (Occupational Health and Safety Assessment Series) (Solvay legacy)  
Number of sites with in-house HSE management system (Rhodia legacy)*



## 3.8. Process safety

### 3.8.1. Process safety management

#### Commitments:

**To perform consistent process hazard identification and risk analysis for existing, new or modified installations using methods and procedures in line with Group standards.**

**To implement Process Safety Management system at sites according to the risks of their processes, covering the local PSM requirements.**

**All concerned sites have implemented Process Safety Management systems. PSM introduces safety key elements, especially at sites involving major-risks, where they support in particular compliance with major risk regulation, like the Seveso Regulation.**

In the framework of such regulation, the Solvay legacy has 40 sites with ad-hoc safety management systems, with 51 sites having a structured safety management.

In the past years in the Solvay legacy, a particular focuses for further reinforcing process safety management have been on (1) deploying a common methodology and generalization of the use of

a common IT tool for Hazardous Operability (HazOp) studies, (2) improving Process Safety Incidents reporting using a uniform template and common database, and (3) further progressing in inspection practices, with reference to the Group guideline for major critical equipments: pressure vessels, pipes and safety instrumented systems.

Rhodia has deployed at all sites an in-house process safety management system, fully compliant with PSM regulations - especially the US Regulation - and defined since more than 10 years ago. In 2011 there was no unsolved "level 1 risk situation" older than 12 months.

Rhodia since 2003 had an in-house Process Safety Management system, based on a number of worldwide tools and methodologies, in particular HazOp (hazard identification) and LOPA (risk control). All sites have implemented such a system, with variations according to the risks of the installations concerned. Control of Rhodia's industrial risks relies on precise risk assessments. Consistency is ensured by a worldwide owner of the method. All installations undergo RCMS safety audits every 3 years.

In depth process safety risk analysis have been conducted for 98% of the installations (100% for Seveso sites and similar major risk installations for countries outside Europe) in the past five years. Including newly acquired installations, where the rule is 3 years more, the coverage rate of safety reviews is 88%.

For the future, the aim is to further reinforce PSM programs at all sites, based on worldwide consistency in risk assessment and control using the standardized Rhodia in-house model (2 common redlines and common Group standards), and to be amongst the best in world class companies in process safety.

#### Process accident at Paulinia

In 2012, a serious accident took place at Paulinia (BR), following a fire at the Adipic Acid Plant. Hydrogen ignited due to the presence of a spark. The detailed investigation is still on going to identify all root causes. The emergency team quickly controlled the situation. There was no environmental impact but serious material damages resulting in several months lost production.

### Deployment of Process Safety Management and the role of Corporate teams

PSM is deployed by sites, with the support of the corporate Health, Safety, Environment management which carries out ad hoc safety performance audits. The Group's Services Risk & Insurance entity and its external risk engineers also play a key role in risk identification, and making recommendations on risk reduction. The external Risk Engineers, belonging to the insurer

FM Global, carry out the audit of PSM systems.

Rhodia's process safety group program relies on a network of worldwide corporate experts and site process safety experts fully dedicated to process safety and, supported by process safety managers. Each process safety expert is appointed and managed as a Leader in risk analysis methods.

**Emergency preparedness** and public information plans are in place and in compliance with regulatory requirements. Exercises and crisis simulations are held periodically, to check on and improve the plans and their practical application. Global international alert procedures are in place at Group level to manage crisis response and communication.

**Process Safety** is a framework for managing the integrity of operating systems and processes handling hazardous substances by applying good design principles, engineering and operating practices. It deals with the prevention and control of incidents that have the potential to release hazardous materials or energy. Such incidents can cause toxic effects, fire or explosion and could ultimately result in serious injuries, property damage, lost production, and impact on the environment.



**The risk matrix is a cornerstone of Rhodia legacy's improvement programs in process safety.**

Whenever a risk is identified, the risk scenario is described, allowing to define the risk level in a standardized risk matrix (level 1 non-acceptable, 2 intermediate or 3 acceptable). Scenarios exhibiting a level 1 risk (=high probability, catastrophic consequences) must be handled in the coming year. This represents around 20 cases per year.

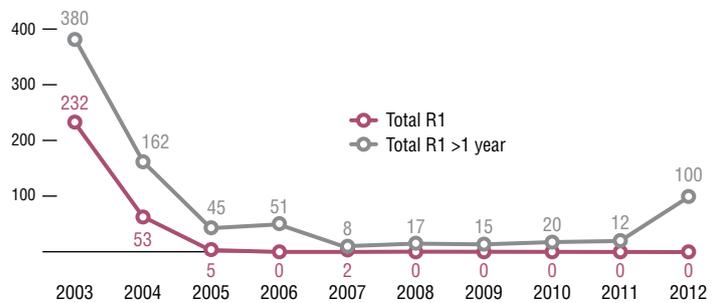
In 2011, risk sheets classified as "intermediate" (level 2) but nevertheless incurring potential catastrophic consequences were included in this process already implemented for level 1.

The risk matrix also provides insurance risk engineers with a good overall, harmonized vision of risks levels and improvements in the various installations.

**Rhodia legacy's risk analysis of production lines**

Each site must perform or review a risk analysis on each production line every five years ("red line" in Rhodia's Management Book). All risk scenarios must be assessed via a risk sheet with a 3 level scale (Acceptable – Intermediate – Unacceptable). All level 1 situations must be solved within one year.

**Number of remaining risk level 1 (R1) situations – total and more than 1 year old**



*Perimeter: Equivalent to financial perimeter - Rhodia legacy*

*Legend: Number of not handled risk level 1 situations – total and more than 1 year old: the detailed "process safety" audits must be performed or reviewed every five years. Any level 1 risk sheet must be handled within the next 12 months.*

## 4. Human Rights performance

The Solvay Code of Conduct provides general guidance to all employees about how to behave in the workplace, in Solvay's businesses and while representing Solvay in their communities. The Solvay Code of Conduct is based on a strong tradition of values that are historically ingrained in the Group's culture. The Code applies to every Solvay employee wherever Solvay operates or conducts its business. Third parties acting on behalf of Solvay are also expected to act within the framework of the Code. In joint ventures, Solvay will use its best efforts to ensure that the principles of this Code are respected.

Solvay is strongly committed to good citizenship, which includes the protection and advancement of human rights with regard to its employees, its business partners and the communities in which it operates. The Group endorses and promotes the internationally recognized standards including the U.N. Universal Declaration on Human Rights.

In addition to the broad range of human rights and workplace issues which are specifically addressed in the Code of Conduct and in the Group's policies, Solvay prohibits any kind of child labour or forced labour. Solvay takes seriously any indication that human rights are not properly protected within its sphere of influence or that it may be complicit in any human rights violation. Employees are expected to understand the human rights issues that may be at stake in their workplaces and should prevent any violation of these rights.

### **Organisation & responsibilities**

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An independent function is dedicated to manage and oversee the deployment of the Code of Conduct and the accompanying of Ethics & Compliance program. This Ethics & Compliance function, comprised of in-house lawyers, consists of regional compliance officers under the direction of the Head of Ethics & Compliance. The Head of Ethics & Compliance reports to the Group General Counsel. The Executive Committee and Board of Directors will receive reports concerning the deployment of the Code of Conduct.

### **Policies**

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The Code of Conduct is supported by more detailed policies on Gift, Entertainment and Anti-Bribery, Insider Trading, Conflict of Interest, Competition Law, Reporting of irregularities and misconduct and Intellectual Property. As part of the integration of the Rhodia legacy, all required corporate policies have been listed and are being redrafted benefitting from an exchange of best practices from both legacies.

In addition to existing policies, new policies are also being developed. A human rights policy has been drafted in 2012 and will be presented to the Executive Committee for approval.

## 4.1. Human Rights

### 4.1.1. Compliance with the Code of Conduct (GRI 4.8)

Number of non-compliances cases

	2009	2010	2011	2012
Cases reported	21	23	16	18
Cases investigated	3	9	9	18

*Perimeter: Equivalent to Solvay legacy financial perimeter.*

#### **Commitment:**

#### **To apply the Code of Conduct systematically.**

Violations of the Code of Conduct are not tolerated. Employees are encouraged to speak up when behavior inconsistent with the Code is observed and managers are expected to deal with such reports and, if necessary, to refer them to the appropriate member of management and/or compliance officer. Violations can lead to disciplinary action consistent with applicable laws and regulations.

Solvay has adopted a general Policy on reporting irregularities and misconducts. Through the "Speak Up" campaign, the Group encourages its employees to take up any difficulty or question relating to the application of the Code of Conduct with its hierarchy or other identified sources (like Compliance Officers, Legal Staff, Human Resources).

The possibility to report concerns through an Ethics Helpline is gradually introduced in every entity and in every region in order to cover the whole perimeter of the

Group. The Helpline is operated by an external service provider and employees can make a report in their native language. Employees can use this helpline to voice their concerns.

—○—  
4.1. Human rights

#### 4.1.2. Human Rights impact assessments (GRI HR 10)

**As part of its Risk Profiling Method, Solvay has explicitly recognized indirect or direct involvements in Human Rights issues as one of the potential risk.**

**(In)direct involvements in human rights issues fall under the Risk Category “Corporate Governance and risks attached to Internal Controls”:**

The main identified risk for Solvay, as a chemical group, is definitely the safety and the health of the personnel. Meanwhile, expanding activities in emerging countries recently led to reinforce the

management of human rights by setting up a specific Policy on the matter and by putting more emphasis in the future i.e. on trainings procedures and follow-up.

The Solvay group has set up an internal control system designed to provide a reasonable assurance that:

1. Applicable laws and regulations are complied to;
2. Policies and objectives set by the company are implemented;
3. Financial and non-financial information is reliable.

This applies of course to the respect of human rights.

Each Global Business Unit and Corporate Function (Legal, Human Resources, Public Affairs, Communication,...) has also to apply the Risk Profiling Method while developing and deploying their own strategic objectives. A full assessment has to be done every 2 years and, additionally, when there is an important change in the Risk Profile. To increase the effectiveness and to assist the GBUs and Corporate Functions, Solvay is currently developing a guidance to help identifying, assessing and mitigating human rights risks and their potential impacts.

**The management of various aspects of human rights is addressed elsewhere:**

- Safe and healthy workplace: p.84-90
- Equal opportunity and non-discrimination: p.80-81
- Freedom of association and the right to collective bargaining: p.82
- Respecting culture, customs and values in communities in which our businesses operate: p.103-106
- Not using child labour or forced labour: p.81
- Not tolerating any form of harassment in the workplace: p.84
- Harassment-free Environment: p.84
- Suppliers CSR: p.123



See the list of the 10 major Risks page 32

#### 4.1.3. Training concerning aspects of Human Rights (GRI HR3)

**Commitment:**

**All employees are expected to act in a manner that is consistent with the prescriptions of the Code of Conduct in relation with human rights.**

**Training courses and induction activities are organized to ensure that an ethical and compliant conduct is embodied in the way business is done by Solvay and also to address behavioral risks in certain specific area.**

Meanwhile, Health and Safety have always been identified as being the higher risks for the Group in terms of Human Rights. In 2012, 23% of the total learning activities in the Group have been dedicated to HSE issues.

The global training campaign relating to the new Code of Conduct and the human rights policy is planned to roll out from May 2013 with the objective to be deployed through the whole Group by end 2013. All Solvay employees will receive a copy of the Code of Conduct and specific training on its implementation.

A human rights training module will be part of this global training campaign. This specific program will be build up jointly with the Human Resources and Sustainable Development functions. The content (including the compliance to the criteria of the ILO Core Conventions) and the deployment are being elaborated.

#### 4.1.4. Human Rights in the supply chain

**In the Solvay legacy, there was a policy dealing with CSR issues related to purchasing activities and Rhodia legacy had quite formal procedures and training related to Human Rights in their purchasing procedures.**

##### **“Together with Sustainability” project**

From 2012, Solvay is taking part in a new collaborative initiative for the Chemical sector regarding the assessment of the CSR performances of suppliers: “Together with Sustainability”.

These assessments will be made on the basis of standardized criteria and tools for supplier sustainability audits in which human rights issues will be addressed. This project is currently in a pilot phase.

In this context, to use available resources more efficiently and to reduce the bureaucratic burden for suppliers, the participants to this initiative will share the supplier sustainability assessments and audit data. Nevertheless, the participants will keep responsibility for their own operations and, in the sphere of influence of their supply chains, for supporting their adherence to existing regulations and to the requirements and expectations of the industrial customers, the consumers and the society at large.

## 5. Society performance

Solvay is strongly committed to the responsible behavior and ethical integrity described in its Code of Conduct, to take into account the sustainable growth of its business and ensure its good reputation in the communities in which it operates.

Some society performance indicators focus attention on the perception, the relationships and the impact some activities may have on local communities in which Solvay operates. Other indicators represent interactions the Solvay group has with social institutions. Information in sought on the risks associated with bribery and corruption and anti-competition practices or the means dedicated to influence public policy-making is presented.

### Organisation & responsibilities

Since 2007, a compliance organization under the leadership of the Group General Counsel has been put in place to enhance a group wide ethics and compliance-based culture to ensure compliance with applicable laws and regulations and compliance with Solvay's Code of Conduct, values and corporate policies.

The commitment includes in particular being in compliance with all relevant laws, including anti-corruption laws. The function "Ethics & Compliance" has the objective of straightening a culture based on ethics and compliance. This organization is also responsible to know the law, create awareness, train the employees and develop procedure.

