

# Hidden Consequences

---

Section Three:

A 'Toxic-Free Future' - Providing a blueprint towards 'zero discharge' of hazardous chemicals



# 03

## A 'Toxic-Free Future' – Providing a blueprint towards 'zero discharge' of hazardous chemicals

Early environmental laws to control pollution relied on a combination of treating wastes to break down and/or remove contaminants, and subsequent dilution to less harmful levels that – it was assumed – natural systems could assimilate. While these approaches had some merit in relation to biodegradable pollutants, they were not able to deal effectively with more persistent chemical wastes. This is particularly true for those chemicals with the propensity to concentrate in the tissues of plants and animals, and, in some cases, accumulate through the food chain.

When applied to wastes containing heavy metals or persistent organic pollutants (POPs), attempts to control pollution through 'end-of-pipe' treat, dilute and disperse approaches have been very costly, and have proven to be impossible at times. This is demonstrated by the long and expensive clean-up stories of the Hudson River and the Rhine Delta<sup>225</sup>, and the potential costs that the clean-up of the Filipino Marilao River System could cause.

Twenty years ago, in recognition of these limitations, chemical management policy began to focus on more preventative approaches. These included prevention or 'reduction at source' legislation and toxics-use reduction planning. Today, the focus is on chemical substitution and green chemistry research.

Preventing pollution and substituting hazardous chemicals with safer alternatives can bring multiple benefits. For instance, it reduces waste – especially hazardous waste – and the cost of its disposal; it makes the workplace safer; and it delivers substantial economic benefits with regard to manufacturing costs. These financial benefits are the result of an increased understanding of inefficiencies, and a focus on innovation in products and the production process.

In order to avoid repeating the long search for a more effective chemicals policy, and thereby prevent irreversible and costly damage to rivers and waters, governments must put policies in place and engage companies to implement a set of important framework principles for the sound management of chemicals. This is particularly true in emerging and developing economies, which can ill afford to pay the clean-up costs that will inevitably result from acting otherwise.

---

## Framework principles for the sound management of chemicals

**1.** It is important to know and disclose all chemicals in use and to prioritise action on the most hazardous. To achieve this, and to establish a clear roadmap, governments must establish a list of locally relevant priority chemicals. This list must be based on their intrinsic hazardous properties as chemicals – in line with the approaches and processes used to establish existing priority substances lists under international and regional policies.<sup>226</sup> Governments should begin by eliminating the most threatening chemicals and evolve over time towards the elimination of all releases of hazardous chemicals ('zero discharge').

'Zero discharge' is inclusive of releases to all environmental media, ensuring that there is not simply a displacement from one place or media to another. 'Zero discharge' of hazardous chemicals into the environment also recognises the difficulty of establishing 'safe' levels of emissions of hazardous chemicals. It has thus been the focus of the most comprehensive regional initiatives, such as the Great Lakes Water Quality Agreement in the US and the European Water Framework Directive.

Reflecting the lessons learnt on the value of precaution, regulatory mechanisms should address the source of the hazardous chemical rather than try to establish what levels of exposure are 'safe' and then try to 'manage' pollution down to those levels in the environment. The focus should be on eliminating the use of toxics and the activities that generate them, without waiting for harm to occur or be a proven certainty.

**2.** It is important to focus on prevention, clean production<sup>227</sup> and the prioritisation of the substitution principle<sup>228</sup>, so that inherently hazardous chemicals are continually designed out of production processes and products. Green chemistry promotes the design and use of inherently non-hazardous chemistry. This focus on inherently non-hazardous chemicals, rather than exposure control, must be the clear policy goal with regard to all hazardous chemicals. Green chemicals innovation in the marketplace relies on the ability of companies to develop knowledge about safer products, and the need to avoid the costs and liabilities associated with hazardous chemicals in their production facilities, and in the chemicals' lifecycles.

