Dirty Laundry: Reloaded

How big brands are making consumers unwitting accomplices in the toxic water cycle

GREENPEACE

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Greenpeace takes samples from the River Elbe as part of Greenpeace Czech Republic's tour to raise awareness of toxic pollution in September 2011
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Wash Testing

Dirty Laundry: Reloaded is a landmark research investigation exploring the amount of the hazardous chemicals nonylphenol ethoxylates (NPEs) that are released as a result of washing clothing items found to contain these chemicals. Throughout the report we refer to the 'washed out' value for each item, which is the difference between the concentration of NPEs in fabric that had been washed compared to the concentration in an unwashed portion of identical fabric from the same item, with the assumption that the unwashed and washed portions from each item initially contained the same concentration of NPEs. For more information on the scientific process and sampling methods and rationale please refer to the Technical Report, available at: http://www.greenpeace.to/greenpeace/wp-content/uploads/2012/03/Dirty_Laundry_Product_Testing_Technical_Report_01-2012.pdf

Terminology used in this report

Bioaccumulation: The mechanism by which chemicals accumulate in living organisms and get passed along the food chain.

Hormone disruptors: Chemicals known to interfere with hormone systems of organisms. For nonylphenol, the most widely recognised hazard is the ability to mimic natural oestrogen hormones. This can lead to altered sexual development in some organisms, most notably the feminisation of fish*.

Persistence: The property of a chemical whereby it does not degrade in the environment, or degrades very slowly.

Plastisol: A suspension of plastic particles, commonly PVC or EVA, in a plasticiser. Used as ink for screen-printing images and logos onto textiles.

Surfactants: Chemicals used to lower the surface tension of liquids. They include wetting agents, detergents, emulsifiers, foaming agents and dispersants used in a variety of industrial and consumer applications including textile manufacture.

**Jobling S, Reynolds T, White R, Parker MG & Sumpter JP (1995). A variety of environmentally persistent chemicals, including some phthalate plasticisers, are weakly estrogenic. Environmental Health Perspectives 103(6): 582-587; Jobling S, Sheahan D, Osborne JA, Matthiessen P & Sumpter JP (1996). Inhibition of testicular growth in rainbow trout (Oncorhynchus mykiss) exposed to estrogenic alkylphenolic chemicals. Environmental Toxicology and Chemistry 15(2): 194-202*

Note to the reader

Global North and Global South

Throughout this report we refer to the terms 'Global North' and 'Global South' to describe two distinct groups of countries. The term 'Global South' is used to describe developing and emerging countries, including those facing the challenges of often-rapid industrial development or industrial restructuring, such as Russia. Most of the Global South is located in South and Central America, Asia and Africa. The term 'Global North' is used for developed countries, predominantly located in North America and Europe, with high human development, according to the United Nations Human Development Index.* Most, but not all, of these countries are located in the northern hemisphere.

** United Nations Development Programme (UNDP). (2005). Human Development Report 2005. International cooperation at a crossroads. Aid, trade and security in an unequal world. Available at: http://hdr.undp.org/en/media/HDR05_complete.pdf*

“Water is essential for life, but it is also the world’s most threatened essential resource. It is imperative that solutions are found to stop poisoning the precious resources we have left with hazardous chemicals.”

Executive summary

The toxic cycle continues

New research commissioned by Greenpeace International shows that residues of the hazardous chemicals nonylphenol ethoxylates (NPEs)[1] – used in textile manufacturing – remain in many clothing items sold by major international clothing brands and, when washed, a significant percentage of the chemicals in these clothes is released and subsequently discharged into rivers, lakes and seas, where they turn into the even more toxic and hormone-disrupting chemical nonylphenol (NPs).

This can happen wherever in the world clothing items are sold and washed, and means that brands are making their consumers unwitting accomplices in the release of these hazardous substances into public water supplies.

Two previous Greenpeace International reports investigated the discharge of hazardous substances from textiles manufacturing in China *(Dirty Laundry)*[2] and the presence of NPEs in clothing and footwear bearing the logos of 15 leading clothing brands *(Dirty Laundry 2: Hung Out to Dry)*[3].