### Policies

The Solvay Code of Conduct sets direction and states a.o.that bribery and corruption are unacceptable. It is backed by several policies for ethical business conduct.

The Group's Code of Conduct is inspired by the Universal Declaration of Human Rights.



## 5.1. Education and culture

The Group's policy on philanthropy specifically encourages initiatives at local level to support social and economic development of the communities in which it operates, in a spirit of long term relationships. This is translated more particularly into promoting local business, professional training of the local youth, reducing the social consequences related to site closures, openings, and restructuring.

At corporate level, the Solvay policy aims at concentrating sponsoring on actions and programs related to science & technology, education and, humanitarian & development projects.

### 5.1.1. Corporate philanthropy & charities

	2012
Science & technology (Solar Impulse) - EUR million	0.34
Social & education (XperilAB, International Institutes for Physics and Chemistry) - EUR million	1.93
<b>Total - EUR million</b>	<b>2.27</b>

*Perimeter: Equivalent to Solvay legacy financial perimeter.*

*The figures reported are limited to main initiatives at corporate level. They do not cover numerous social actions and sponsoring initiatives taking place at local level. Relevant reporting criteria for such multiple actions are not established.*

**Solvay's corporate philanthropic actions concentrate on initiatives in the field of science & technology and education in these matters, with currently a major support to the Solar Impulse project. Charities and humanitarian initiatives make particular sense when Solvay can contribute with its products, infrastructures or competencies.**

On the occasion of the 150<sup>th</sup> anniversary of the company founded by Ernest Solvay, and to perpetuate the founder's commitment as a strong supporter of scientific research, Solvay's Executive Committee has decided to set up the Chemistry for the Future Solvay Prize. It is intended to endorse basic research and underline the essential role of chemistry as a science and an industry to help solve some of the most pressing issues the world is facing. This EUR 300 000 prize will be awarded every two years.

An independent Nomination Committee composed of 15 eminent scientists will propose candidates for the Prize. The Committee will look for achievements in various fields, including biochemistry, material sciences, soft matter, biophysics and chemical engineering. The independent Prize Jury, will then select the final winner. The first Awards ceremony will be held in Brussels in November 2013.

As a result of the integration of Rhodia into the Solvay group, the Rhodia Pierre-Gilles de Gennes Prize for Science and Industry that was created in 2008 will no longer be awarded, but will find a continuation in its spirit in the Chemistry for the Future Solvay Prize.

Other initiatives in the education to science area is the truck sponsored by Solvay in Belgium that drives around the country and turns into an inviting laboratory big enough for a

whole class where the pupils carry out real experiments over a period of 90 minutes. This initiative is a great success and its agenda full one year in advance.

> See: [www.xperilab.be](http://www.xperilab.be)

Further examples are the support to the development of a solar food dryer for developing countries or the continued support with Solvin to a science magazine called "Mens" dedicated to teachers and their students in the secondary school.

At local level, Solvay participates in the life of communities where it operates in many ways and through multiple initiatives: indirect and direct added value for the local economy and employment of course, but also schemes, support to local associations and initiatives.



## 5.2. Awards and recognition

The Group and its operational entities receive awards and recognitions testifying of the being at the forefront of good management practices.

### 5.2.1. Recent awards and recognitions received (GRI 2.10)

#### US - Solvay North America

- In 2011 and for the second time, Solvay North America corporate headquarters in Houston, Texas was awarded the Energy Star designation, exemplifying the Group's commitment towards Sustainable development, by the federal Environmental Protection Agency (EPA)'s.

#### Argentina - Bahia Blanca

- Two awards were received (2011).
- One for the reuse of cleaning water for multi-media filters.
  - The other for the improvement of the effluents of the electrolysis unit.

#### Brazil

- Creation of the Instituto Rhodia (2007) to pursue social and environmental projects at national level.

#### Belgium - Brussels NOH

- Label "Ecodynamisme" two stars by IBGE. The award classified Solvay amongst the five top companies, for its health promotion program MOVE EUROPE (2009).
- The Solvay's HSE advisor has been nominated a second best prevention expert by AGORIA (2010).
- Among the two finalists of the Best Belgian Sustainability Report (2011).

#### Belgium - Jemeppe

- Among finalist of the technological innovation of the Walloon Region (2009).

#### Bulgaria - Devnya Sodi

- "Eco-innovator" award received from the business newspaper "Pari" (2009).
- "Vision" award received for social responsibility and support to people with disabilities (2008).

#### China

- The Shanghai R&I team helps to fund the education of disadvantaged young Chinese women: Rhodia Way trophies (2012).

#### Germany - Bad Wimpfen

- Behavior program at site awarded by the accident insurer (BG RCI) (2011).
- Employer's Liability Insurance Association for Raw Materials and the Chemical Industry (BG RCI's) special award for innovative contributions to health protection: idea and construction of a swivel-seat forklift truck (2012).

#### Germany - Hannover

- Ökoprofit-Award by City of Hanover and County of Lower-Saxony for Solvay GmbH (2010/2011).

#### Germany - Rheinberg

- Environmental award from the environmental Ministry of Northrhine Westfalia for involving site employees in energy efficiency programs (2010).

#### Great Britain - Lostock

- Gold Award for attaining five consecutive awards for years 2005-2009 from Chemical Industry Association (2011).

#### Great Britain - Warrington

- Chemicals Northwest "Best Community Project" award (2009).

#### Italy - Ferrara

- Premio "Innovazione al Quadrato" 2012 for the electricity consumption and costs reduction project.

#### Italy - Roccabianca - Padanaplast

- CEFIC European Responsible Care® Award 2011 for three projects in Italy: CO<sub>2</sub> emissions control, Safety at work, CSR Best practice in Italy.

#### Italy - Vinyloop

- Awarded as among the top ten companies for green economy "made in Italy" by Fondazione Sviluppo Sostenibili (2011).

#### India - Kalahasti

- Award for innovation (2011).

#### India - Panoli

- "Winner in Design Category" for waste water minimisation project in 2012 by the International Water Association.

#### India - Savli RD&T Centre

- Federation of Indian Industry and Commerce awarded the "Safety in Excellence" in 2012.

#### United States-Alorton

- ACC Responsible Care Initiative award in 2012 for the HF (Hydrogen fluorides) Transportation Training program.

#### Portugal - Povoá

- Best face to face internal communication (multiple events) by FEIEA Grand Prix (2010).
- Finalist of the Portuguese "great place to work" Award promoted by Heidrick & Stuggles and the Management magazine "Exame"; Special Mention for the "Simplex Project" (2009).

**Spain - Martorell**

- Special recognition for ten years of EMAS certification by Generalitat (Administratio of Catalonia) (2009).

**Spain - Torrelavega**

- Recognition as business partner with the dining Coorcopar solidarity (2011).
- Recognition as an institutional partner of NGOs, such as Cantabria or AMAT ALCER Torrelavega, among others (2011).

**Thailand - Map Ta Phut VINYTHAI**

- Zero accident award by the Ministry of Labor Green industry certificate from the Ministry of Industry (2011).
- Award for good environment performance governance by Industrial Estate Authority of Thailand.
- CO<sub>2</sub> reduction label from Thailand Greenhouse Gas Management Organization.

## 5.3. Local communities

Keeping good relationships with local communities is essential for the Group. Firstly, because Solvay wants to make sure it meets the expectations of this key stakeholder. They are, by definition, directly concerned by the impact of Solvay industrial activities. Secondly, because good relationships can be decisive in its “liability to operate” and in keeping or obtaining the operation licenses for its production units.

### 5.3.1. Dialogue with local communities

The local dialogue initiatives and communication actions are not systematically consolidated, given the diversity of local situations but this will be considered in the future in the context of the lessons to be learned from the opinion surveys recently performed in a series of industrial sites (> see next page).

Meanwhile, a standardised form is sent to the sites to identify their key actions performed in engaging the dialogue with their communities. In 2012, this form was sent specifically to the sites selected for the opinion surveys (> see an example in the table) in order to further improve the interpretation of the results.

**Management of neighbor dialogue**

Engagement towards local communities is managed at local level, under the initiative of each plant’s management. In the Solvay legacy, two main objectives relative to neighbor relationships and dialogue were set among the major sustainability objectives defined in 2008:

- Developing a strategic approach to harmonize and measure the performance of local community dialogue initiatives. This action was initiated in 2011 and a KPI was proposed to measure the outcome of the engagement with the community. Further developments will be based on the results of the worldwide opinion survey (next point).
- Conducting opinions surveys in a series of major sites. These surveys were conducted in 2012 around 16 industrial sites worldwide.



**Key communication & dialogue initiatives undertaken these last years - example**

Site of Rheinberg (DE)

Actions relative to:	Main action or initiative (s) (frequency /quantity/financial contribution if appropriate)	Other initiatives
<b>1. Major risks</b>	<ul style="list-style-type: none"> <li>• “Seveso brochure” for neighbors (to act properly in case of an incident at Solvay) extended with additional information on Solvay in Rheinberg (every 3-5 years)</li> <li>• Publication of Solvay neighborhood newspaper including articles explaining safety measures/safety topics (twice a year)</li> <li>• Regular discussions with journalists – even on critical topics</li> <li>• Participation in association meetings (chemicals, energy, environment etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Day of open doors (every three years)</i></li> </ul>
<b>2. Contacts with authorities, associations</b>	<ul style="list-style-type: none"> <li>• Regularly individual talks (HSE/Safety-Department), at least 6 times/year</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Talks with local committees concerning actual topics</i></li> </ul>
<b>3. Safety</b>	<ul style="list-style-type: none"> <li>• “Seveso brochure” for neighbors (to act properly in case of an incident at Solvay) extended with additional information on Solvay in Rheinberg (every 3-5 years)</li> <li>• Articles in Solvay neighborhood newspaper treating safety topics (2/yr)</li> <li>• Internally: trainings for employees treating HSE-topics</li> <li>• In case of emergency, the direct neighbors will be rung up automatically</li> <li>• Participation in association meetings (chemicals, energy, environment etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Day of open doors (every three years)</i></li> <li>• <i>Boards, showing numbers of days without accidents</i></li> <li>• <i>Internal/external program for load securing</i></li> <li>• <i>Intense cooperation with government safety organizations</i></li> <li>• <i>Safety instructions and training for subcontractors (regularly)</i></li> <li>• <i>Brochure with safety instructions for visitors</i></li> </ul>
<b>4. Environment</b>	<ul style="list-style-type: none"> <li>• Articles in Solvay neighborhood newspaper treating environmental topics (twice a year)</li> <li>• In case of incident: proactive press release/press talks/ brochures/letters or talks to concerned people</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Day of open doors (every three years)</i></li> <li>• <i>Neighborhood-phone (return channel 24h/365 days)</i></li> <li>• <i>Brochures on different topic</i></li> </ul>
<b>5. Local press &amp; media (inc website)</b>	<ul style="list-style-type: none"> <li>• Conversation with the press (frequency depends on topics)</li> <li>• Press releases (on average every month)</li> <li>• Frequent news on the Solvay website/Solvays’ Rheinberg website</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Personal contacts</i></li> <li>• <i>Providing neighborhood newspaper and the employees magazine “EinBlick” to journalists</i></li> </ul>
<b>6. Societal, educational initiatives</b>	<ul style="list-style-type: none"> <li>• Cooperation with local schools (continuously)</li> <li>• Participation at apprenticeship fairs</li> <li>• Site visits in cooperation with local adult education center (“Volkshochschule”; twice a year). Frequently: site visits for pupils and students</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Day of open doors (every three years)</i></li> <li>• <i>Providing dual studies program</i></li> <li>• <i>Support of various local initiatives (disabled sports, etc....)</i></li> </ul>
<b>7. Economical aspects</b>	<ul style="list-style-type: none"> <li>• Articles/Editorials in Solvay neighbourhood newspaper treating economical topics (twice a year)</li> <li>• Presentation/events like inaugurations or jubilees (press and local+regional stakeholders invited)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Day of open doors (every three years)</i></li> </ul>
<b>8. Historical situation (incl. a.o. on past pollution)</b>	<ul style="list-style-type: none"> <li>• Chronicle of the Rheinberg site</li> <li>• In case of historical pollution detected (dating back to World War 2): proactive press releases, press talks, letters or talks to concerned people, etc.</li> </ul>	
<b>9. Others (ex: on products, sports activities ...)</b>	<ul style="list-style-type: none"> <li>• Systematic discussions with all stakeholders for industrial projects (i.e. biogas powerplant)</li> <li>• Community advisory panels or townhall meetings to discuss special topics with stakeholder groups e.g. neighbors.</li> <li>• Brochure to promote the industrial park Solvay Rheinberg</li> <li>• Day of open doors (every three years)</li> <li>• Dedicated publications during approval processes</li> <li>• Participation in special initiatives of associations e.g. “Industrial night” (once a year)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Neighborhood survey in 08/2005</i></li> <li>• <i>Sponsoring of social initiatives</i></li> <li>• <i>Sponsoring disabled sports in direct neighborhood (regularly)</i></li> </ul>

**Opinion surveys performed among local communities of 16 industrial sites of Solvay (2012)**

**The approach**

- Standardized opinion surveys about Solvay's activities were performed in 2012 among the communities living in the vicinity of 16 production sites worldwide: 12 sites of the Solvay legacy and 3 of the Rhodia legacy were selected.
- The global aim of these surveys is to gather information about the local perception of Solvay activities according a.o to age groups. One further site of the Rhodia legacy which performed an opinion survey independently (Paulinia, Brazil) was also included in the project.
- The perception of the local communities is considered in a broad way as it includes social, economical and environmental matters.