**3.** Targets are important. International conventions, such as OSPAR for the North East Atlantic, or the Stockholm Convention on Persistent Organic Pollutants, call for the elimination of highly hazardous chemical emissions into the environment within one generation. This target not only seeks to ensure the protection of the environment and future generations, it also allows progress towards the goal to be tracked. It also recognises that merely trying to mitigate exposure is impossible, given the multiple sources of chemical exposure. As with business development plans, chemicals policy must have a clear roadmap and metrics for success. For instance, policy tools – such as the Toxics Use Reduction Act in the US state of Massachusetts – have succeeded by setting a clear intermediate goal.

---

4. It is important to establish a good framework to encourage and ensure the compliance of companies, and foster their ability to innovate and transition to the use of non-hazardous chemicals. The framework should enforce the 'principle of producer responsibility', placing the responsibility to prevent ecological harm in the hands of those who can make the most effective changes. The REACH<sup>229</sup> approach of 'no data, no market' provides a good example. Harnessing the watchdog capacities of wider society is another important building block for accelerating change, commonly referred to as the 'right to know'. To this end, it is imperative that governments establish the obligation for chemical users to disclose all of their uses and releases.

These policies and others should be coupled with bans or appropriate restrictions on the use of chemicals that cause substantial harm and need not be used, and fees for chemical use. These fees would both fund the necessary support programmes, and act as a disincentive to use toxics and as a reward for cessation of use.

Other transition tools, such as enforceable requirements for examining alternatives, e.g. toxics-use reduction plans, audits<sup>230</sup> or alternatives assessments, should be complemented with direct assistance. This direct assistance can take the form of: education, training, research, databases of alternative non-hazardous chemicals, technology demonstrations and subsidies for innovation and technology upgrades.

Small and medium-sized companies need technical support, clear regulatory policy and financial incentives to constantly improve their chemicals performance. Some international support for education and training exists – be it UNITAR's work to promote Pollution Release and Transfer Registers, or cleaner production centres' advice and support for small and medium-sized enterprises (SMEs) – but more is needed. Good examples of such support exist. For instance, the technical assistance provided in the United States under initiatives such as the US EPA P2 programme, and the Massachusetts Toxics Use Reduction Act (MTURA), described further in Boxes 6 and 7.

## Box 6 The Massachusetts Toxics Use Reduction Act (MTURA):

### A strong pollution source reduction programme

The Massachusetts Toxics Use Reduction Act consists of:

- An ambitious intermediate reduction target for the state of Massachusetts: 50% reduction in the generation of hazardous chemical wastes over 10 years.
- Extensive right-to-know reporting, including public disclosure of chemical use and release by industrial facilities.
- Obligatory toxics-use reduction plans, based on the principle that the manufacturer choosing to use toxic chemicals has the responsibility to attempt to reduce that use and the associated risks through mandatory planning.
- Concerted technical assistance, professional education and research, based on the principle that such 'transitional tools' facilitate a shared commitment between firms and government, to assure better-tailored regulations and more successful adoption of safer alternatives.
- Use of third-party certification, based on the principle that government cannot efficiently oversee all parties, and must also delegate the means of ensuring responsible action (which in turn enables the diffusion of needed expertise).
- Fees for toxics use, based on the principle that those who impose the risks of toxics use on society should bear the cost of the programme developed to reduce those risks (thereby providing an incentive to stop using toxic chemicals).
- A flexible planning requirement, based on two principles:
  - (1) That government cannot effectively prescribe exactly what changes need to be made for each process or product,
  - (2) That businesses will elect to implement source reduction options that they identify through planning, when they make sense.

#### Combining pollution prevention with cost efficiencies

The most extensive data analysis<sup>231</sup> of company and chemical categories covered by the MTURA law from 1990 to 2004, showed that (adjusting for a 17% increase in production over this time), the companies reduced their toxic chemical use by 41% and their by-products (emissions) by 65%.

In 1997, the programme commissioned an independent evaluation by Abt Associates of Cambridge, Massachusetts, which found that companies saved more than MTURA cost them. Total costs amounted to \$76 m US dollars<sup>232</sup>, while savings equalled \$90 m<sup>233</sup>.

