

Chapter 12

Sustainable Consumption by Design

Kate Fletcher, Emma Dewberry and Phillip Goggin

1. Introduction

In many ways, the environmental crisis is a design crisis. It is a consequence of how things are made ... constructed ... and used (Van der Ryn and Cowan 1996:9).

Design is about conception and planning, the intentional shaping of ideas into everyday objects, systems and settings. As such, it occupies the space between people and their surroundings. A space that both influences, and is influenced by, wants and needs, material choices and actions. It is this unique position of design as the interface between consumers and the activities of consumption, which firmly establishes its potential to influence the environmental and social impact of products and services and hence, to contribute towards the goals of sustainable development.

This chapter explores the role that design activities play in promoting more sustainable patterns of consumption. We proceed by investigating particular strategies with reference to a specific context: clothes washing, or more specifically, the design, production and consumption of washing machines, new developments in textiles, washing and clothing services and the socially- and culturally-determined need to keep clean. The social and cultural phenomena that are the subject of this chapter are necessarily situation-specific, particular to the United Kingdom at the beginning of the twenty first century. Yet it is in gaining such specific knowledge about a narrowly defined area that we can begin to draw inferences about the broader industrial framework and the role that design might play in a new trans-disciplinary dialogue on consumption.

2. Design for Sustainability

We address the design dimension of the environmental and social crisis explicitly by using the concept of *design for sustainability*. Rather than an aesthetic, the ideas embodied in design for sustainability connect and form alliances between people and their surroundings and are not tied to any individual design profession. Their inclusion in design profoundly challenges the dominant market position and status quo. These ideas question the major role played by design activities in such things as product differentiation, branding and

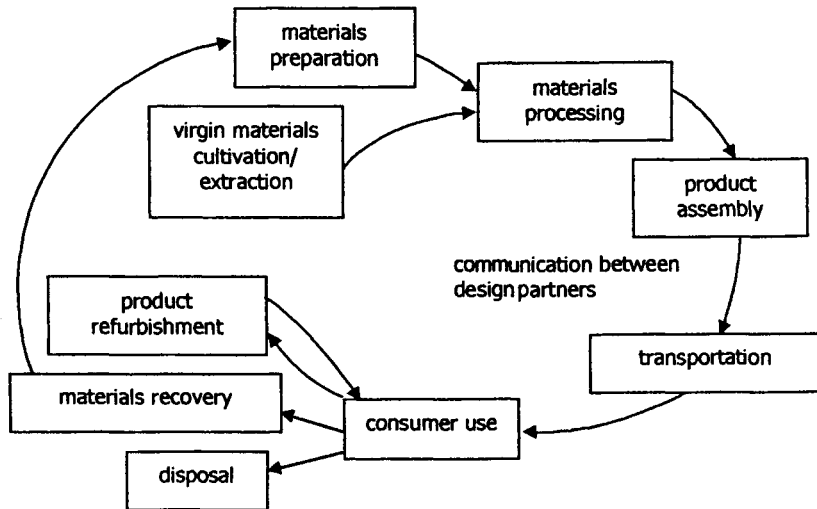


Figure 12.1: The product lifecycle.

advertising and in amplifying the consumption of material goods. They raise doubts about the reliance, in the conventional Western economic paradigm, on maximum consumption as a primary source of wealth creation and measure of happiness. They query unequal access to resources and exposure to risk between and within communities.

Proponents of design for sustainability typically express reservations about traditional views on who can design and what it involves (see, for example, Papanek 1995). Most fundamentally, they demand that an expanded view of design is taken, in which the implications of a design's entire *lifecycle* on both people and resource flows are considered. This involves connecting the design of a 'product' (an object, service or system) to the larger situation of materials extraction, production, use, reuse and disposal (refer to Figure 12.1). Focusing on the whole, rather than on fragments of systems, can reduce overall impact and prevent shifting resource consumption between different lifecycle stages. Lifecycle thinking necessitates a high level of design competence, intelligence and communication, supported by the involvement of new design partners such as community groups, the coming together of formal disciplines as diverse as anthropology and environmental science and bounded by the traditional, creative, organising skills embodied within design.