Of the 78 items of clothing tested in *Dirty Laundry 2*, NPEs were found in exactly two-thirds of the samples, with the presence of these hazardous substance indicating that NPEs were used during the manufacture of the clothing items and released into waterways in the country of production. For this latest report, the effect of washing a subset of 14 of the samples, consisting of 12 samples of plain fabric and two samples of fabric bearing a plastisol print, was investigated under simulated standard domestic laundering conditions[4]. **This is the first ever study to investigate differences in the amounts of NPEs in fabric products before and after washing**, as far as we are aware, and the results have major implications for brands and governments – demonstrating that the direct pollution impacts of the textile sector extend far beyond the country of manufacture and are creating a **global cycle of toxic pollution.**

Results

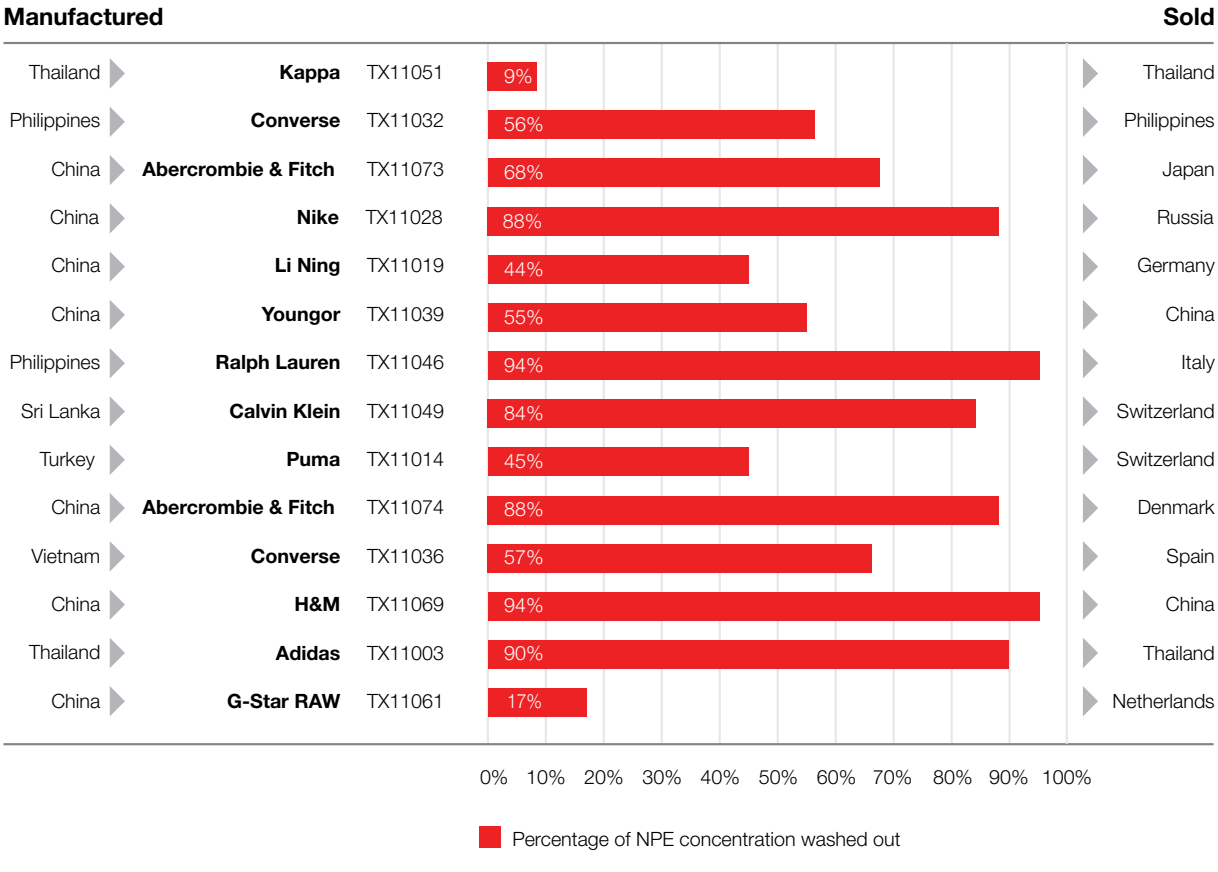
In all 14 samples, lower concentrations of NPEs were found in the fabric that had been washed, compared to an unwashed portion of identical fabric from the same item, with a lower concentration of between 17% and 94% NPEs found in the washed fabric versus the identical unwashed fabric, and between 9% and 56% lower concentration of NPEs in the washed plastisol-printed samples versus the identical unwashed samples.

