



# Sustainable Consumption and Production

Issue 2

March 2008

## Asking the key question: What is sustainable?

Sustainable consumption and production are two sides of a coin, both are needed to achieve real progress towards sustainability and both will be addressed in the forthcoming European Commission Action Plan on Sustainable Consumption and Production which is expected in May 2008. With this in mind, this thematic issue discusses a number of strategies that could be used to reduce consumption and improve the sustainability of production systems.

Two articles in this issue discuss what policy can do to support and promote sustainable consumption. A basket of different policy measures are reviewed along with consumer profiles in 'Understanding different consumer behaviours'. This article highlights the importance of taking multiple approaches to promote pro-environmental behaviours to ensure that all consumer groups are adequately addressed. The issue of policy effectiveness is addressed in 'Greening consumers: a policy analysis', which evaluates the effectiveness of a range of policies implemented in the 1990s.

Measuring the environmental impact of products remains a difficult challenge. Ecological footprint measures have found favour amongst green groups as a way to measure the environmental impact of individuals and this approach is now being tested as a means of screening products for environmental performance (see 'Ecological footprint: a screen for environmental performance?'). The measure works well for the majority of products, whose ecological footprint is dominated by non-renewable energy consumption.

Product Service Systems (PSS) takes this a step further by seeking to integrate the issues of consumption and production (see 'Materialism curbed using obesity management strategies'). The key to PSS strategies is identifying packages that add value to products while at the same time reducing consumption by finding novel ways of satisfying the needs of consumers.

Policies around sustainable consumption and production need to address the whole supply chain and with increasing globalisation this means turning our attention to developing countries. Encouragingly, a study using integrated product policy suggests that pressure from European consumers and policymakers can stimulate changes to environmental policy in developing countries (see 'European consumer pressure drives changes in developing countries').

Manufacturers can also benefit from looking at supply chains nearer home. Research suggests that green supply chains have many benefits, including improving manufacturing performance, stimulating product improvements and even offering a competitive advantage (see 'Green supply chains improve performance').

**Professor Matthias Finkbeiner**

Berlin Institute of Technology, Germany

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## Understanding different consumer behaviours

**Contact:** [behavioursunit@defra.gsi.gov.uk](mailto:behavioursunit@defra.gsi.gov.uk)  
**Themes:** Sustainable consumption and production

Individuals are urged to embrace 'green' lifestyles and move towards sustainable consumption. A new report identifies interventions likely to cause changes in particular social groups. It describes the barriers, motivations and understanding of different sectors of the population, providing a framework for pro-environmental behaviours.

"Considering the array of attitudes and behaviours, it is clear that multiple routes are needed to ensure all groups are adequately addressed."

Social marketing gives an insight into the socio-demographics, lifestyle, attitudes, beliefs and current behaviours of people, allowing the population to be divided into seven segments (percentage of UK population in brackets):

1. The Positive Greens. Believe it is important to do as much as possible to limit their own impact on the environment (18 per cent).
2. The Waste Watchers. Believe in avoiding waste and thinking carefully about consumption (12 per cent).
3. The Concerned Consumers. Do more to help the environment than most, but unwilling to curb certain behaviour patterns, such as taking flights abroad (14 per cent).
4. The Sideline Supporters. Concerned about climate change but do not know how to change their behaviour or which behaviours to change (14 per cent).
5. The Cautious Participants. Happy to act in some pro-environmental ways, provided other people do too (14 per cent).
6. The Stalled Starters. Understand little about climate change, but have less environmental impact than most due to low income and thus lower consumption rates and inability to afford a car (10 per cent).
7. The Honestly Disengaged. Unconcerned about climate change issues, conduct lives irrespective of environmental impact (18 per cent).

The report analysed behaviour according to a willingness and ability to act on environmental issues, such as personal transport (for instance, avoiding unnecessary car trips or flights) home energy consumption (insulation and domestic energy generation), recycling and waste reduction, and food consumption (eating local products, for example). The groups fell into three discreet categories: those willing to act and prepared to do more, those who need different approaches to become environmentally friendly, those less willing to act who need encouragement and, where necessary, regulation.