The importance of design as a force for sustainability has grown out of the realisation of its major role in determining the resources that are consumed. It is estimated that decisions made in design are responsible for 80 to 90 percent of a product's environmental and economic costs (Graedel *et al.*, 1995). Further recognition of its potential is found in environmental, economic and social policy documentation at national, regional and international levels (UK Foresight Programme 1998). This reflects the potential for design actions to be *preventative* actions. Preventing the conditions that lead to social and environmental problems is a key mechanism to achieve sustainability

(as set out, for example, in Principle 8 of Agenda 21). Preventative measures reduce the need for remedial 'clean-up' activity as they look for solutions elsewhere in the industrial economy, namely in the areas of conceptualisation and design (Jackson 1996). The concept of prevention is a radical one and is difficult to implement because of its wide social and cultural remit. Unlike remedial approaches, which often defer responsibility for environmental problems to institutions and technology, preventative actions require widespread societal commitment and lifestyle change. They therefore impress on all aspects of society, making collective, preventative action *cultural change* (Hirschhorn *et al.*, 1993). It is this influence on people's ideas, values and actions — on culture — where design for sustainability ideally should be focused; on envisaging more sustainable patterns of consumption.

Design is a solutions-orientated discipline and, while much design-related activity is focused on commerce and profiteering through the proliferation of goods and services, a number of strategies addressing the need for sustainable consumption are beginning to emerge. These vary by degree of influence and timescale, and range, in the short term, from simple recycling, reuse and efficiency schemes, to more challenging and long-term ideas such as displacing products with systems of service delivery or emphasising local- or community-based solutions to human needs. In other words, design for sustainability comprises some strategies concerned with *redesigning* that which is consumed (consuming greener); others which *reorganise* the way consumption takes place (consuming differently); and others still which *rediscover* the nature of needs and associated satisfiers (consuming appropriately). These strategies attempt to influence both the quantity and quality of consumption and can be clustered in three broad categories, each with a different focus:

- Product focus — making existing products more resource efficient;
- Results focus — producing the same outcome in different ways; and
- Needs focus — questioning the need fulfilled by the object, service or system, and how it is achieved.

As illustrated in Figure 12.2, the potential environmental benefits associated with each of these three categories — although generalised — is predicted to vary between a factor of four for product focus strategies, to a factor of 20 for strategies which focus on needs (Brezet 1997; von Weizsacker *et al.*, 1997; Manzini 1994). The greatest factor improvements occur over a long period as they are perceived as difficult to implement and require some form of cultural change. Lower-level improvements, in contrast, can be realised more easily as they generally involve familiar product types and require little change to established behavioural patterns.

3. Product Focus

Design for sustainability strategies with a product focus attempt to influence the impact of consumption by making existing products more efficient. Most design for sustainability activity to date has been concerned with this focus and considerable research is being

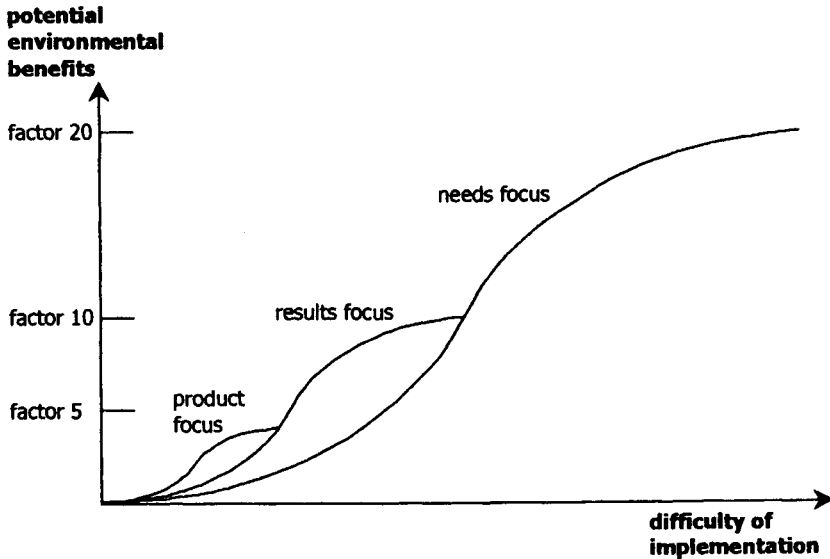


Figure 12.2: Approaches to design for sustainability.