The compilation of results will be used by each local management to (re) define its action plans aiming at trying to overcome some of the negative perceptions, to work on them and to improve the mutual relationships and the regular dialogue on identified issues with these communities.

- Lessons of these surveys will of course be also integrated at corporate level.

**The questionnaire**

- To obtain these opinions, a set of questions common to all sites was elaborated but the opportunity was also given to each site to add a few questions more directly related to its local situation. These surveys were based on phone interviews except for one site, Onsan in Korea, where, for practical reasons, face to face interviews were also organized. This approach allowed to both build

up a coherent comparative database and to tackle in a coherent way specific local questions of interest for each site.

- Questions covered the spontaneous awareness about the site and the Group, the knowledge of the products the plant produces, the perception of its health and environmental impact, the contributions that it may provide to the local economy and its social and/or cultural initiatives. Sensitive issues were of course included in the surveys like the safety of installations, their impact on water and air quality and the information provided by the site in these matters.



Figure 1: Solvay industrial sites covered by an Opinion Survey of their local communities in 2012.

- 5.1. Education and culture
- 5.2. Awards and recognition
- 5.3. Local communities
- 5.4. Advocacy and dialogue
- 5.5. Ethical practices

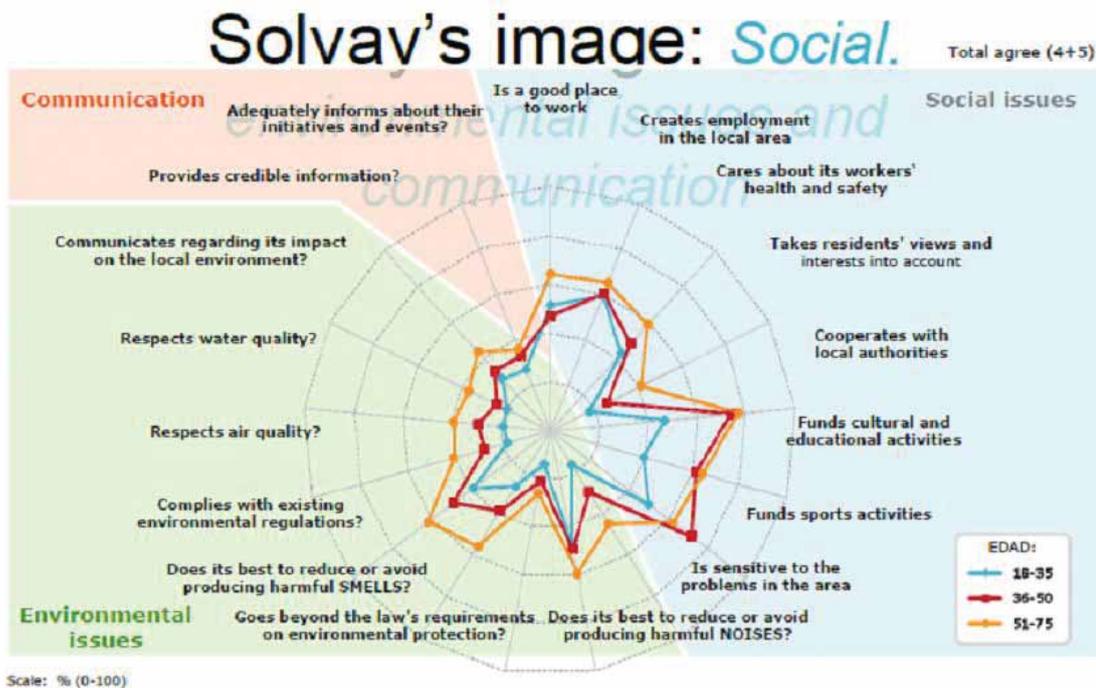


Figure 2: An example of synthetic data presentation reflecting the neighbor perception by age category of a specific industrial site.



Figure 3: example of information brochure towards a local community: Spinetta Marengo (Italy).



## 5.4. Advocacy and dialogue

### 5.4.1. Advocacy (SO5)

Advocacy staff, Solvay group

	2011	2012
Corporate	6	5,5
Region	13	12

*Perimeter: Equivalent to Solvay financial perimeter.  
Number of persons (full time equivalents) in Public Affairs.*

**Commitment:**  
Everywhere be in line with the Group's vision, mission and values, to foster the best possible business environment for the Solvay group and be recognised as a responsible actor in business-public authorities/stakeholders dialogues.

**About 17 Solvay employees are directly involved in the management of these matters:** 5 at corporate level and a network corresponding to 12 "full time equivalent" people at national/regional level in Europe, the United

States, Asia, and Latin America. Their goal is to directly or indirectly establish on a basis of trust and clarity a permanent dialogue and a long term partnership with public authorities and other relevant stakeholders on issues of common concern. These actions are performed in line with all existing local laws and in respect of the Solvay group policy on Government and Public Affairs.

Solvay has direct and indirect contact with policy makers and public officials on issues of relevance to the Group. This includes participation in trade associations such as

BusinessEurope, the European Round Table of Industrialists, the American Chemistry Council, the Association Francaise des Entreprises Privées and others. Solvay also engages directly with stakeholders through responses to European Stakeholder Consultations and attendance at Parliamentary hearings and debates where relevant. The success of Solvay's efforts to engage sustainability with stakeholders has been validated by a survey conducted by a third party asking Solvay's stakeholders to rate the transparency and professionalism of the Group in its contacts with them.

ISSUES	STANCES
Fight against climate change	Contributing to the development of a clear and predictable legislative framework for climate change policy in the EU and globally in the post 2020 period. Contribution to various pieces of legislation developing a climate-friendly framework for business.
Responsible chemical handling	Getting US EPA approval for a methane emission recovery project at one of Solvay's US sites which will avoid 300.000 tonnes of CO <sub>2</sub> emissions per year.
Supporting eco-mobility	Supporting the development of a framework enabling eco-mobility, notably through support of flagship trans-European journey of a fleet of hydrogen powered cars.
Anticipating emerging issues	A small group of experts from Public Affairs, HSE, Advanced Technologies, and Corporate Communication called Paracelsus plays a proactive role in monitoring and anticipating emerging issues in health and environment: (nanotechnologies, "micropollutants", cocktail effects, biomonitoring, endocrine effects...) to enable the company to take responsible actions and positions on complex issues.



### 5.4.2. Dialogue with investors on sustainability (GRI 4.16)

Solvay group

	2008	2009	2010	2010	2012
Meetings with investors focused on sustainability	12	8	18	12	10

*Perimeter: Equivalent to Solvay financial perimeter.*

*Solvay took part to only one SRI roadshow in 2012 as combined disclosure of extra-financial performance covering Solvay and Rhodia legacies did not yet exist. The Solvay Sustainability Indicators and Progress Report was the main reference document used in the contacts with the investors interested on these matters.*

**The sustainability dimension of extra-financial performance is increasingly important to institutional investors. Ratings by financial agencies now encompass a larger number of sustainability indicators. Solvay is developing a targeted communication and dialogue on its sustainability policy and parameters and multiplies the opportunities of dialogue with investors involved in Corporate Social Responsibility (CSR) values.**

Solvay's disclosure in these matters is more and more appreciated and called "best in class" by many. Solvay is now also part of the STOXX index.

The investors' interest goes mainly towards governance, CO<sub>2</sub> emissions, improvement of production processes footprint, energy and waste management or product toxicological profiles. The organization of Solvay sustainability management at Board level is also gaining importance.

> *More information on extra-financial ratings, see general introduction pp. 34-35.*



## 5.5. Ethical practices

### 5.5.1. Bribery and corruption

#### Commitment:

**Solvay stands doing business with ethics and integrity. Solvay is committed to maintaining a fair and honest business environment for its employees, customers, suppliers, shareholders, competitors, and the public in general.**

Exchanging token gifts and entertainment with customers or suppliers is permitted in accordance with the Group Policy. However, the Group prohibits bribery in any form. Solvay and its employees do not use gifts or entertainment to gain competitive advantage. Disguising gifts or entertainment as charitable donations is a violation of the Code and the Group Policy and is not accepted.

Solvay does not take part in political activities nor does it make corporate donations to political parties or candidates. However, the Group will engage in a constructive debate with public authorities on subjects of legitimate interest to Solvay. Any personal participation or involvement by an employee in the political process must be on individual basis, in the employee's own time and at the employee's personal expense.

#### Risk assessment

As part of its Risk Profiling Method, Solvay has explicitly recognized failure to comply with Solvay's Code of Conduct, internal policies or business procedures as one of the potential risk. Solvay will systematically incorporate the issue of corruption in its risk assessment.

#### Training

In order to ensure understanding and compliance, all employees will receive a copy of the Code of Conduct and specific training on its implementation. Employees will receive further training relating to specific ethics and compliance issues when relevant for their function. Employees should review their behavior in light of the Code and determine whether changes are required. At the same time, all managers and supervisors should actively communicate about the Code, monitor compliance and act as positive role models.

#### Actions taken in response to incidents of corruption

Auditing on corruption or any other form of fraud is part of the mission of Solvay's compliance department, in collaboration with Internal Audit, legal and other departments or functions.

Reports on potential violation of the law, the Code or internal policies and procedures are taken very seriously by the organization and are investigated by the compliance function. In case of violation the compliance function proposes adequate sanctions and measures to prevent future violations.

### 5.5.2. Anti-competition

#### Commitments:

**Solvay values fair and open competition. The Group does not enter into business arrangements that distort, eliminate or discourage competition, or that provide improper competitive advantage.**

**Every employee, wherever located, must strictly respect fair competition and all applicable laws, regulations and the company policy.**

Solvay observes and supports all laws and regulations governing the export and import of product, services and information throughout the world. In particular, the Group respects regulations that govern doing business in embargoed countries, persons or organisations.

## 6. Product responsibility performance

Besides the responsibility regarding production activities and their safety, the responsibility for the products Solvay provides to its customers and to society is essential and this all along the life cycle of products, down to their end-of life and recycling. This is reflected in the important efforts to identify and communicate accurately about the potential dangers of some of Solvay products and the ways to manage the associated risks, according to all existing regulations and further, in line with commitment to the Responsible Care Global Charter®.

### Organization & responsibilities

A central corporate entity coordinates the compliance of all products with applicable regulations and requirements. The entity keeps updated dossiers for all substances and products and updates the Safety Data Sheets (SDSs) according to regional or local requirements, a key element in the safe use and transportation of products.

### Policies and management approach

The Group meets the extensive regulatory evolutions related to product safety such as those resulting from the European Union REACH Regulation and those associated to the Globally Harmonizing System (GHS).

The Group has policies in the product management areas. In particular "level 2 policies" have recently been redefined for Product stewardship and for Process and Transport safety.

## 6.1. Regulatory compliance and product stewardship

### 6.1.1. Product compliance

Understanding product hazards and risks, managing product knowledge

#### Commitments:

**To maintain a comprehensive understanding of each product's hazards, risks and impacts related to all life cycle steps and intended applications.**

**To manage product knowledge so as to comply with local requirements on product information while ensuring worldwide consistency.**

**To keep all necessary and required information on product safety to ensure availability throughout the full life cycle, beyond the commercialization period.**

Nearly 10 000 chemicals, the majority being polymers with many different grades, are put on the market by Solvay. To them are attached legal requirements regarding a.o. information to be provided to downstream users, in particular for those chemicals with a potential hazard related to their intrinsic properties and/or risks related to the conditions of use.

In this context, Solvay seeks to obtain the knowledge of the conditions under which Solvay products are used, so as to assess any associated risks.

In 2010, the Solvay group submitted 276 dossiers for registration. Solvay was lead registrant for 74 substances.

**In 2012, because of new available information or at the request of ECHA, 33 updates of registration dossiers were submitted.**

Preparation of dossiers for the second 2013 registration phase within REACH is on track. This second phase involves chemical substances produced or imported in quantities between 100 and 1 000 t/y. 191 dossiers concerning Solvay products, covering 176 substances, will be submitted before the second registration deadline of May 2013. The Group has a lead role for 69 substances, as lead registrant or alone. By the end of December 2012, 30% of Solvay dossiers for this second registration phase had already been submitted, of which 39% for the Solvay legacy and 19% for Rhodia legacy)

In 2012, 10 ELINCS (*European List Inventory of Notified Chemical Substances*) dossiers were updated and some 15 EINECS (*European Inventory of Existing Commercial chemical Substances*) new registration dossiers (inquiries) were been filed.

Workshops and training sessions are regularly organized to make GBUs product stewards and sites HSE managers aware of REACH enforcement. In particular, training sessions have been carried out on provisions

and needed documents to prepare sites for REACH inspections and on requirements related to electronic SDS compliance.

In 2012, only one REACH inspection took place at the Tavaux site (F).

The *Globally Harmonized System of Classification, and Labeling of Chemicals* (GHS) is an initiative of the United Nations to harmonize the classification, labeling of chemical substances worldwide. These requirements were translated in the EU within the Regulation on the Classification, Labeling, and Packaging of substances and mixtures or CLP Regulation. The CLP Regulation came into force in December 2010 and its requirements apply to all Solvay's substances and their applications, and for all activities relating to their production, import, marketing and uses. The deadline for complying individual substances to the CLP Regulation were met in 2010.

In the European Union in 2012, about 20 new CLP notifications for substances were submitted by Solvay.

An information leaflet for customers on the application of the CLP Regulation is downloadable via the website: CLP information leaflet.