Much can be done within current lifestyles, by encouraging the uptake of green products and services, and challenging wasteful habits, while encouraging those with 'green' lifestyles to influence others. Considering the array of attitudes and behaviours, it is clear that multiple routes are needed to ensure all groups are adequately addressed. Policy packages must rely on a mix of labelling, incentives, rewards and education. In most cases, a combination of top down approaches and community-based action will be required to make the best use of resources. Government and business should be prepared to intervene and remove the most unsustainable products from the market place.

**Source:** 'A framework for pro-environmental behaviours report' January 2008, DEFRA report. Published by the Department for Environment, Food and Rural Affairs (DEFRA). Document available at <http://www.defra.gov.uk/evidence/social/behaviour/index.htm>



## Greening consumers: a policy analysis

**Contact:** thc@ipl.dtu.dk

**Themes:** Sustainable consumption and production

In most industrialised countries, curbing personal energy consumption is now high on the political agenda. New research shows that water taxes and metering, energy rating schemes for household electrical goods and policies to improve household insulation encourage consumers to reduce consumption but other policy mechanisms have been less effective.

“Cutting water consumption is a result of a broad array of water-saving campaigns and measures and the population’s willingness to change their practice, combined with a 300 per cent increase in water taxes, water metering and technological change.”

New Danish research focused on three areas of consumption that are inherently bound to people’s daily habits: housing, transport and ICT (information and communication technology). These sectors contribute significantly to private consumption. Housing and road transport (including transport of food and goods) represent 29 and 25 per cent respectively of the total Danish end-use of energy. ICT products, such as mobile phones and video recorders, consume approximately 15-20 per cent of all electricity used in Danish households, with electronic waste adding to local environmental problems.

In the housing sector, the main environmental impact is from water and energy consumption. The authors found that, over the past two decades, water usage dropped by about one third. Cutting water consumption is a result of a broad array of water-saving campaigns and measures and the population’s willingness to change their practice, combined with a 300 per cent increase in water taxes, water metering and technological change.

Even though the economy has grown, household energy consumption has remained stable since the 1990s. The researchers attribute this stability to the use of co-generation of power and heat, the replacement of old electrical products, such as freezers, with new, A-rated products, as well as concerted efforts to insulate buildings. This suggests that labelling schemes, which allow consumers to identify energy efficient products, can contribute to reductions in energy consumption.

Energy use in the transport and ICT sectors has increased over the study period. The study revealed a broad range of problems connected to motoring and suggests that increases in car transport accompany general economic growth. Despite initiatives to discourage motoring, such as car pooling schemes and promotion of public transport, the number of cars has been rising steadily, and there is no sign that this will change. The growth in consumption of ICT is strongly linked to rapid product innovation and changing conditions in everyday life. The authors argue that sustainable consumption policies can be undermined by continued growth in consumption by consumers and the rising standards for ‘normal consumption’.

The authors add that while environmental concerns have not swayed the public to reduce their consumption, other issues have had an impact. For instance, the introduction of a 35-hour working week in France led to a drop in consumerism and an upsurge in time spent with family and friends. Changing consumer values opens up the possibilities for radical, sustainable consumption policies.

**Source:** Christensen, T.H., Godskesen, M., Gram-Hanssen, K. *et al.* (2007). Greening the Danes? Experience with consumption and environment policies. *Journal of Consumer Policy*. 30:91-116.



## Ecological footprint: a screening for environmental performance?

**Contact:** M.Huijbregts@science.ru.nl  
**Themes:** Sustainable consumption and production

Non-renewable energy dominates the ecological footprint of most products and services, according to new research. The study examined 2630 products and services from the energy, materials, transport, waste treatment and infrastructure sectors and suggests that ecological footprint measurements can be used to help assess the sustainability of products.