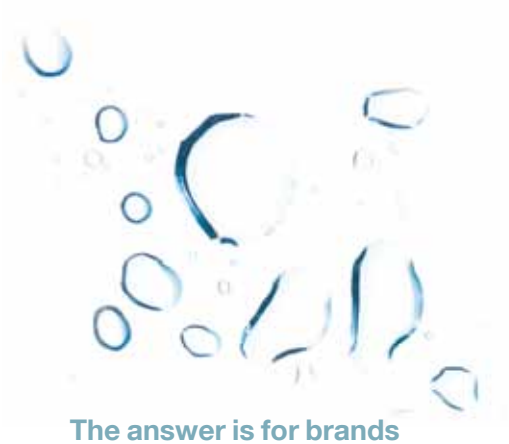
These results indicate that a single wash, using conditions that simulate standard domestic laundering, can wash out a substantial fraction of NPE residues present within textile products, with more than 80% being washed out[5] for half of the plain fabric samples tested. This study suggests that all residues of NPEs within textile products will be washed out over their lifetime and that in many cases this will have occurred after just the first few washes.

These NPEs are then discharged to wastewater treatment plants, which do not effectively treat or prevent the release of these hazardous substances into the environment; in fact, they break down NPEs to form toxic and hormone-disrupting NPs that are then released within the treated water.

Whereas discharges from the manufacturing of these products take place in textile manufacturing hubs, commonly located in the 'Global South' – in this case China, Vietnam, the Philippines, Thailand, Sri Lanka and Turkey – the washing of the finished articles can take place anywhere in the world, wherever the products are sold, and even in countries where legislation restricting the use of NPEs is in place.

Figure 1. Percentage of NPEs washed out of tested items in one wash





The answer is for brands to urgently require the elimination of the use of APEs throughout their supply chains. This will effectively address emissions of these hazardous substances in both the country of manufacture and the country where the product is sold, contributing to the transformational change needed to create a toxic-free future.

APEs are still entering our environment – despite restrictions

The use of NP and NPEs in clothing manufacture has effectively been banned within the EU and similar restrictions are also in place in the US and Canada. In the EU, releases of NP/NPEs due to the washing of textile products imported from outside the EU has been estimated to constitute by far the largest source of these chemicals entering wastewater treatment facilities in some instances. It is likely that the washing of textile products containing NPEs contributes a considerable fraction of the total releases in many other countries, especially where industrial uses of NPEs are prohibited. Data collected by Greenpeace Russia shows that the discharge of NP/NPEs by urban wastewater treatment systems is not exclusively a problem in the EU, but that similar discharges are happening in other countries.

Some major clothing brands set limits on the presence of certain hazardous substances in their products, as part of their programmes to ensure product safety. The limits typically set by these brands for the presence of alkylphenols/alkylphenol ethoxylates (APs/APEs)[6] in their products (the respective groups of chemicals that NP/NPEs fall under), as well as limits set by other product standards such as Oeko-tex[7], are far too high and therefore still allow for the continued use of these chemicals during manufacturing – and therefore their discharge both in the country of manufacture and the country of sale.

These limits allow for the products sold in countries around the world to contain many tonnes of APEs that would ultimately end up contaminating our waterways. For example, it is estimated that up to **15 to 20 tonnes** of NPEs would be permitted within the textile products sold globally by H&M each year, based on its current limit of 100 ppm[8], and a similar picture is likely for other clothing brands. Similarly, if the EU were to adopt a 100 ppm limit, it would also permit up to **88.1 tonnes** of NPEs within textile products from outside the EU to be imported into Germany each year and up to **103.2 tonnes** within such products imported into Spain, for example[9].

Brands must make immediate changes to their supply chains

Setting a lower limit for the concentration of APEs in finished products is an important step to take – both for brands and for regulators. However, such a step, taken in isolation, would not necessarily prevent emissions of APEs in the country of manufacture. Instead of eliminating its use, suppliers could attempt to achieve a lower level of APEs in the final product by additional rinsing, thereby increasing the discharge of these substances into rivers, lakes and seas in the manufacturing countries.