[www.solvay.com/EN/Sustainability/productsustainability/Classification/Documents/Leafletcustomer-EN-Definitive%20version.pdf](http://www.solvay.com/EN/Sustainability/productsustainability/Classification/Documents/Leafletcustomer-EN-Definitive%20version.pdf)

#### Dossiers registered for the first REACH registration phase, 2010

	Number of dossiers	as lead registrant	accepted by ECHA
Solvay legacy	170	39	100%
Rhodia legacy	106	35	100%
Total	276	76	100%

Perimeter: All Group entities.

#### Dossiers scheduled for the second REACH registration phase, by January 2013

2011 - 2012 - May 2013	Number of substances	Number of dossiers	REACH dossiers already submitted to ECHA	REACH dossiers to be submitted to ECHA by 31 may 2013	Registrations done by January 2013
Solvay group	176	191	65	126	32

Perimeter: All Group entities.



### 6.1.2. Supplying product safety information

Safety Data Sheets (SDSs) management and distribution

#### Commitments:

**To provide all necessary information to all stakeholders concerned, avoiding any concealing of validated information about hazardous characteristics of products,**

**To establish Safety Data Sheets as required by regulations (SDSs), and beyond with the aim of adequately protecting users and the environment,**

**To maintain and distribute SDS consistently worldwide, for all products and all customers.**

Solvay, GBUs and industrial sites have to provide all necessary information to all stakeholders involved in order to help them to comply with their own risk management and product safety obligations for all our products and to all customers and downstream users.

To this end, Solvay manages product safety information centrally. The key element is an integrated information system on its substances and products (SAP/EHS): a central database aimed at helping achieve compliance with all applicable product regulations worldwide. This database ensures consistency of

the information on Solvay products provided in the SDSs in all countries. For the enforcement of CLP Regulation in the EU in the case of mixtures, the deadline is mid 2015 but the SDSs of the Solvay legacy for such mixtures (about 500) already comply with this Regulation.

In 2012, in line with the worldwide GHS implementation, Solvay also updated and/or developed the SDSs for a series of countries: Singapore, Thailand, China, Japan, South Korea,...). Studies are currently being developed to adapt the GHS model of SDSs to the USA.

#### GBU's must have a process to ensure and monitor SDS compliance

SDSs are sent to customers at first delivery and are maintained and distributed consistently worldwide, for all products to all customers in the appropriate language every time they have been significantly modified. GBU's ensure that their SDSs are revised at least every 3 years, for all the products put on the market.

GBU's and industrial sites have also processes ensuring that their products are adequately labeled according to regulations such as GHS and CLP or transport regulations.

SDSs provide systematically and according to the regulations all the required information on the identity, physico-chemical properties and hazardous properties of each substance, the associated risks and the safety measures to be applied in their use. By further developing systems for SDSs, preparation and distribution, efforts are made to supply this accurate information in full compliance with the regulatory frameworks like GHS or REACH and CLP (Classification, Labeling and Packaging) regulations in the EU.

#### Product Safety Summaries (PSS): 123 already available

As part of a project initiated by the International Council of Chemical Associations (ICCA), Solvay committed to produce Product Safety Summaries (PSS) which are short and simple descriptions of the main Solvay products: properties, uses, potential health and environmental hazards described in a language understandable by the layman and a broad public. Some 123 PSSs are already available, which makes of Solvay one of the most advanced companies in Europe. These PSSs are available on the ICCA website and also via a link from the corresponding Solvay website: [www.solvay.com/EN/Products/ProductSafetySummaries.aspx](http://www.solvay.com/EN/Products/ProductSafetySummaries.aspx)





### 6.1.3. Substances of Very High Concern (SVHC) and their substitution

#### Commitments:

To identify substances of very high concern used or produced, update risk studies and strive to substitute them with safer alternatives that are technologically equivalent and socio-economically sustainable.

To handle substances of very high concern under strictly controlled or equivalent conditions.

#### Substances of Very High Concern (SVHC)

None of the substances registered by the Solvay legacy in the first phase of the REACH Regulation were classified as either Persistent, Toxic and Bioaccumulable (PTB), or as very Persistent, or very Bioaccumulable (vPvB). Only three substances sold by the Solvay legacy are classified as Carcinogenic, Mutagenic, or Toxic to Reproduction (CMR).

These CMR substances are exclusively sold to industrial customers to be used as chemical intermediates for the production of other materials (a.o. epichlorohydrin to produce polyester resins). An inventory of all SVHC substances purchased by the Solvay legacy will be available by end 2013.

In the Rhodia legacy six CMR-classified substances were sold in 2012, as such or as mixtures. The risks associated with the production and the use of these substances are

well managed and controlled. The number of CMR present at each site with an identification of the business implementing the CMR (FAB, R&I, Lab control or maintenance) is known as well their use as either raw materials, intermediate isolated, non-isolated, waste final product, or "other" category for R&I lab and Maintenance. 29 different substances that are classified according to their criteria for the "red line" (CMR 1A or 1B or IARC group 1 or 2) were purchased for use in production at 25 industrial sites worldwide (raw materials, solvents or catalysts). The Rhodia legacy has also an inventory of products purchased for maintenance activities (in particularly petroleum derivatives) as well as substances used R&I which represents in total worldwide about 140 different substances used in pure or mixtures. The so-called "CMR red line" is a voluntary commitment and process implemented since 2006.

It is a specific procedure covering all substances used or placed on the market. It defines specific CMR classification rules to be used globally at its sites, with definitions that may vary from one country or one continent to the other. A substance classified in this process as CMR complies with both the CMR classification 1A and 1B of the European Union (CLP Regulation) and the classification of the International Agency for Research on Cancer (IARC) for groups 1 and 2A. The "CMR red line" requires from all sites:

- An inventory of CMR substances matching the Rhodia CMR definition;
- A systematic search for alternatives (> see 6.1.4 Product Stewardship);
- The control of risks associated with the manufacture or the use of these substances.

#### Substances of Very High Concern – Definition according to EU regulation

SVHC refers to substances put on the market or used as intermediate raw materials by Solvay and identified according to the SVHC definition in the frame of the application of the REACH regulation.

These substances are those which are:

- Carcinogenic, Mutagenic, or Toxic to Reproduction (CMR), meeting the criteria for classification in accordance with the new Regulation on Classification, Labeling, and Packaging of chemical substances and mixtures, the so-called "CLP" Regulation;

- Persistent, Toxic and Bioaccumulative (PTB) or very Persistent and very Bioaccumulative (vPvB) and classified as such according to the criteria of the REACH Regulation;
- Identified, on a case-by-case basis, through scientific evidence indicating to cause probable serious effects to human health or the environment of an equivalent level of concern as those above (e.g. substances classified as "endocrine disruptors").

In the framework of the authorization process of the REACH Regulation, Member States competent authorities or the European Chemicals Agency (ECHA), upon request of the European Commission, may prepare dossiers for the identification of SVHC.



**Substitution of substances of Very High Concern (SVHC)**

The remaining substances sold by the Solvay legacy classified as SVHC are raw materials such as monomers for which, by definition, no alternatives are available that could lead to their possible substitution in the production of these polymers. These substances are sold exclusively to professional customers that are fully aware and able to manage the associated risks.

In the Rhodia legacy, studies to find substitutes, or even decisions to stop producing or selling these substances, were undertaken and, over a seven years period, the number of substances classified as CMR decreased from 20 to 6.

In 2011, a multidisciplinary team was set up at corporate level in the Solvay legacy to address the so-called “Substances of Very High Concern” (SVHC). The role of this advisory team is to support the business to ensure a proactive and sustainable management of SVHC that are manufactured, imported, and placed on the market and/or used by Solvay. While providing recommendations to the business in defining their product strategy positioning, the team contributes to securing business continuity in respect to legal duties and the Group’s Responsible Care Global Charter® commitment.



### 6.1.4. Product stewardship

**Commitments:**

**To carry out product stewardship programs to contribute to the safe management of hazardous products throughout their lifecycles with a particular attention to products involving higher risks.**

**To take specific actions for products aimed at applications in direct connection to health, such as food.**

**To maintain a comprehensive understanding of each product's hazards, risks and impacts related to all life cycle steps and intended applications.**

Product Stewardship is the act of minimizing health, safety, environmental and social impacts, and maximizing economic benefits of a product and its packaging throughout all lifecycle stages. The producer of the product has the greatest ability to minimize adverse impacts, but other stakeholders, such as suppliers, retailers, and consumers, also play a role. Stewardship can be either voluntary or required by law. Product liability exposure is also reduced by Product Stewardship programs.

Risk management is of fundamental importance in the use of hazardous materials, and the voluntary Responsible Care Global Charter

Program finds practical application to product management in "Product Stewardship". This is also one of the key change introduced via the REACH regulation with the mandatory description of the precautions to be taken for the main scenario's of use of substances and the development of Chemical Safety Reports.

**Product stewardship is deployed along 10 management areas**

<b>PRODUCT KNOWLEDGE</b>	1. Comprehensive understanding of each product's hazards, risks and impacts related to its whole life cycle	> 6.1.1. Product compliance > 6.1.2. Supplying Product Safety information
	2. Identification of Substances of Very High Concern (SVHC), updating risk assessments and striving to substitute with safer alternatives when possible	> 3.5.3. Industrial hygiene standards > 6.1.3. Substances of Very High Concern (SVHC) and their substitution
	3. Establishing environmental profiles of products	> 6.2.1. Ecoprofiles of products
<b>PRODUCT INFORMATION MANAGEMENT</b>	4. Complying to product technical specifications by using high-performing quality assurance system	
	5. Ensuring Safety Data Sheets are sent to customers, and revised at least every 3 years	> 6.1.1. Product compliance
<b>INFORMATION AND PRACTICES DISSEMINATION</b>	6. Dedicated product stewardship programs addressing specific products and customers	> This section and 6.1.1. Product compliance
	7. Providing all necessary information to external stakeholders in the value chain	> 6.1.2. Supplying product safety information
	8. Making available ecoprofile data (information on the environmental footprint) of products	> 6.2.1. Ecoprofiles of products
	9. Safety during distribution of products	> 6.3.1. Transport of dangerous goods – Selection of transports and safety verification
	10. Recycling of end-of-life products	> 6.2.2. Product recycling

**A dedicated program for applications in health, feed and food**

The aim of the HealthCare, Food and Feed Risk Management (HCRM) is to avoid risks for user from substances used in healthcare, food and feed applications. This covers pharmaceutical uses, food, drinking water, food and drinking water contact, cosmetics, medical devices such as suture filaments, packaging of pharmaceutical and medical devices, etc.

Following dedicated risk management initiatives focused a.o. on biomaterials for human implants (Solviva®) a Solvay HCRM policy has been defined to improve the risk control for substances placed on the market for healthcare, food and feed applications. HCRM is part of the management systems of the Solvay legacy. The mapping is maintained and the systems under control.

**Product stewardship for essential chemicals**

The product stewardship program for peroxides is fully deployed and maintained so as to keep an adequate level of safety awareness at the customer level. A recent update of the multi-language training tool has recently been prepared. Products stewards have the responsibility to maintain the level of awareness of distributors and customers. A working group has been set up to coordinate with the product stewardship actions in place for chlorine.



## 6.2. Sustainable consumption

Solvay has the objective to be a global industrial model in sustainable chemistry, to enlarge its portfolio of products and reach markets supported by good sustainability perspectives. Acquiring Rhodia's portfolio was a step in this direction. The sustainability Product Management tool (SPM) evaluates the sustainability of the Solvay products in their applications.

For the existing products portfolio, Solvay supports customers in assessing and improving the full lifecycles of the finished products. Establishing the environmental profiles of products and taking an active role in recycling schemes are two key elements in this respect.

### 6.2.1. Ecoprofiles of products (PR1)

Solvay legacy

	2009	2010	2011	2012
Products with ecoprofile established	50%	95%	95%	95%

*Perimeter: Equivalent to Solvay legacy financial perimeter.*

*Legend: The advancement of the program is measured on the basis of the turnover of the concerned products.*

#### Commitment:

**To maintain a comprehensive understanding of each product's hazards, risks and impacts related to "cradle to gate" life cycle phases.**

**Extensive ecoprofiles are available for the largest part of products.**

**The target now achieved and defined in 2008 for products belonging to the Solvay legacy was to have ecoprofiles for:**

- Any existing major product;
- Any product with critical characteristics (in relation to sustainability);
- Any new product or process.

Some more extensive studies have also been obtained, for instance the calculation of the full environmental footprint of epichlorhydrin in the new Epicerol process (see box).

The limiting factor for the remaining products still lacking a full ecoprofile is often the difficulty of obtaining such data for the raw materials used to

produce them. These may be very diverse and of multiple origins, thus with no reliable data yet available from suppliers or regular databases.

In 2012, ecoprofile calculation was focused on completeness, and on adapting ecoprofiles following recent improvements in the international databases and improvements in Solvay manufacturing processes: better energy use, reduced emissions of specific substances, water consumption optimization, etc.

For Research and Innovation projects, a method to assess environment impacts is in use within the Rhodia legacy. The method covers each stage of a product's development in order to highlight at early stage the benefits and potential environmental risk of the product under study. (> See 1.3.3. *Sustainable Portfolio – Products contributing to Sustainability in key applications*).

#### Ecoprofiles and lifecycle assessments by Solvay

An ecoprofile is the inventory of selected environmental impacts of a product, from its raw materials down to the environmental impact resulting of the manufacturing steps ("cradle to gate" approach).