“Land and fossil fuel use, which form the core of the ecological footprint assessment, are important drivers of overall environmental impact and the ecological footprint measure could serve as a screening indicator for environmental performance.”

A large number of environmental assessment methods are now available to help assess the sustainability of products, processes and ultimately lifestyle, but few studies have been undertaken to compare the findings of these different tools. New research from The Netherlands and Switzerland suggests that the ecological footprint, which is increasingly used to assess the sustainability of lifestyles at individual, regional and national levels, can also be applied to reliably assess the impact of a range of products and services.

Life-cycle assessment methods are used to measure environmental performance and identify where improvements can be made. These tools focus on impacts from ‘cradle to grave’, looking at both direct and indirect resource inputs and/or emissions, and fall into two broad types:

- Impact assessments which aim to analyse all potential environmental impacts, such as the Eco-indicator 99<sup>1</sup>, which quantifies the impacts on human health, ecosystem quality and resources.
- Resource-related indicators, such as ecological footprints, which focus on cumulative use of land, energy and materials.

In this study, the researchers calculated the ecological footprint of a range of sectors, measured using three input types: direct land occupation, atmospheric CO<sub>2</sub> emissions, largely from fossil fuel combustion, and nuclear energy demand. They compared these results with an impact assessment, calculated using Eco-indicator 99, and found that, for most sectors, the two indicators produced a similar ranking of products and services. This suggests that land and fossil fuel use, which form the core of the ecological footprint assessment, are important drivers of overall environmental impact and that the ecological footprint measure could serve as a screening indicator for environmental performance. However, it should be noted that the ecological footprint proved to be less reliable for product life-cycles with relatively high mineral consumption and process-specific metal and dust emissions.

The research shows that land occupation is particularly significant when measuring the environmental performance of renewable energy products as well as for agriculture and the paper/cardboard industry. For most other categories, the ecological footprint is dominated by CO<sub>2</sub> emissions from fossil fuels use.

**Source:** Huijbregts, M.A.J., Hellweg, S., Frischknecht, R. *et al.* (2008). Ecological footprint accounting in the life cycle assessment of products. *Ecological Economics*. 64: 798-807.

<sup>1</sup> The Eco-indicator 99 is a life-cycle impact assessment method developed by a Dutch environmental consultancy. See <http://www.pre.nl/eco-indicator99/default.htm> for more information.



## Materialism curbed using obesity management strategies

Product Service Systems (PSS) offer a flexible approach to reducing material consumption in society, by adding value to a product while still achieving customer satisfaction. Instead of increasing production to meet rising demand, research suggests that PSS strategies can be used as an alternative means of satisfying the needs of the consumer.

Contact: [rw@grat.at](mailto:rw@grat.at)

Themes: Sustainable consumption and production

“Product service systems can be used to fulfil consumer needs, while at the same time decreasing consumption and reducing waste.”

A materialistic society encourages behaviour patterns based on over-consumption, product owning and a throwaway culture. In such a society, an individual's identity may be defined by the material possessions they own. Research suggests that strategies which are successful in managing obesity, which is also a problem of over-consumption, can also be used to curb material consumption.

PSS offers a means to drive fundamental changes in society's production and consumption patterns. It takes a multidimensional approach similar to strategies that have been proved to be successful in managing obesity. Successful PSS include solutions for producing fewer products, of higher quality; offering alternative uses for products and providing customised product and service combinations, as well as marketing products to give the customer emotional satisfaction.

A systematic design can encourage less material consumption by satisfying the customer with more durable and better quality products, while solutions involving temporary use, rather than owning and disposing of products, can fill short-term consumer needs. Examples of PSS include affordable and easy upgrades to extend the life of technical products, bike rental schemes in big cities as alternatives to owning a bicycle and the hiring of sporting equipment at holiday resorts. Here, temporary needs can be met without the customer owning the product.

Researchers suggest that manufacturers can still achieve the same or greater profit margins with fewer products by combining service and extra value solutions to the product, which are, nevertheless, still attractive to the customer. Traditional marketing strategies can be used to promote customised solutions, which combine products with services, to make them emotionally attractive to consumers.