No company was forced to make any particular changes, only to consider them through mandatory planning. Plans had to be certified by toxics-use-reduction planners at the Toxics Use Reduction Institute (TURI). However, once companies realised the cost savings possible due to the opportunities for toxics-use reduction, most of them implemented the plans.<sup>234</sup>

Prevention planning, and adopting a preventative approach, also prompts innovation. This innovation arises out of the careful examination of what is being used, and what could be used, to accomplish a task, and by constant consideration of ways to improve how things are done.<sup>235</sup>

### **Auxiliary benefits**

When total chemical use is reduced, it is likely that toxic accidents, contamination, exposures, and the loss of resources – as well as the impacts on health and the environment – are also reduced significantly. Companies that eliminate toxics use eliminate storage costs, the concerns of neighbours and local emergency responders, the need to prepare for accidental releases, as well as the potential of costly litigation. Litigation is a growing ‘economic risk’ companies are facing globally.<sup>236</sup> Companies that reduce toxics input to their processes also reduce the need to authorise transport of hazardous materials, and thus the responsibility for spills.



## Box 7 Pollution prevention pays – for the wider economy

‘Prevention at source’ policies have benefits – at both the individual company level and at the level of a region or state – not only in terms of protecting the environment, but also in terms of innovation and economic competitiveness.

North Carolina, the first state in the US to establish a cleaner production programme (the ‘Pollution Prevention Pays’ programme), provides an example of the benefits of the ‘prevention at source’ approach. The state’s approach to tackling alkylphenol surfactant pollution is an example of how conventional pollution controls failed to solve the problem, and instead risked placing an increased financial burden on the sector. In contrast, substitution and redesigning how things were made proved to be successful strategies, which allowed more than 100 companies to stay in operation for more than a decade.

The value of this is difficult to estimate. In 1992, the North Carolina textile industry represented about 16% of total manufacturing in the state, compared to a national average of 2%. Hundreds of thousands of jobs were at stake.<sup>237</sup> A substantial portion of this industry involved wet processing, potentially using toxic surfactants. Sam Moore, formerly of Burlington Research Incorporated, the primary consulting firm working with the state on the project, later wrote that the effort ‘demonstrated that there could be measurable improvements in aquatic toxicity and POTW<sup>238</sup> treatment efficiency, driven by the goal of increased industrial productivity and reduction of aquatic toxicity by industry. This kept stakeholders out of costly litigation, while improving environmental quality’.<sup>239</sup>

The state of North Carolina’s ‘Pollution Prevention Pays’ programme was based on this ‘win-win’ concept, in which both society and the regulated entities benefited from reducing pollution at the source of the problem – reducing their toxic inputs and using materials more efficiently.<sup>240</sup> Since that time, the programme has provided benefits to the state far exceeding its costs. One recent programme, the Environmental Stewardship Initiative, saved more than \$23 m US dollars in just over two years, while preventing 2,579 tons (2,340 tonnes) of air emissions, water emissions and hazardous waste. Comparatively, the cumulative cost of the programme during those years amounted to less than half a million US dollars.<sup>241</sup>

According to Gary Hunt<sup>242</sup>, who has provided pollution prevention assistance out of the Division of Environmental Assistance and Outreach, North Carolina Department of Environment and Natural Resources, for 25 years:

‘Over the last 25 years, the programme has helped thousands of businesses and industries reduce their operating costs and improve their competitive advantage, through the implementation of pollution prevention techniques and technologies. However, it has taken many years for policymakers and the general public to really see that it is possible to advance environmental protection through means that benefit the economy. I believe that the North Carolina experience has shown quite clearly that it is also possible not just to avoid costs, but to stimulate new technology, modernisation, upgrading and the kind of development that allows a state to keep up with global competition.