Ecoprofiles make possible wide internal benchmarking and wide publication of results through producers associations which usually aggregate the data into average, multi-manufacturers ecoprofiles.

Ecoprofiles are also used for Solvay's Sustainable Portfolio Management (SPM) assessments as input for the environmental impact of manufacturing (> See 1.3.1. *Sustainable Portfolio Management*).

Finally, ecoprofiles are typically used by customers to calculate Lifecycle Assessments (LCAs) of a given application made with our products.

#### Solvay embarks on world class platform on LCA methods

With LCA methods moving fast, how to remain at the forefront of LCA science?

Solvay has embarked on a high level of research platform worldwide on LCA methodologies, coordinated by Ciraig<sup>(1)</sup>, via a 5-year collaborative program 2012-2017 with 15 industry partners.

<sup>(1)</sup> CIRAIIG: Centre interuniversitaire de recherche sur le cycle de vie des produits, procédés et services, Canada.

This will enable the partners of the project to:

- Establish a long term contact-collaboration and benefit from world level expertise;
- Keep abreast of moves by frontrunners;
- Enrich their own sustainability assessment tools (SPM, Umberto, S3S, etc);
- Take better account of social impacts, biosourcing,...

#### A specific extensive study on the Epicerol process

Dedicated extensive studies have been performed to fully assess the environmental footprint of the new Epicerol process for the production of epichlorhydrin, from gate to gate. The Dutch TNO has peer reviewed this study and the underlying methodologies used by Solvay in the ecoprofile calculations.



## 6.2.2. Product recycling – (GRI EN2)

Contribution to the recycling at the end of lifetimes - Progress for key Solvay products

### Commitments:

**To develop and encourage new recycling technological processes: the strategy is to bring its know-how to the development of new or improved technologies.**

**To encourage the setting-up of waste management schemes involving collection, recovery and recycling of waste at regional and national levels.**

**To contribute in the reuse of secondary raw materials (urban mining, industrial ecology, bio-sourcing,...), taking into account the overall life cycle assessments.**

**Within the lifecycle of a product, Solvay is usually one player among others in the recycling initiatives and the management of the end of a product's lifetime. Quantitative indicators are difficult to establish due to the diversity of products, applications, stakeholders' initiatives and given the complex perimeters to be taken into account. Solvay has been proactive in developing recycling technologies and schemes related to its products and in promoting initiatives through various channels and in particular specialised federations initiatives.**

Solvay actively participates also within Plastics Europe in the initiative related to the challenges of plastic marine litter.

> See also 2.6.1. Renewable raw materials.

### 1. Chemicals recycled indirectly

Many of the main Solvay chemical products are consumed during their lifetime and can therefore not be recycled as such at the end of the product lifecycle. Some are indirectly

recycled, like soda ash, which is a significant constituent of glass ( $\pm 20\%$ ) and is indirectly recycled via the very efficient glass recycling schemes.

### 2. Vinyls applications

The VinylPlus campaign of the European Council of Vinyl Manufacturers (ECVM) includes an ambitious target of 800 000 t of PVC recycling per year by 2020, and other objectives relating to organochlorine emissions and additives in order to tackle further the sustainability

challenges for PVC. After being one of the initiators and catalysts of the Vinyl 2010 commitment of ECVM, the objectives of which were largely met (> see details on [www.vinyl2010.org](http://www.vinyl2010.org)) SolVin is again a key player in VinylPlus of the renewed 10 years commitment multi-partner program

for PVC in Europe. The VinylPlus program has set itself clear targets and deadlines allowing transparent progress monitoring. The General Manager of SolVin is also Chairman of VinylPlus. [www.vinylplus.eu](http://www.vinylplus.eu)

### London Olympics went green with VinyLoop!

The Olympic Games in London had to comply with sustainability commitments monitored by the organizing committee (LOCOG). Solvay Vinyls contributed to meeting this exceptional challenge with its VinyLoop® recycling technology for PVC composites.

Serge Ferrari (France) the global leader in architectural tarpaulins, and partner of VinyLoop Ferrara, delivered 80% of the PVC coated technical textiles used in London Olympics equipment. Among many others, this included venues like the Olympic stadium, the water polo

arena, the Royal Artillery barracks, and the emblematic Olympic pool being designed by the world renowned architect Zaha Hadid.

Romain Ferrari, CEO of the Serge Ferrari Group, declared: "This unique process jointly developed with Solvay provides a second life to vinyl textiles and makes them 100% recyclable".

Some of the equipment from the temporary London 2012 venues will be used in football stadiums currently under construction in Brazil for the 2014 FIFA World Cup. Others will be reused and converted into gym

mats for schools and the rest will be recycled at the VinyLoop® Ferrara plant.

Jo Carris, Learning Legacy Ambassador of the Olympic Games, declared: "The PVC policy focused attention on the use of PVC across the project and highlighted that the functional properties of PVC make it the most appropriate material in certain circumstances".



**3. Vinyloop**

**Solvay is engaged in VinyLoop®, as the only PVC producer with its own recycling activity.**

The VinyLoop plant operates its filtration based recycling process in Ferrara (IT) for the tenth year. In 2012, VinyLoop improved the efficiency of its production process, with significant savings in steam (-23%), energy consumption (-10%) and waste disposal (-29%). Important

results were also achieved in terms of health and prevention, as the plant has registered zero lost-day accidents per million of worked hours since May 2003. Its new anti-seismic protection system proved its worth during the May 2012 earthquake. Moreover, the process ISO 14404-44 compliant while the plant is REACH certified and fully complies with the European Regulations. Vinyloop also published in 2012 a White

Paper which explains recycling to manufacturers, retailers, policymakers and how the use of recycled PVC reduces the environmental footprint of their applications. Recycled PVC is recognized as a “textbook example” of how to cut natural resource use through recycling. Solvay is now looking to license the technology to third parties.



	2009	2010	2011	2012
PVC recycled - tons	3 100	3 600	5 600	4 701

*Perimeter: Equivalent to Solvay legacy financial perimeter. The advancement of the program is measured on the basis of the turnover of the concerned products.*

A recent lifecycle analysis (LCA) presented in the White Paper showed that PVC recycled via the Vinyloop process has a 72 lower water consumption, a 46% lower climate impact and a 39% reduced primary energy consumption than virgin PVC. > See [www.vinyloop.com](http://www.vinyloop.com).

**4. Recycling initiatives for polyamides**

**With its 4earth™ by Technyl® brand, Solvay is participating in the creation of innovative recycling outlets for various polyamide scraps.**

This move focusses major polyamide markets such those for automotive, sports and leisure, construction, textile and household appliances including post consumer ones, with the objective of offering its customers a high-performance recycled material under optimal conditions of security. The 4earth™ by Technyl® contract links together each partner in a closed loop in which each becomes a customer and supplier of the other. This allows for the first time to overcome three frequent obstacles to the recycled products market:

- its supply is guaranteed by sustainable sources provided by its partners
- the consistent quality of its recycled products is guaranteed, and finally
- long-term economic viability is ensured.

Other advantages of 4earth™ by Technyl® products include their technical competitiveness with non-recycled products and their environmental benefits, which are duly measured on a case by case basis by a Life Cycle Assessment method.

In 2010, the Rhodia legacy and its partners Renault, INDRA SAS / Re-source Industries, Steep and Mann+Hummel made also a commitment to create a polyamide recycling channel for end-of-life vehicles (ELVs). The partners have a common desire to work together for a circular economy and develop solutions that will contribute to reaching compliance with European regulatory requirements, which have set a minimum recycling and reuse rate of 95% for ELVs as of 2015.

The Rhodia legacy has designed an original catalytic process using a by-product from the polyamide chain that, until now, was burnt off. The conversion of this by-product into a

useful raw material helps optimize the use of petrochemical resources and reduce its environmental footprint.



**5. SOLVAir®**

**For the past 10 years, Solvay has developed the recycling of salt residues recovered from the use of sodium bicarbonate in waste incinerators to neutralize acidic flue gases - mainly hydrogen chloride (HCl) and sulfur dioxide (SO<sub>2</sub>).**

Effective over a wide temperature range, the process has been successfully implemented at many coal-fired power plants and other industries or waste incinerators in Europe. This service, originally

called Neutrec®, is now proposed by SOLVAir®. It takes back and purifies the salt residues in installations in France (Resolest®) and in Italy (Solval®) with capacities of respectively 50 kt and 30 kt/y. The recovered and purified sodium chloride is recycled as raw material in soda ash manufacturing, replacing “virgin” salt.

Used in air emission control, the reactivity of sodium bicarbonate BICAR® is high within a large moisture content and temperature

range. This is why SOLVAir bicarbonate process avoids water injection for cooling/conditioning purposes and reheating of the flue gas upstream of a catalytic DeNOx system (SCR). By saving steam or fuel for flue gas reheating, and by optimizing heat recovery, energy recovered from waste is boosted by SOLVAir process in comparison with other processes.

> See: [www.solvairsolutions.com](http://www.solvairsolutions.com)

**6. Sulfur hexafluoride (SF<sub>6</sub>) recycling**

**Solvay Fluor offers a worldwide recycling service for SF<sub>6</sub> in Bad Wimpfen (D) as well as in Onsan (South Korea).** The United Nations Framework Convention on Climate Change (UNFCCC) has recognized Solvay’s SF<sub>6</sub> recycling efforts and registered a particular SF<sub>6</sub> recovery and reclamation Clean Development Mechanism (CDM) project in South Korea.

SF<sub>6</sub> is a highly efficient, highly valued insulating gas for medium and high voltage equipment. It is chemically inert, non flammable, non toxic, and non corrosive. SF<sub>6</sub> allows simplified design of switchgears mainly because of size reduction, quiet, and reliable handling and maintenance. As SF<sub>6</sub> has a very high Global Warming Potential (GWP), its emissions must be carefully avoided.

The quantity reclaimed in 2012 are higher as compared to 2011 but quantities are no more communicated for business confidentiality reasons.

**7. Fluorinated / Chlorinated hydrocarbons (CFCs, H-CFCs, HFCs) recycling**

**Solvay Fluor also offers a recovery service through a dedicated high temperature destruction facility in Frankfurt (D) of CFCs and H-CFCs gases which have an Ozone Depletion Potential and also a relatively high Global Warming Potential (GWP).** Due to their impact on the environment, these substances were regulated

and their emissions should be avoided. To this end, this unique installation is operated in line with the requirements of the European Union waste directive to produce secondary raw materials – hydrofluoric and hydrochloric acids – that are recycled in industrial processes. Globally, CFCs quantities are declining. Hydrocarbons shares is increasing

coming from fridge disposal as well a HFCs share. On the longterm, it can be expected that HFCs will be more and more recovered (also blends), reclaimed and sent back to the market, because shortage on virgin HFCs material due to the phase down of their production.

	2010	2011	2012
Recycling of fluorinated hydrocarbons (CFCs / HCFCs / HFC mixtures) - tons	300	550	450



**8. Sulfuric acid recycling**

**The Eco Services business is focused exclusively on North America where it is the market leader in producing and regenerating sulfuric acid, one of the most widely used chemicals in the world.**

Eco Services’ network of eight production units at six sites collectively service more than 50 percent of the 2.3 million ton sulfuric acid regeneration market in North America. The key customers for Eco Services’ regeneration business are petroleum refineries, which utilize

a high-strength sulfuric acid as a catalyst in the production of alkylate, a high-octane component of gasoline. Refinery-used or “spent” sulfuric acid is transported to Eco Services sites where it is regenerated in high-temperature furnaces. Fresh, regenerated sulfuric acid is then transported back to the refining customer for re-use in a continuous, sustainable cycle. The major refining customers are located along the U.S. Gulf Coast, West Coast and Mid-West regions, as well as in Canada.

**9. Rare earths recycling**

**Solvay has recently opened two rare earth recycling units in France for the recovery of rare earths contained in end-of-life equipment such as low-energy light bulbs, batteries or magnets with an initial focus on low-energy light bulbs because the recovery channels already exist.**

Launched in 2007, this project required two years of R&I followed by two years of industrialization studies and site selection. These light bulbs are rich in six different rare earths – lanthanum, cerium, terbium, yttrium, europium and gadolinium – which Solvay is now in a position to recycle while preserving 100% of the functional properties. of the rare earth concentrate obtained from its partners specializing in the magnets’ recycling.

Solvay has also partnered with Umicore to recycle rare earths from nickel metal hydride (NiMH) rechargeable batteries which equip portable applications, hybrid electric vehicles, etc. A third part of the project is focused on the recycling of the rare earths contained in magnets, components largely used in windmills, electric vehicles and hard disks to reformulate the neodymium, the praseodymium, the dysprosium and the terbium, four rare earths contained in these magnets.

**“Nothing is lost...Everything is transformed!”**

Following the massive success of its first edition, within the GBU Special Chemicals, the Chemical Business Deployment group (CBD) has launched a new Seeds for Growth challenge on the theme is: “How to use chemicals in order to valorize or recycle industrial by-products and waste?”

What they expect is to gather ideas about recycling submitted through Innoplace, the Solvay Intranet site for innovative ideas. Meetings to

stimulate the generation of ideas -a key step for this initiative- are already being organized on the various sites of the GBU.

Now more than ever, let’s recycle and transform ideas into business projects.