Organisations wanting to design PSS schemes can use a variety of procedures and tools, which incorporate key environmental, economic and social strategies. Successful PSS solutions can be promoted using traditional branding and marketing methods.

PSS can be applied in preference to the accepted product sales model and move society towards a post-material economy. PSS can be used to fulfill consumer needs, while at the same time decreasing consumption and reducing waste.

Source: Kang, M-J., Wimmer, R. (2007). Product service systems as systemic cures for obese consumption and production, *Journal of Cleaner Production*. doi:10.1016/j.jclepro.2007.08.009.



## European consumer pressure drives changes in developing countries

**Contact:** [anna-lisa.linden@soc.lu.se](mailto:anna-lisa.linden@soc.lu.se)

**Themes:** Sustainable consumption and production, Sustainable development and policy assessment

Globalisation now means products consumed in Europe and other western industrialised regions are often produced in developing countries, where costs of production are lower. However, these countries may have different health and environmental standards. New research shows that pressure from European consumers can drive improvements in the environmental performance of manufacturers operating in developing nations.

“Although national environmental policies were designed to regulate domestic production, the influence of these policies could be extended to the production processes in foreign markets.”

Swedish researchers investigated how consumer concerns motivated international manufacturers to meet European environmental standards. The researchers used integrated product policy<sup>1</sup> to explore the role of consumer influence and national policies on decision-makers who are involved in the production chain for three types of products: clothing, meat and batteries. Integrated product policy seeks to reduce the environmental impact of products by looking at the cradle to grave life-cycle of the product, from design through to production, distribution, consumption and disposal or recycling of the product.

In the case of clothing, researchers discovered that when employees handling imported clothing reacted adversely, such as coughing and skin reactions, to the chemicals used to produce the clothes imported from other countries, larger importers and distributors chose to work with the foreign suppliers to incorporate the latest Swedish health and environmental practices into the manufacturing process. As a result, Swedish environmental standards were extended to textile factories in foreign countries.

When examining the meat food chain, the researchers found that consumer concerns about food safety at the time of the BSE crisis led Swedish importers to initiate a labelling system to identify the country of origin of meat products. The case of meat labelling indicates that consumers react more strongly to health risks than to environmental issues. The EU official labelling system<sup>2</sup>, initially introduced in 2000, now allows all European consumers to trace meat products from farm to shop.

Consumers are also concerned about the environmental impact of discarded batteries. A labelling regime and taxes are used to control the importation of batteries, especially those containing heavy metals. However, enforcement of national regulations has not kept pace with the volume of imported goods, particularly those containing fixed or rechargeable batteries. Nevertheless, Swedish policies have pushed suppliers to develop more environmentally friendly batteries.

The researchers concluded that although national environmental policies were designed to regulate domestic production, the influence of these policies could be extended to the production processes in foreign markets. In many instances, consumer concerns have played a key role in driving changes in the whole production chain.

**Source:** Lindén, A-L., Carlsson-Kanyama, A. (2007). Globalisation of markets and products: a challenge for environmental policy. *International Journal of Environment and Sustainable Development*, 6 (4): 473-487.

<sup>1</sup> For more information on integrated product policy see: <http://ec.europa.eu/environment/ipp>

<sup>2</sup> Details on the food labelling directive can be found at: [http://ec.europa.eu/food/food/labellingnutrition/foodlabelling/comm\\_legisl\\_en.htm](http://ec.europa.eu/food/food/labellingnutrition/foodlabelling/comm_legisl_en.htm)



## Green supply chains improve performance

**Contact:** stephane.vachon@hec.ca  
**Themes:** Sustainable consumption and production

Manufacturers could gain broad benefits from environmental practices aimed at enhancing environmental performance throughout the supply chain. As well as improving environmental performance, new research shows that collaborating with suppliers on environmental practices improves manufacturing performance across three key indicators: quality, delivery and flexibility.