undertaken on the development of methodologies (such as lifecycle assessment¹) to further refine current products and processes. In the particular context explored here — clothes washing — improvements in the design of washing machines have been shown to have significant potential. For example, a Danish study found that energy consumption could be reduced by more than 70 percent if the most efficient washing machines replaced existing stock (von Weizsacker *et al.*, 1997).

For a typical washing machine, 95 percent of its total environmental impact arises out of the phase of the lifecycle when the machine is in use (refer to Figure 12.3). Although washing machine manufacturers have directed some attention to issues associated with energy, water and detergent use, partly because of the development of eco-labelling schemes (see for example, Roy 1996), there is little evidence to suggest that the environmental implications of the way people use washing machines have been fully considered. One of the UK's white-goods manufacturers has designed a washing machine that is able to mechanically wash clothes in cold water with comparable results to warm-water washing. Resulting from an innovation in detergent technology, it removes the need to wash in heated water, thus saving energy without requiring a change in behaviour. In addition, the simple detergent ball or tablet is not only more effective than the dispensing tray in delivering detergent to the laundry but it also reduces resource consumption because less detergent is required or wasted during the wash cycle. Such simple ideas remove the

¹Lifecycle assessment (LCA) is a method by which key environmental burdens associated with a product, process or activity are recorded and assessed so that improvements can be identified.

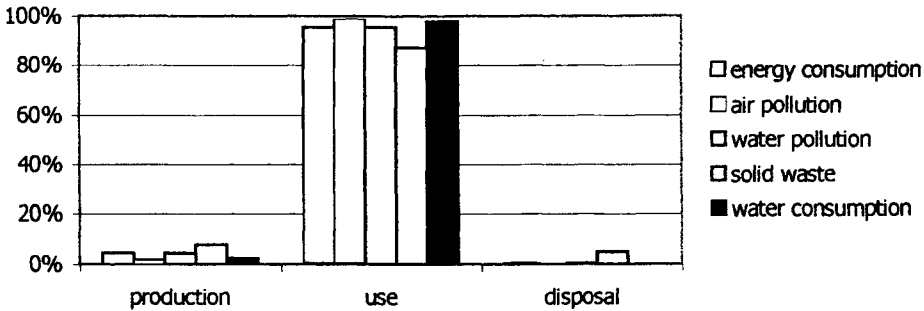


Figure 12.3: Contribution of lifecycle stages to total environmental impact for washing machines (PA Consulting Group, 1991).

need for complex water-heating and detergent-dosing mechanisms, as well as the sophisticated controls required to provide the range of wash programmes found in many machines.

Consumers' acceptance of product innovation is not straightforward. It can, for example, be inhibited by the sometimes-conflicting issues of product status, performance and cost. Features, such as cold-wash only, are seen by some companies as unacceptable platforms from which to launch and market new products. One UK firm, which conducted its own market research, convinced itself that inexpensive, simple, easy to use, reliable and long-lived washing machines would not sell because they were considered by potential customers as inferior and lacking status. This is a strong indicator of the enhanced image, choice and control (regardless of usefulness or environmental compatibility) that both companies and customers have come to expect of new products. A further factor limiting the acceptance of these technologies is the higher price frequently charged for environmentally superior machines, resulting in poorer households frequently being excluded from the potential benefits that these new technologies can bring. According to one study (Uitdenbogerd *et al.*, 1998) this is compounded further by poorer people not only using less efficient machines than those who are more well-off, but by them using these machines *more* frequently to do *more* laundry. It is suggested that this disparity may be because poorer households spend more time at home than their more affluent counterparts, and while at home textile maintenance is one of the jobs to be done, to take time over and/or pride in.