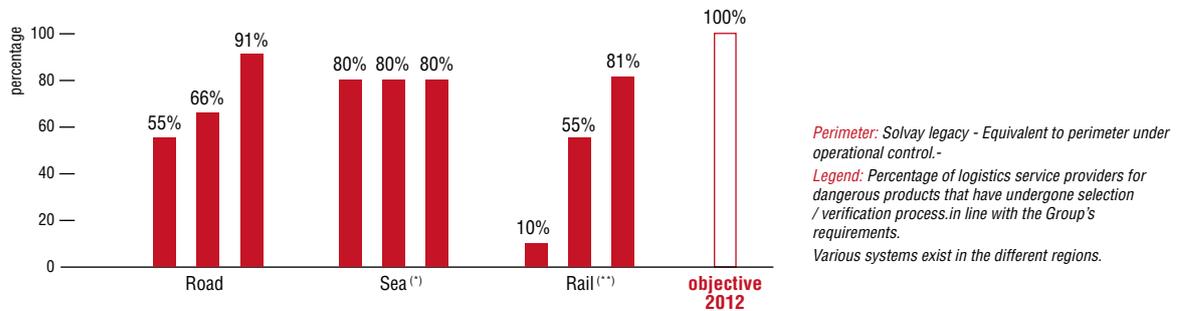


## 6.3. Transport and purchasing

Safe transport is a key aspect of product stewardship, in particular for dangerous goods that involve potential risks for human health and the environment. Safety measures for transport start from the loading of the products. Most of the transport of raw materials and end products is contracted out. Key safety elements taken into account are the selection of transporters and transport routes (road - sea - air) and the prevention, and when occurring, monitoring of accidents in order to take appropriate corrective measures. Solvay is member of a worldwide service which gives immediate support to mitigate the potential consequences of an emergency during the transport and use of its products.

### 6.3.1. Transport of dangerous goods - Safety verification

Selection / safety verification of logistics service providers for Solvay dangerous products (Transporters & storages - World assessment), 2012



#### Commitment:

**To use logistic service providers on the basis of audits schemes selected by the Group, and use containers and packaging that are appropriate for the transported products, in compliance with testing and certification requirements.**

**The target defined for the Solvay legacy for end 2012 was that all providers of logistics services for dangerous goods had to be selected using recognized selection schemes or audit systems. Since 2006, the figures show a good and regular progress towards the objective. In 2012, above 80% (90% for road transport) of Solvay's logistics service providers, encompassing most transport modes worldwide, undergo assessments of their HSE management.**

**The business units of the Rhodia legacy also pay very particular attention to the choice of carriers, relying on the data from the European Chemical Industry Council (CEFIC).**

As this is an ongoing process, it is progressively extended to all new logistical activities involving dangerous products.

In the framework of Rhodia legacy's Sustainable development practices, when selecting new suppliers, the Rhodia Purchasing department used a questionnaire for the assessment of their sustainable development and CSR practices. A yearly performance evaluation process has been defined for a worldwide deployment.

With regard to maritime and river transport of bulk liquid chemicals (and butadiene in gas form), the Rhodia legacy applies "vetting", ensuring checks in addition to those performed by flag states, ship-owners, and classification societies.

For maritime shipment of containers, isotanks and chemical tankers, the Rhodia legacy has a vessel geolocation system. In case of accident, a real-time information system also makes it possible to know rapidly if Rhodia' products are involved through identification of the containers and to give access to the appropriate information to both the maritime company and the response services.



**Assessment of transporters based on existing recognized systems**

Suppliers of logistics services, in particular transporters, are key actors in building safe value chains. To assess their performance and select them, Solvay legacy performs surveys or relies on existing recognized systems such as the European Safety Quality Assessment System (SQAS), the Chemical Distribution Institute (CDI), the Health, Safety, Environment, and Quality assessment systems of the Brazilian Association of Chemical Industry (SASSMAQ), the Road Safety Quality Assessment Safety (RSQAS) for the road transport in China or the European Barge Inspection Scheme (EBIS) schemes.

**Road**

- Assessments are organized on a worldwide scale for the large majority of road transporters and are developed systematically for each new business.

**Sea**

- For bulk sea transport of dangerous products (liquids and gas), Solvay has developed its own rating system based on the CDI reports, for fixing at worldwide level all the sea bulk transporters transporting its products.

- For dry products and containers' shipments, Solvay relies on the Port State Control (PSC) system, avoiding ships that have been detained in the past three years.

**Rail**

- For rail transport, Solvay has to rely on the railway companies which have their own safety management systems and audits.

**6.3.2. Accidents during transport (GRI EN29)**

Incidents during transport, loading, and unloading of Solvay products

	2010	2011	2012
Significant	28	20	41
Serious	5	7	6
Total	33	27	47

*Perimeter: Equivalent to manufacturing perimeter under operational control - 2010 and 2011: Solvay legacy only.*

*Legend: The reported events are the incidents that occurred at Solvay premises or those that have been reported by transporters and third parties to Solvay. Transport accidents reported by Solvay encompass accidents occurring all along the logistics chain (from the shipping site to customers or to the disposal sites in the case of waste) and for raw materials when Solvay is the charterer.*

**Commitment:**

**To prevent process and transport incidents with potential impact on people, environment, equipment and assets thanks to effective risk assessment and control.**

**28 accidents (8 classified as High Severity, 18 as Medium Severity) were reported in 2012. Programs have been carried out and are under way to further improve transport safety, notably through implementation of the Cefic guidelines on best practices in transport and logistics operations, in dialogue with Solvay's logistic service providers. One of the most serious accidents was when a truck driver lost control of his vehicle which crashed into a cliff. The driver was killed, the co-driver was seriously injured and 3360 kg of product leaked from the tanker.**

The analysis of the reported transport accidents shows that more than 50% of accidents continue to occur during transport, and mainly during road transport (overturning, collision, other). The other portion of accidents occurred during loading and unloading operations (none respect of procedures, overfilling of tanks, rupture of flexible hoses,...)

Future work/improvement will consists in:

- Developing standardized methods for risk assessment of transport operations involving dangerous goods;
- Analyzing more systematically the root causes of all high severity transport accidents (as defined by the classification grid);

- Further Developing Lessons Learning Events to avoid the reoccurrence of such accidents elsewhere;
- Putting in place training programs more focused on corrective actions to be deployed, following the reporting analysis;
- Implementing a controlling program of safety barriers in place for loading and unloading operations.



**Accident prevention**

The main preventive actions to avoid accidents and mitigate consequences are:

- regularly auditing the loading and unloading stations and transport units at the sites;
- developing and applying technical standards for the transport of products presenting specific risks;
- using logistic service providers selected on the basis of audits schemes, and using containers and packaging that are appropriate

for the transported product, in compliance with testing and certification requirements, and free of leaks or any other visible defect;

- regularly training for persons involved in logistics operations involving dangerous goods;
- developing product stewardship programs to ensure the safe manufacture, distribution use, and disposal of dangerous products;
- reporting and analyzing all distribution accidents;

- subscribing to the Carechem24 (and Chemtrec in the US) worldwide service, allowing any caller anywhere in the world to get a telephone response and technical advice in his/her language in case of an emergency, 24 hours a day, 7 days a week. Phone numbers to be used are displayed in the Safety Data Sheets and on the transport documents and labelling.

**6.3.3. Purchasing and suppliers selection**

Continued integration of our suppliers to the CSR approach

The Procurement Function continues to implement long-lasting and responsible relationships with their suppliers, via information campaigns, regular interactions, training, evaluations and innovations, in-line with socially and environmentally responsible principles established by Solvay Way®.

**Responsible practices continuity in the Group**

For each tender, suppliers are qualified, selected and evaluated with one single methodology across the world. This methodology grades suppliers from 1 to 4, both specifically and globally and taking into account 5 axes: competitiveness, quality and security, products and services risks, innovation and strategic relationships, and CSR.

CSR dimension is evaluated by questionnaires and/or audits specific to purchasing domains (raw material, packaging, logistics,...) and cover the following themes: working relationship and social practices, hygiene and security policy, commercial practices, environmental policy.

**Solvay Purchasing Process**

Sustainability is an integral part of the Solvay Group strategy, as a source of long-term value, which has been structured with a continuous progress approach. The Solvay Way Corporate Social Responsibility (CSR) framework is integrated into the Solvay Purchasing Process.

**Together for Sustainability**

An novel approach of joint assessments and shared audits has been launched by six major chemical companies including Solvay: "Together for Sustainability" (TfS). This approach consists of using a best in class external service provider who performs sustainability assessments\* and of prequalified audits companies who do standardized physical site audits on behalf of the different member companies in order to simplify relation with chemical suppliers. For compliance and strategic reasons every single member company remains completely responsible to define a specific and confidential action plan.

In this context Solvay runs over 250 assessments per year targeting mainly raw materials and major suppliers for all others domains in all countries.

\*If you wish to learn more about the assessments: [www.ecovadis.com](http://www.ecovadis.com)

**Selecting suppliers in a CSR perspective**

To select other types of suppliers, Solvay, with a group of five German companies, is currently evaluating, a future participation in Ecovadis, a company active in the assessment of suppliers of all kinds in a CSR perspective. EcoVadis "operates the first collaborative platform, allowing companies to assess the environmental and social performance of their suppliers on a global basis."

For suppliers of biosourced raw materials, other approaches are used.

> See 2.6.1 Renewable Raw Materials.



# Addendum

## Reporting boundaries, definitions and assumptions

### Energy, Greenhouse gas and environmental emissions monitoring and reporting – Definitions and assumptions.

“Reported data correspond to the current (2012) boundaries of the Group including for previous years, thus integrating the Solvay and Rhodia legacies for all years, except otherwise mentioned.”

#### Definition of indicators for energy

The energy consumption has three components:

- Primary fuels (Coal, gas, fuel oil...). The primary fuels purchased are used:
  - To produce internally steam and electricity;
  - In manufacturing processes (coke in lime kiln / gas in pyrolysis furnaces,...);
- Steam purchased;
- Electricity purchased.

These three components are converted in primary energy, in order to get the total energy consumption in Gigajoules (GJ), with the following conventions:

- Fuels using net calorific value;
- Steam purchased assuming an efficiency of 90% for its generation;
- Electricity purchased: (IEA source) 3.6 GJ/MWh and 39.5% generation efficiency in average of all types of power production except nuclear power (33%).

#### Definition of indicators for Greenhouse gases (GHG) (scope 1 + 2)

The GHG emissions reported by Solvay correspond to the scope of the Kyoto Protocol and comprise the following compounds / compound families: CO<sub>2</sub> / N<sub>2</sub>O / CH<sub>4</sub> / SF<sub>6</sub> / HFCs and PFCs. The impact on climate change (expressed as teq CO<sub>2</sub>) is calculated using their respective Global Warming Potential (GWP) potentials (as defined by the IPCC) and taking further into account:

- The direct emissions for each GHG released from Solvay's industrial activities (Scope 1 of Kyoto Protocol);
- The indirect emissions of CO<sub>2</sub> linked with the steam and electricity purchased externally (Scope 2 of Kyoto Protocol);

- Convention adopted for emissions related to acquired electricity: the emission factor specified in the supply contract or the one of the power supplier if it is not defined in the contract. In case of no publication by the power supplier, the national mix production per country is applied.

#### Definition of indicators used to monitor the environmental performance related to emissions of pollutants to air / water

The main indicators used to assess the environmental impact of Solvay's manufacturing activities are: climate change (Kyoto and non-Kyoto GHG, teq CO<sub>2</sub>), (stratospheric) ozone depletion (teq CFC-11), (tropospheric) photochemical ozone creation (teq NMVOC), eutrophication (teq PO<sub>4</sub>) and acidification (teq SO<sub>2</sub>). These main impact categories are internationally recognized and calculated using the characterization factors published by ReCiPe, which is a compendium of opposable databases from the IPCC (International Panel on Climate Change), WMO (World Meteorological Organization), SETAC-UNEP,...

Besides those 5 main impact indicators, Solvay publishes emission data related to specific pollutants and pollutant families.

Additional indicators (compartment “air”):

- Dust (t)
- Sulfur oxides (SO<sub>x</sub>), t
- Nitrogen oxides (NO<sub>x</sub>), t
- Non Methanic Volatile Organic Compounds (NMVOC), t

Additional indicators (compartment “water”):

- Chemical Oxygen Demand (COD), t O<sub>2</sub>
- Total Nitrogen (TN), t
- Total Phosphorous (TP), t
- Heavy metals (sum of the metals As, Cd,



More information

Note de dossier TRP 2012.5054, K. Vermeiren, 20.12.2012

NOTICE TRP 2011-111  
J.-P. Perrot 22-12-2011

Cr, Cu, Hg, Ni, Pb and Zn recorded in the E-PRTR pollutant list).

**Remark: key Performance Indicators (KPI's)** are used internally to monitor a series of main Solvay productions. For the production of PVC, for example, a set of indicators is computed and followed: they are expressed as relative (i.e. per ton of PVC produced) consumptions and/or emissions. The KPI's are used to benchmark individual Solvay plants with Best Available Technique (BAT) -AEL (BAT Associated Emission Levels), described in Europe's BAT Reference (“BREF”) documents or voluntary commitments (e.g. the PVC Charters of the European Council of Vinyl Manufacturers (ECVM) or the Vinyl 2010 Commitment).

#### Perimeter of activities consolidated in the energy and environmental reporting

Reported data correspond to the current (2012) boundaries of the Group including for previous years, thus integrating the Solvay and Rhodia legacies for all years, except otherwise mentioned.