“This study suggests that environmental performance can be improved by active collaboration with customers and suppliers.”

Increasingly, manufacturers seeking to improve environmental sustainability are extending their efforts across the supply chain, both upstream to engage their suppliers and downstream to involve distributors and consumers. This often means establishing collaborative environmental management programmes aimed at aspects such as joint environmental goal setting, sharing technical information, shared environmental planning and working together to reduce pollution or other environmental impacts. Such processes improve the understanding between organisations of their respective responsibilities and capabilities associated with environmental management.

In the North American package printing industry, research shows that upstream environmental collaboration (collaboration in early stages of the manufacturing process) led to improvements in process-based performance, such as superior delivery and greater flexibility from suppliers. Engaging in joint goal setting improved both the speed and reliability of delivery. Other research suggests that this type of improvement may also lead to enhanced financial performance.

Downstream collaboration, with customers and distributors, led to product improvements, such as improvements in durability and conformance to specifications. A degree of competitive advantage could be gained by involving downstream stakeholders through, for example, developing the capacities of the organisation. Collaboration on environmental issues with customers may also stimulate organisations to evaluate product quality, improving the overall performance of their products and reducing scrap rates.

Other studies have also found a strong link between involving external stakeholders in the implementation environmental management systems such as ISO 14001 and the degree of competitive advantage gained by ISO 14001 certification. Involving external stakeholders fosters the development of innovative solutions to environmental challenges which may have wider benefits to the organisation.

Environmental management practices continue to evolve, with companies implementing green purchasing policies, reverse logistics and product stewardship practices. This study highlights the benefits of these practices, in terms of manufacturing and environmental performance.

**Additional information:** Ways that business sectors can profit from improved environmental performance throughout the supply chain are also demonstrated by numerous projects co-funded under the EC's LIFE programme. Lists of relevant projects, videos, articles and publications featuring their results can be found in the thematic section on Environmental Management on the LIFE website: <http://ec.europa.eu/environment/life/themes/management/index.htm>

**Source:** Vachon, S., Klassen, R.D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. *International Journal of Production Economics*. 111: 299-315.



## **A selection of recent articles on Sustainable Consumption and Production from the *Science for Environment Policy* News Alert**

### **International policies needed to drive sustainable consumption (21/2/08)**

Problems with global sustainability are often blamed on the lifestyles of people living in developed countries, which in turn are emulated by those in less wealthy nations. The 'sufficiency strategy' suggests that if the rich consume less, global environmental impact would be lower. However, new research suggests that this is not necessarily the case. International political efforts, and not personal lifestyle changes alone, may be the only way to live sustainably.

### **Environmental Impacts of Recreational Boating (22/11/07)**

A recent report on the environmental impacts of recreational boating shows that the major issue is the management of waste water. Further research appears necessary on how to equip all boats with on-board water treatment systems.

### **Do Environmental Management Systems lead to new, cleaner Technologies? (08/11/07)**

Recently, a team of Slovenian researchers investigated the link between the Environmental Management System ISO 14001 and the introduction of new cleaner technologies in the Slovene metal and chemical industries. Their results show that the ISO 14001 standard is a very good way to move towards cleaner technologies.

### **Human Activities significantly decrease the Earth's Biological Productivity (31/10/07)**

How much of the biosphere's productivity can we appropriate before planetary systems begin to break down? Austrian researchers have recently quantified and mapped the impacts of human land use and biomass harvest on the biosphere. The results suggest that humans consume approximately 24 per cent of the organic matter contained in vegetation globally. This amount reduces energy available to other species, having a marked impact on biodiversity, flows of carbon, water and energy. Croplands and pastures now rival forests as the largest ecosystems on the planet, occupying 35 per cent of the ice-free land surface.

### **Are we meeting Sustainable Development Goals? (18/10/07)**

According to a recent study, the challenge to increase sustainable development is currently falling short, in spite of national and international sustainability goals. In fact, almost all national and regional trends are moving away from sustainable development, particularly in high income countries.

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