The answer is therefore for brands to urgently require the elimination of the use of APEs throughout their supply chains. This will effectively address emissions of these hazardous substances in both the country of manufacture and the country where the product is sold, contributing to the transformational change needed to create a toxic-free future. **Given their significant economic influence, major clothing brands are in a unique position to lead on this phase-out and to take immediate action to achieve this.**

Six of these brands – the sportswear brands Puma, Nike, Adidas and Li-Ning, and the fashion brands H&M and C&A – are now collaborating on the further development and implementation of the 'draft joint roadmap towards zero discharge of hazardous chemicals'[10] launched in November 2011. This roadmap sets out the steps that the brands commit to take to achieve zero discharge of hazardous chemicals, and invites others to partner in this endeavour.[11] However, the draft joint roadmap does not yet include a specific commitment or a date to eliminate all uses of APEs.

The need for an adequately protective regulatory limit on products – and other precautionary measures

In the EU, **NP is identified as a priority hazardous substance under existing legislation and releases of NPs are required to cease**. An EU restriction on the marketing of products with NPEs above a specified level is under development – and necessary to close the loophole that allows clothing to contain NPEs. An adequately protective limit would also send a strong signal to brands and manufacturers that APEs should not be used.

Parallel measures to restrict the use of APEs in manufacture must also be taken in countries where the majority of manufacturing takes place, such as in East Asia and Southeast Asia, to avoid the washing out of APEs from finished articles by manufacturers before export in order to meet these restrictions.

It should also be noted that APEs are just one example of the many hazardous substances used in the production of textiles and that political commitments need to be made to achieve 'zero discharge'[12] of all hazardous chemicals within one generation[13].

Governments in these countries need to ensure that their regulations implement a precautionary approach to hazardous chemicals elimination, based on their intrinsic properties. As part of this, specific restrictions on the manufacture and use of APEs are needed. However, it is the multinational brands that have an immediate **opportunity and responsibility** to act on this issue by requiring the elimination of the use of APEs in their supply chain in all countries where their products are manufactured; by doing so they will be acting ahead of the regulatory curve in China and other manufacturing hub regions.

What needs to be done?

This report confirms that NPEs present in textile products are released during washing by consumers. These NPEs are either released directly or collected by the urban waste water treatment system before being converted into toxic and persistent NPs, which are then released into our rivers and waterways worldwide. **Urgent and real measures are needed to stop NPEs and NPs entering our environment**.

Given the fact that textile manufacturing in North America (to a large extent) and the EU does not use APEs, it should be possible for the major brands collaborating on the draft joint roadmap to make a commitment to **eliminate at least the major uses (scouring, degreasing and detergents) of APEs by the end of 2012, in their manufacturing supply chains**, with the complete elimination of all uses of APEs to follow swiftly, for example by the end of 2013. To allow for implementation, brands need to request (and verify) **quantitative information from their suppliers in relation to the use of APEs** in the manufacturing processes, with the intention of disclosing this to the public.

Furthermore:

- Greenpeace is calling on all brands, including those identified in the three *Dirty Laundry* reports[14], to become champions for a toxic-free future by **eliminating all releases of all hazardous chemicals from their supply chains and products.**
- As part of this, brands should do everything possible to completely eliminate the use of APEs during production in their supply chains, irrespective of adequate regulation in the countries of manufacture restricting the use of APEs during manufacturing.
- Limits that the brands and regulators set for the APEs both in production processes and the final products **need to be set at the lowest possible level**[15] **and must include a sufficiently wide range of NPEs**[16], to ensure full elimination of the use of these substances and prevent their re-distribution to aquatic ecosystems throughout the world.
- Within the EU, a restriction on the marketing of textile products containing APEs needs to be implemented as soon as possible. Ultimately, regulations banning the use of APEs in manufacturing also need to be enforced globally; with the countries where textile manufacturing takes place implementing regulations which take a precautionary approach to restricting **ALL hazardous chemicals**.