The perimeter covers all sites with manufacturing activities belonging to the financial perimeter of the Solvay group. Indeed, in order to better link environmental performance to business results, our environmental reporting perimeter has been aligned to the financial consolidation perimeter (> *See Annual Report*): environmental performance is reported to the extent the activity is included in the financial consolidation. Therefore, companies classified as “discontinued operations” and companies consolidated under the equity method are no longer included in the environmental reporting scope (while previous Sustainability Indicators Report included all sites under operational control ie sites under operational control of Solvay - in the environmental reporting perimeter).



The main sites belonging to the operational perimeter but now excluded from this public reporting perimeter are Devnya (BG), Curitiba (BR), Bahia Blanca (AR), Santo André (BR).

In addition, since 2012, the reporting of most environmental data (all emissions to air and water as well as industrial wastes) has been brought down to the business level inside each multi-business production sites. At the end of 2012 and taking into account the integration between the Solvay and the Rhodia Legacies, the Group counts 189 reporting entities (i.e. combinations of sites and businesses), covering 137 manufacturing sites.

### Comparability at constant perimeter: coping with the changing perimeter of the Solvay group since 2006

#### Trends in % as compared to 2006 (at constant activity perimeter)

Performance is communicated in absolute figures and in % in comparison to reference 2006 "at constant activity perimeter".

This means that trends are reported after yearly corrections to take into account the changes in the Group's activities. Reported data correspond to the current (2012) boundaries of the Group. Performance of all past years have been recalculated to integrate Rhodia's operations acquired in 2011 and exclude companies classified as "discontinued operations" and companies consolidated under the equity method. As general rules:

- **Sold sites** are removed for all years, because selling a site does not result in real progress in environmental performance.
- **Newly acquired sites** are added retroactively for all years prior to their acquisition, on the basis of real or estimated data:
  - If available, the 2006 data of the acquired activity (and subsequent years) are used;
  - If these data are not available, the Solvay 2006 average for this type of activity (if available) is used as reference for 2006 for the acquired activity;
  - In case of activities for which no Solvay reference exists, a case by case approach is used.
- **Operations discontinued** on sites after 2006, but that remain property of the Group (i.e. which are not sold) remain included in the "baseline" (data for the reference year 2006). Indeed, their productions have generally been transferred to more efficient (from an environmental viewpoint) production units of the Group, so contributing to an overall reduction of the Groups impact.

- **Other inclusion criteria:** Newly acquired plants are subject to environmental reporting not later than two years after their full integration into the Solvay group (adoption of its monitoring and reporting requirements). For energy consumptions, the process is described hereafter: If, after a transfer of operations or acquisition of an activity, a site meets the inclusion criteria, it is included in the reporting perimeter as of the 1<sup>st</sup> January following a 6 month period starting at the date the criteria are met. In other words, if a site meets the inclusion criteria before the 1<sup>st</sup> July, it is included as of the 1<sup>st</sup> January of the following year, but if the inclusion criteria are met later, the site is included as of the 1<sup>st</sup> January of the second year following the date of status change. This delay is necessary to inform all the concerned persons involved in the reporting process, to implement the needed measures and to check if it works correctly.

#### Performance in absolute figures (Historical perimeter)

This includes all production sites in the financial perimeter of each considered reporting year regardless of the situation of each site in 2012 (active, closed, sold...).

#### Taking changing production volumes into account

- The trend graphs show the progress achieved since the reference year 2006. To take into account the changes in production volumes since then, the % represents the ratio - expressed as a percentage - of the "real" emissions for that year to the "expected" emissions if the environmental performance had been that of 2006. These "expected" emissions are obtained by correcting the 2006 emissions for variations in production volumes. This allows to avoid, for example, to attribute the reduced footprint of the Group in 2009 to a real environmental progress, whilst this was caused by a drop in activity due to the general economical down-turn)
- To take these variations into account:
  - For a number of high volume businesses, the production volumes of a given product taken as reference for that business is used (for example, for a site producing PVC, the baseline is calculated as explained above, but using the quantity of vinyl chloride volumes as the reference product representative for PVC production).
  - In other cases, the total production volumes at the business level. For the Rhodia legacy, the total production volumes for each business (Acetow, Aroma Performance,...) have been

used to normalize the emissions for each of the entities belonging to that business.

#### Indicators presented: Greenhouse gas emission index, "Energy index", etc.

- **"Greenhouse gas emission index" / "Emission trend at constant (corrected) activity perimeter since 2006" / "Energy index":** comparison to baseline year 2006 after corrections for acquired and sold sites and for changing production volumes from year to year.
- **"Emissions in ton" / in Mtons / "in tons equivalent" / "Energy consumptions":** Emissions / energy consumptions without corrections, ie as they really were in for the perimeter of the Group in the given year and without correction of production volumes of that year.

#### Reporting boundaries for other parameters

For most of the parameters other than Energy, Greenhouse Gases and environmental emissions, the perimeter also corresponds to the perimeter of the Group.

The consolidation of data and their publication are still evolving and, for some of them, the covered scope is different or part of the overall Group. Nevertheless, they are aimed at reasonably reflecting its overall performance. The rationale is to cover the most pertinent perimeter, in line with the materiality requirements of the Global Reporting Initiative (GRI) guidelines.

The perimeters covered are mentioned for each parameter, in the legend of the figures. Data are sometimes not available for previous years or for a given parameter. They are then supplied to the best of Solvay's knowledge and in function of the capabilities of the existing reporting systems. For most parameters, the perimeter adopted for previous years is the Historical perimeter = the perimeter of each considered reporting year, regardless of the situation of each site/activity in 2012 (active, closed, sold, etc).



Aspects	Reference	Basic Indicators	Correspondance to Global Compact Principles	Indicators	SOLWAY	
STRATEGY & ANALYSIS	1.1	• Ongoing commitment to the GC	See the table of concordance with the principles of the UNGC on p. 136	Chairman's Statement	SOLWAY SUSTAINABLE DEVELOPMENT REPORT 2012 p. 4-7	
	1.2	• Ongoing commitment to the GC		Key impacts, risks, and opportunities	SOLWAY ANNUAL REPORT 2012 p. 129-140	
PROFILE OF THE ORGANIZATION	2.1	No specific COP requirement		Company name	Cover and back cover	
	2.2	No specific COP requirement		Principal brands, products, and services	pp.116-123	
	2.3	No specific COP requirement		Operational structure	p.142	
	2.4	No specific COP requirement		Location of head office (headquarters)	p.142	
	2.6	No specific COP requirement		Nature of ownership and legal form	p.142	
	2.8	No specific COP requirement		Company size		
	2.9	No specific COP requirement		Significant changes in the reporting period	p. 30, pp.124-125	
	2.10	No specific COP requirement		Awards received in the reporting period		
	3.1	No specific COP requirement		Reporting period	p.30, pp.124-125	
	3.2	No specific COP requirement		Date of previous report	p.30	
REPORT PARAMETERS	3.3	No specific COP requirement		Reporting cycle	p.30	
	3.4	No specific COP requirement		Contact persons		
	3.5	No specific COP requirement		Process for defining report content, materiality, and priority	pp. 29, 30, 31	
REPORT PARAMETERS	3.6	No specific COP requirement		Boundary of the report	pp.124-125	
	3.7	No specific COP requirement		Any limitations on the boundaries of the report	pp.124-125	
	3.8	No specific COP requirement		Basis for reporting on joint-ventures	pp.124-125	
	3.9	No specific COP requirement		Data-measurement techniques and bases for the calculation of quantitative data	pp.124-125	
	3.10	No specific COP requirement		Explanation of the consequences of any changes in the boundaries of the report	pp.124-125	
	3.11	No specific COP requirement		Consequences of the changes in boundaries	pp.124-125	
	GRI content index	3.12	No specific COP requirement		Location of required information in the report	pp.126-127
		Assurance	3.13	No specific COP requirement	External validation by independent bodies	pp.128-129



GOVERNANCE, COMMITMENTS, AND ENGAGEMENTS						
Governance	4.1	Actions taken to implement Principles 1-10	Governance structure			p.141-162
	4.2	Actions taken to implement Principles 1-10	Chairman's independence from the Board of Directors			p.147-151
	4.3	Actions taken to implement Principles 1-10	Independence of the members of the Board of Directors			p.147-151
	4.4	Actions taken to implement Principles 1-10	Mechanisms for shareholders and employees to provide recommendations or instructions to the Board of Directors			p.147-153
	4.5	Actions taken to implement Principles 1-10	Link between the organization's performance & remuneration for the board members, senior managers, and executives			p.155-158
	4.6	Actions taken to implement Principles 1-10	Processes introduced by the Board of Directors to ensure conflicts of interest are avoided			p.147-153
	4.7	• Actions taken to implement Principles 1-10	Assessment of the qualifications and expertise of members of the Board of Directors for guiding in economic, social, and environmental matters			p.161
	4.8	Actions taken to implement Principles 1-10	Mission, values, and codes of conduct; and their implementation			pp.14-15
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	4.11	Actions taken to implement Principle 7	Position regarding the precautionary principle and its application			pp.6-17
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	4.16	Sharing the COP with the Company's Stakeholders	Approaches to dialogue with the stakeholders			p.29
	4.17	Sharing the COP with the Company's Stakeholders	Stakeholders' concerns			pp.10-12
Economic performance	EC1	• No specific COP requirement	Economic value generated and distributed			p.37
	EC2	• Actions taken to implement Principle 7	Financial implications, risks and opportunities due to climate change			CDP reporting <sup>(*)</sup>
	EC3	• No specific COP requirement	Coverage of the organization's defined benefit plan obligations			
	EC5	Outcomes from implementing Principle 1	Range of ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation			pp.18-19
	EC6	• No specific COP requirement	Policy, practices and proportion of spending with locally-based suppliers			
	EC7	• Actions taken and outcomes from implementing principle 6	Procedures for local hiring, proportion of senior management recruited locally			
	EC8	• No specific COP requirement	Involvement in developing infrastructure and services benefiting society as a whole			
	EC9	• No specific COP requirement	Understanding and describing significant indirect economic impacts, including the extent of impacts			p.37
	Market presence					
Indirect economic impacts						

△ Gaps in numbering are due to indicators that are not included, because they are irrelevant for our activities or not available. <sup>(\*)</sup> CDP = Carbon Disclosure Project



Aspects	Reference	Basic Indicators	Correspondance to Global Compact Principles	Indicators	SOLVAY SUSTAINABLE DEVELOPMENT REPORT 2012	SOLVAY ANNUAL REPORT 2012
MANAGEMENT APPROACH AND PERFORMANCE INDICATORS	Materials	EN1	Outcomes from implementing Principle 8	Materials used by weight or volume (Materials consumed)		
		EN2	Outcomes from implementing Principles 8 and 9	% of materials used that are recycled input materials (Materials recycled)	pp.66-71, 117-120	
	Energy	EN3	Outcomes from implementing Principle 8	Direct energy consumption by primary energy source	pp.55-56	
		EN4	Outcomes from implementing Principle 8	Indirect energy consumption by primary source	pp.55-56	
		EN5	Outcomes from implementing Principles 8 and 9	Energy save due to conservation and efficiency improvements (Energy savings)	pp.55-58	
	Water	EN6	Actions taken to implement Principles 8 and 9	Initiatives to provide energy-efficient or renewable energy based products and services, and reductions in energy requirements as a result of these initiatives (Use of renewable forms of energy)	pp.55-58	
		EN8	Outcomes from implementing Principle 8	Total water withdrawal by source	pp.68-70	
	Biodiversity	EN10	Outcomes from implementing Principles 8 and 9	% and total volume of water recycled and reused		
		EN11	Outcomes from implementing Principle 8	Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas. (land areas used, and effects on biodiversity)	p.73	
		EN12	Outcomes from implementing Principle 8	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas	p.73	
EN13		Outcomes from implementing Principle 8	Habitats protected restored	p.73		
EN16		Outcomes from implementing Principle 8	Total direct and indirect greenhouse gas emissions by weight	p.73		
Emissions, Effluents, and Waste	EN17	Outcomes from implementing Principle 8	Other relevant indirect greenhouse gas emissions by weight	pp.56-58		
	EN18	Actions taken and outcomes from implementing principles 7, 8 and 9	Initiatives to reduce greenhouse gas emissions and reductions achieved	pp.56-58		
	EN19	Outcomes from implementing Principle 8	Emissions of ozone-depleting substances by weight	pp.56-58		
	EN20	Outcomes from implementing Principle 8	NO <sub>2</sub> , SO <sub>2</sub> , and other significant air emissions by type and weight	p.59		
	EN21	Outcomes from implementing Principle 8	Total water discharge by quality and destination	pp.61-63		
	EN22	Outcomes from implementing Principle 8	Total weight of waste by type and disposal method			
Products & services	EN23	Outcomes from implementing Principle 8	Total number and volume of significant spills	pp.67-68		
	EN24	Outcomes from implementing Principle 8	Weight of transported, imported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I,II,III, and VIII, and percentage of transported waste shipped internationally			
	EN26	Actions taken to implement Principles 7, 8 and 9	Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation			
Compliance	EN27	Outcomes from implementing Principles 8 and 9	% of products sold and their packaging materials that are reclaimed by category			
	EN28	Outcomes from implementing Principle 8	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations			
Transport	EN29	Outcomes from implementing Principle 8	Significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting members of the workforce		pp.139-140	
	EN30	Actions taken and outcomes from implementing principles 7, 8 and 9	Total environmental protection expenditures and investments by type	p.122		

△ Gaps in numbering are due to indicators that are not included, because they are irrelevant for our activities or not available.