‘The growing green economy in North Carolina is an example of how the public and private sectors can work together to foster a better economy and cleaner environment for all of NC citizens ... More investment in clean technology will mean more jobs, yet a smaller impact on the environment. It’s a hard concept for people to grasp – it seems counterintuitive. People have grown up with the assumption that protecting the environment costs money, and it’s hard to see that there actually is a way to protect the environment and not just save, but make money. Pollution Prevention does Pay!’<sup>243</sup>

### **A better route to prosperity for governments**

In short, the preventative approach forces regulated entities to rethink and redesign their products, which leads to better knowledge and understanding, and often results in permanent solutions that have many ancillary benefits.<sup>244</sup> Waste, including hazardous chemical releases, is after all an indicator of operating inefficiency.<sup>245</sup>

In addition to the need to tackle pollution to protect the environment and people's health, strong chemical management systems can also provide clues as to how operations and products should be redesigned – enabling processes to become more efficient as problems are proactively prevented. Countries that are developing programmes for chemical management have an opportunity to 'leapfrog' over the conventional approach of waste and wastewater end-of-pipe treatment, and focus on prevention first.<sup>246</sup>

Adopting clean production policies will cause industries to not only become cleaner and more resource-efficient, but also enable them to participate in the rapidly growing markets for safer and eco-labelled goods. Examples include clothing with no harmful chemicals; low-VOC carpets, furnishings and paints; and children's toys without lead paint or phthalates. As people all over the world are waking up to the need for environmental responsibility, there is a rapidly growing demand for responsible manufacturing<sup>247</sup> and clean products<sup>248</sup> that do not destroy the natural world.

Not only consumers but also investors are following the trend for more responsible production. The socially responsible and green investment market has grown exponentially over the past 20 years and now makes up over 11% of all assets under professional management in the US<sup>249</sup>, and 10% in the EU<sup>250</sup>.

Even lenders now favour processes that do not use toxic chemicals such as nonylphenol ethoxylates. The guidelines of the International Finance Corporation, for use by World Bank members, recommend that 'potentially hazardous surfactants should be replaced with biodegradable/bioeliminable compounds that do not generate potentially toxic metabolites'.<sup>251</sup>



### The message is clear

Countries in Asia and other regions developing their chemicals policy simply cannot afford to make the same mistakes that led to countries in the Global North spending billions of euros and dollars cleaning up the damage they inflicted upon their rivers, reservoirs and deltas. As the examples contained within this report demonstrate<sup>252</sup>, prevention not only saves society money, but it can also reduce companies' costs. Encouragingly, the market potential for the development of innovative green chemistry and clean processes is growing internationally, both due to pressure from the substitution requirements of REACH and the substance restrictions of EU laws, and due to a growing demand for responsible manufacturing and clean products.

Emerging economies have an enormous opportunity to learn from the experiences of the Global North and other industrialised countries. Acting in a precautionary way, preventing pollution, aiming for 'zero discharge', eliminating toxics and promoting clean production and green chemistry are not only more effective strategies for protecting human health and the environment, they also offer opportunities for companies. Forward-thinking companies can not only strengthen their market competitiveness and increase their capacity to innovate but ultimately, they can save themselves significant sums of money.

### To this end, Greenpeace is calling for governments to adopt:

- 1) A political commitment to 'zero discharge'<sup>253</sup> of all hazardous chemicals within one generation<sup>254</sup>, based on the precautionary principle and a preventative approach to chemicals management. This commitment must have the substitution principle at its core, and include producer responsibility<sup>255</sup> in order to drive innovation and toxics-use elimination.
- 2) An implementation plan to:
  - establish a dynamic priority hazardous chemical list, for immediate action<sup>256</sup>;
  - establish intermediate targets to meet the generation goal above; and
  - establish a publicly available register of data about discharge, emissions and losses of hazardous chemicals.
- 3) Measures to ensure infrastructure and policies are in place to support implementation, including:
  - identifying priority chemical restrictions;
  - policies and regulations that require mandatory audits and planning;
  - the provision of technical help and appropriate financial incentives; and
  - research and support for innovation in green chemistry.

For more details on why Greenpeace is supporting these principles and policies please see our accompanying Questions and Answer document – available at: <http://www.greenpeace.org/q-and-a-for-a-toxic-free-future.pdf>



**GREENPEACE**

**Greenpeace International**

Otto Heldringstraat 5  
1066 AZ Amsterdam  
The Netherlands

Greenpeace is an independent global  
campaigning organisation that acts  
to change attitudes and behaviour,  
to protect and conserve the environment  
and to promote peace.

**greenpeace.org**