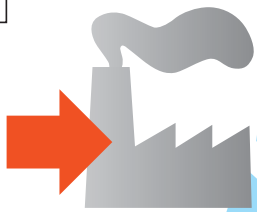
As global citizens – who brands are currently making unwitting accomplices in the release of hazardous substances into rivers, lakes and seas – we also have a role to play. We can choose to reduce the impact of the clothes we purchase by reducing our consumption, re-using and re-purposing existing items, and buying second-hand or vintage clothes where possible. We can also use our influence to call on global brands to act responsibly on behalf of the planet and its people, so that they set a date for the elimination of the use of APEs and other hazardous chemicals in their supply chains and products, and stop using our global waterways as their private sewers.

A future free from toxic chemicals is possible. Together we can help create it.

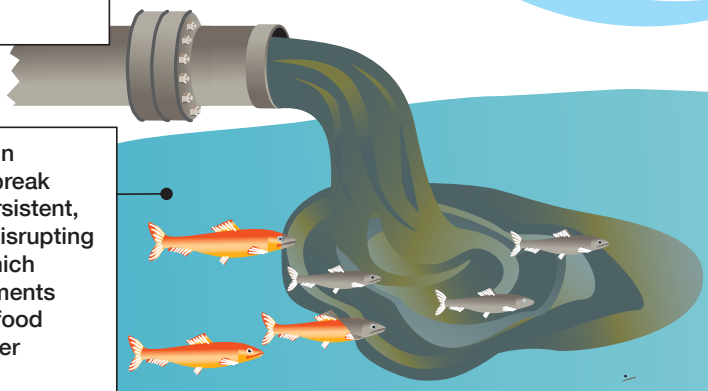
To find out more or get involved visit: greenpeace.org/detox

Clothing and the global toxic water cycle

1) Formulations containing nonylphenol ethoxylates (NPEs) and other chemicals are delivered to textile manufacturers for use as surfactants.