Indicator	Specific COP requirement	Findings	Details	Page
LABOR PRACTICES & DECENT WORK	LA1	• No specific COP requirement	Total workforce by employment type, employment contract, and region, broken down by gender	p.75
	LA2	• Outcomes from implementing Principles 6	Total number and rate of new employee hires and employee turnover by age group, gender, and region	pp.76-77
	LA4	• Outcomes from implementing Principles 3	% of employees covered by collective bargaining agreements	p.82
	LA6	• Outcomes from implementing Principle 1	% of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs	
	LA7	• Outcomes from implementing Principle 1	Rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender	pp.88-89, 91-92
	LA8	• Actions taken to implement Principle 1	Education, training, counseling, prevention, and risk-control programs in place to assist workforce members, their families, or community members regarding serious diseases	pp.85-86, 92
	LA10	• No specific COP requirement	Average hours of training per year per employee by gender, and by employee category	p.78
	LA11	• No specific COP requirement	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings	p.78
	LA12	• No specific COP requirement	% of employees receiving regular performance and career development reviews, by gender	p.83
	LA13	• Outcomes from implementing Principle 1 & 6	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity	pp.80-81
	LA14	• Outcomes from implementing Principle 1 & 6	Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation	
	HR1	• Outcomes from implementing principles 1, 2, 3, 4, 5, and 6	% and HC of significant investment agreements and contracts that include clauses incorporating human rights concerns, or that have undergone human rights screening	
	HR2	• Actions taken and outcomes from implementing Principles 1, 2, 3, 4, 5 and 6	% of significant suppliers, contractors, and other business partners that have undergone human rights screening, and actions taken	
	HR3	• Outcomes from implementing principles 1, 2, 3, 4, 5, and 6	Total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained	p.98
HR4	• Actions taken and outcomes from implementing Principles 1, 2 and 3	Total number of incidents of discrimination and corrective actions taken		
HR5	• Actions taken to implement Principles 1, 2 and 3	Operations and significant suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and actions taken to support these rights		
HR6	• Actions taken to implement Principles 1, 2 and 5	Operations and significant suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor		
HR7	• Actions taken to implement Principles 1, 2 and 4	Operations and significant suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor		
▷ Gaps in numbering are due to indicators that are not included, because they are irrelevant for our activities or not available.				



Aspects	Reference	Basic Indicators	Correspondance to Global Compact Principles	Indicators	SOLWAY
<b>HUMAN RIGHTS</b>	Security practices	HR8	Outcomes from implementing Principles 1 and 2	% of security personnel trained in the organization's policies or procedures concerning aspects of human rights that are relevant to operations	SUSTAINABLE DEVELOPMENT REPORT 2012
	Indigenous rights	HR9	Actions taken and outcomes from implementing Principles 1 and 2	Total number of incidents of violations involving rights of indigenous people and actions taken	SOLWAY ANNUAL REPORT 2012
	Assessment	HR10		% & HC of operations that have been subject to human rights reviews and/or impact assessments	
	Remediation	HR11		Number of grievances related to human rights filed, addressed and resolved through formal grievance mechanisms	
<b>SOCIETY</b>	Local communities	S01	No specific COP requirement	% of operations with implemented local community engagement, impact assessments, and development programs	
		S10		Prevention and mitigation measures implemented in operations with significant potential or actual negative impacts on local communities	
		S02	Outcomes from implementing Principle 10	% & HC of business units analyzed for risks related to corruption	
	Corruption	S03	Outcomes from implementing Principle 10	% of employees trained in organization's anti-corruption policies and procedures	
		S04	Actions from implementing Principle 10	Actions taken in response to incidents of corruption	
	Public policy	S05	Actions taken to implement Principles 1 - 10	Public policy positions and participation in public policy development and lobbying	p.107
<b>PRODUCT RESPONSIBILITY</b>	Anti-competitive behavior	S06	Outcomes from implementing Principle 10	Total value of financial and in-kind contributions to political parties, politicians, and related institutions by country	
		S07	No specific COP requirement	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes	
	Compliance	S08	No specific COP requirement	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations	
	Customer health & safety	PR1	Actions taken and outcomes from implementing Principle 1	Lifecycle stages in which health and safety impacts of products and services are assessed for improvement, and percentage of significant products and services categories subject to such procedures	
	Product & service labeling	PR3	Actions taken and outcomes from implementing Principle 8	Type of product and service information required by procedures, and percentage of significant products and services subject to such information requirements	
	PR4	Outcomes from implementing Principle 8	HC of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes		
	PR5	No specific COP requirement	Practices related to customer satisfaction, including results of surveys measuring customer satisfaction		

△ Gaps in numbering are due to indicators that are not included, because they are irrelevant for our activities or not available.



## Making the UN Global Compact - GRI connection

Information regarding the implementation by Solvay of the ten principles of the United Nations Global Compact can be found using this table of concordance.

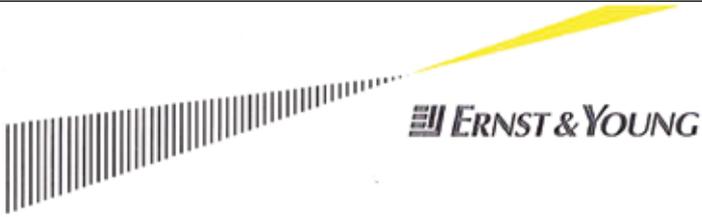


In 2012, Solvay renewed its annual Communication on Progress (COP), about implementation of the ten principles of the Global Compact Charter on supporting the broad UN development goal. 24 criteria of the advanced reporting level are still met. Solvay is consequently classified as a “Global Compliance Advanced” Company.

Issue Areas	GC Principles		Relevant GRI indicators
Human rights	Principle 1	Businesses should support and respect the protection of internationally proclaimed human rights	EC5, LA4, LA6 - 9, LA13-14, HR1-9, S05, PR1-2, PR8
	Principle 2	Businesses should make sure that they are not complicit in human rights abuses	HR2-9, S05
Labor	Principle 3	Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining	LA4-5, HR1-3, HR5, S05
	Principle 4	Businesses should uphold the elimination of all forms of forced and compulsory labor	HR1-3, HR7, S05
	Principle 5	Businesses should uphold the effective abolition of child labor	HR1-3, HR6, S05
	Principle 6	Businesses should uphold the elimination of discrimination in respect of employment and occupation	EC7, LA2, LA13-14, HR1-4, S05
Environment	Principle 7	Businesses should support a precautionary approach to environmental challenges	EC2, EN18, EN26, EN30, S05
	Principle 8	Businesses should undertake initiatives to promote greater environmental responsibility	EN1-30, S05, PR3-4
	Principle 9	Businesses should encourage the development and diffusion of environmentally friendly technologies	EN2, EN5-7, EN10, EN18, EN26-27, EN30, S05
Anti-corruption	Principle 10	Businesses should work against corruption in all its forms, including extortion and bribery	S02-6



## Assurance reports



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**Limited Assurance Audit Report on a selection of Energy, Environmental, and Product Portfolio Information of the Solvay Group**

Upon your request and in our capacity as independent auditor, we conducted procedures in order to obtain limited assurance that:

- the selection of Energy and Environmental indicators for the financial year 2012, marked with the sign  in the Chapter called "Environmental Performance" of the "Sustainable Development Report 2012" (the "Indicators"), were prepared in all material respects, in accordance with the 2012 reporting protocol (hereafter referred to as the "Reporting Protocol"). The Reporting Protocol consists of specific definitions and assumptions that are summarized in the addendum of the Sustainable Development Report 2012 p. 126 to 128 under the heading « Reporting boundaries, definitions and assumptions ». The Reporting Protocol also clarifies that the reported data corresponds to the current (2012) boundaries of the Solvay Group, thus integrating the Solvay and Rhodia legacies for all years, except otherwise mentioned.
- the Information on Sustainable Portfolio Management (SPM) presented in Sections 1.3.1 - 1.3.3 from page 39 to page 43 of the "Sustainable Development Report 2012" ("the Information") has been fairly presented, in all material aspects, in accordance with the principles of completeness, neutrality and clarity as defined by international standards.<sup>1</sup>

**Management's Responsibility**

The Solvay Group's management is responsible to prepare the Information, the Indicators and the Reporting Protocol and to ensure this information is available.

**The Auditor's Responsibility**

It is our responsibility, based on our limited assurance procedures, to express a conclusion regarding the Information and the Indicators. We conducted our procedures in accordance with the international standard as defined in ISAE 3000 (International Standard for Assurance Engagements, December 2003). With respect to independence rules, these are defined by the respective legal and regulatory texts as well as by the professional Code of Ethics, issued by the International Federation of Accountants ("IFAC").

Our review was designed to obtain a limited level of assurance and, as such, does not provide all the evidence that would be required to provide a reasonable level of assurance.

**Nature and scope of the procedures**

We performed the following procedures to support our conclusion:

**For the Indicators:**

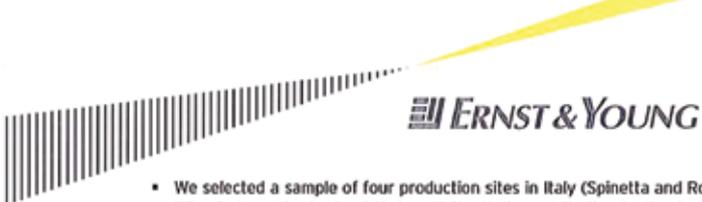
- We assessed the Reporting Protocol with respect to its reliability, understandability, neutrality, completeness and relevance, as related to the Group's activities and the sector's reporting practices.
- At Group level, we conducted interviews with those responsible for the reporting on Energy and Environment, more precisely with Solvay Energy Services and with the Department Health Safety & Environment of the Industrial Function, to verify whether the procedures used to obtain, consolidate and control data, had been correctly applied. At this level, we have implemented analytical procedures and verified, on a test basis, the calculations and the consolidation of data.

<sup>1</sup> ISAE 3000 from IFAC and Global Reporting Initiative (GRI), Sustainability Reporting Guidelines, Version 3.1, Part I.

Société civile ayant emprunté la forme d'une société coopérative à responsabilité limitée  
 Burgerlijke vennootschap die de rechtsvorm van een coöperatieve vennootschap met beperkte aansprakelijkheid heeft aangenomen  
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## Assurance reports



- We selected a sample of four production sites in Italy (Spinetta and Rosignano), the US (Green River) and Germany (Bad Wimpfen) on the basis of their activity, their contribution to the Group's consolidated data, and their location. At this level, we conducted interviews with those responsible for obtaining and consolidating data at an intermediate level to verify if they understood and correctly applied the Reporting Protocol and verified, on a test basis, calculations and reconciliation with supporting documents.

On average, our tests on site covered 16% of energy indicators (energy consumption in Petajoules and GhG) and 18% of environmental indicators (Sulfur Oxides, Nitrogen Oxides, Solid Particulates, NMVOC, Chemical Oxygen Demand, Phosphorous Nitrogen, Heavy Metals, Drinking water, Surface water, Sea water, Underground water, Hazardous Industrial Waste, and Non-hazardous Industrial Waste).
- We reviewed the unqualified opinion dated 12 February 2013 of the limited assurance engagement carried out by PricewaterhouseCoopers France on the same selection of indicators for the Rhodia Legacy perimeter for the fiscal year 2012. Their procedures included on-site tests on a sample of five production sites: Chalampé and Collonges (France), Freiburg (Germany), Houston (US) and Paulinia (Brazil), representing on average 12% of energy indicators (energy consumption in Petajoules and GhG) and 21% of environmental indicators (Sulfur Oxides, Nitrogen Oxides, Solid Particulates, NMVOC, Chemical Oxygen Demand, Phosphorous Nitrogen, Drinking water, Surface water, Sea water, Underground water, Hazardous Industrial Waste, and Non-hazardous Industrial Waste).
- We reviewed the presentation of the indicators for the financial year 2012, marked with the sign  in the Chapter called "Environmental Performance" of the "Sustainable Development Report 2012" and the associated notes on methodology in the addendum of the Sustainable Development Report 2012 p. 126 to 128.

**For the Information:**

- We verified that the Group had set up a process for the collection, compilation, processing and control of the Information to ensure its completeness and consistency. We examined the internal control and risk management procedures relating to the preparation of the Information.
- We conducted interviews with those responsible for the Information reporting and reviewed the related documentary sources in order to corroborate this information and assess its fairness.
- We reviewed the presentation of the Information in Sections 1.3.1 to 1.3.3 of the "Sustainable Development Report 2012".

**Comments on the Reporting Protocol**

We wish to make the following comments on the Reporting Protocol:

- The Group has made an effort to merge and make the reporting processes from Rhodia Legacy and Solvay Legacy consistent. However, the transition towards a set of common and unique reporting criteria is still ongoing and for the fiscal year 2012, we noted some differences in the definitions or tools applied by the entities of Rhodia and Solvay Legacy. However, none of these were deemed significant and therefore do not impact our conclusion.

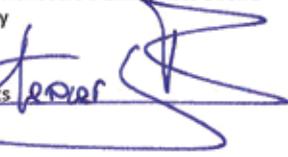
**Conclusion**

Based on our review and our procedures with respect to the financial year 2012:

- nothing has come to our attention that causes us to believe that the Indicators were not implemented and calculated, in all material respects, in accordance with the Reporting Protocol; and
- nothing has come to our attention that causes us to believe that the Information has not been presented fairly, in all material aspects, in accordance with the principles of completeness, neutrality and clarity as defined by international standards.

Diegem, 28 March 2013

Ernst & Young Réviseurs d'Entreprises SCCRL  
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