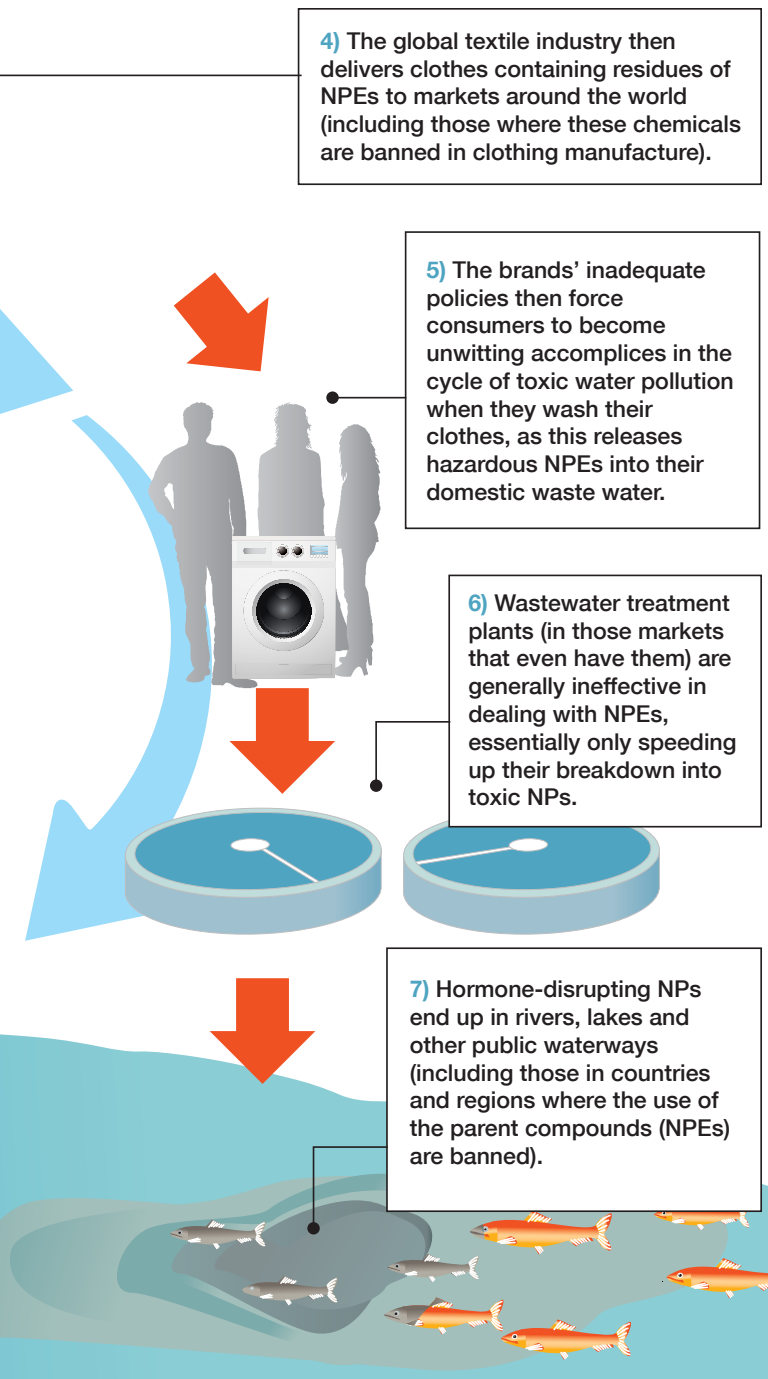


2) Lax regulation and the lack of policies by global clothing brands to eliminate the use of NPEs (and other hazardous chemicals) results in wastewater discharges containing these hazardous chemicals to enter public waterways, such as rivers and lakes.



3) Following release in wastewaters, NPEs break down to form the persistent, toxic and hormone-disrupting nonylphenol (NP), which accumulates in sediments and builds up in the food chain, in fish and other wildlife.

The problem and the solution are not only a cause for local concern. This is a truly global issue.



Endnotes

1 Nonylphenol ethoxylates (NPEs) belong to a chemical group known as alkylphenol ethoxylates (APEs) – this group includes NPEs and octylphenol ethoxylates (OPEs). APEs break down in wastewater treatment plants, or in the environment, to form the more toxic alkylphenols (APs), which are persistent (do not readily break down in the environment) and bioaccumulative (build up in the food chain). This study examined the presence of NPEs in textile products, and their release through laundering; however, government regulations and company policies need to address the entire group of APEs.

2 http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry/

3 http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry-2/

4 Each product was washed separately according to the standard method SS-EN 6330 (domestic washing and drying procedures for textile testing), at 40°C using an eco-labelled washing powder for coloured garments. No subsequent tumble-drying was employed. 40oC cotton and easy-care programmes are the most commonly used by the general public.
http://www.which.co.uk/home-and-garden/laundry-and-cleaning/reviews/washing-machines/page/faqs/

5 The 'washed out' value for each item is the difference between the concentration of NPEs in fabric that had been washed compared to the concentration in an unwashed portion of identical fabric from the same item, with the assumption that the unwashed and washed portions from each item initially contained the same concentration of NPEs

6 The chemical groups which includes NP and NPEs respectively, as well as the closely related octylphenols/octylphenol ethoxylates (OPs/OPEs).

7 A European product label designed for consumers who specifically aim to buy textiles which are harmless to health, amongst other requirements, http://www.oeko-tex.com/OekoTex100_PUBLIC/content4.asp?area=hauptmenue&site=ziele&cls=02, accessed 29 December 2011.

8 Parts per million – ppm – is equivalent to milligrams/kilograms – mg/kg

9 Based on import data for Germany and Spain from 2010

10 The Joint Roadmap is available on the companies' websites, see for example: Puma: http://about.puma.com/?page_id=10

11 Greenpeace's response to the joint roadmap is available here: http://www.greenpeace.org/international/en/campaigns/toxics/water/Detox-campaign/#a3

12 'Discharge' in this context means all discharges, emissions and losses; in other words, all pathways of releases.

13 Typically, one generation is understood to be 20 to 25 years.

14 The 15 brands were: Abercombie & Fitch, Adidas, Calvin Klein (Philips van Heusen), Converse, GAP, G-Star RAW, H&M, Kappa, Lacoste, LiNing, Nike, Puma, Ralph Lauren, Uniqlo and Youngor.

15 *Dirty Laundry 2: Hung Out to Dry* demonstrated that it is technically possible for the concentration of NPEs to be accurately determined in textiles with a detection limit of 1 mg/kg (1 ppm = 0.0001%). Many textile products contain a wide range of NPEs , while some standards, such as the Oeko-tex standard are based on a more limited range of chemicals.

16 *Dirty Laundry*: http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry/
Dirty Laundry 2: Hung Out to Dry: http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry-2/

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