In addressing consumption issues associated with clothes washing, efficiency improvements in machines can be complemented by designing clothes that are 'easier' to clean (that is, cause less impact as they are washed). Just as with environmental burdens associated with washing machines, those resulting from the clothing lifecycle are mainly a consequence of use (refer to Figure 12.4). It is worth noting however that the design of 'environmentally friendly' garments and 'environmentally friendly' systems of laundering those garments have developed in isolation (Fletcher 1999).

The environmental impact associated with clothes laundering, as influenced by clothing design, can be reduced in a number of ways, including washing less frequently, on lower temperatures and in fuller loads. Garments can be designed, for example, that are more

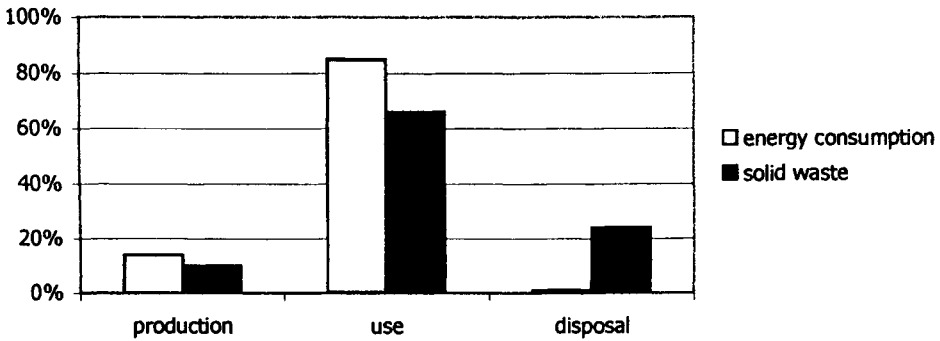


Figure 12.4: Contribution of lifecycle stages to total environmental impact for clothing (Franklin Associates, 1993).

resistant to soiling and odour. Stain-blocking coatings form a barrier around the fibres giving stain and soil repellency and deodorising fibres or layers act to control bacterial growth on the fibre surface. Such developments reduce resource consumption if their application translates into less frequent washing. However, without a change in current laundering habits, in which it has been shown that consumers rarely wash clothes to remove dirt (in Britain in 1993 there were on average only seven stains per load of washing, approximately 4 kg of textiles), few benefits are likely to be gained. As it is only when the removal of dirt is the principal motive for laundering that coatings begin to have an effect on washing frequency and hence on resource consumption.

Where the potential environmental benefits from developments such as coatings are determined by changes in behaviour, enquiries into current behaviour can also provide scope for improvement. For example, surveys of consumer behaviour reveal that different fibre types are laundered at different temperatures. Cotton items are commonly washed 'at the boil' (70°C), whereas synthetics are washed at 40°C. This means that by substituting 'synthetic' fibres for 'cotton', there is considerable potential to reduce impact associated with consumer care. Estimates suggest that making this switch can lead to up to 70 percent of energy consumed in laundering being saved. Thus it seems that selecting fibres that wash well on cool temperatures and dry quickly could bring major benefits. This is of course dependent on consumers correctly differentiating between different material types and washing them accordingly.

Evidence indicates, however, that this is not the case (Groot-Marcus and van Moll 1996). While there is approximately the same number of natural and synthetic textiles in circulation, cotton or cotton blends make up the bulk (89 percent) of washing loads. This perhaps indicates that cotton fabrics are laundered more frequently than synthetics (as well as on higher temperatures) and consequently have a higher impact (and therefore should be avoided). An alternative explanation could be that consumers are unsure of the fibre content of textiles and unconsciously launder non-cotton articles as cotton. Further, when studies of how people *sort* their laundry are taken into account, it is clear that in the majority of cases, sorting is done on the basis of colour and not fibre type. These variously

sorted loads are then laundered at hotter temperatures if they are white or light coloured than if they are made up predominately of dark shades. This suggests that the effects of consumption could be reduced by changing garment colour. Yet while restrictive use of colour may lessen the environmental impact of consumption in laundering, it fails to take account of the wider cultural, psychological and spiritual significance of colour for society and indicates the importance of wide ranging expertise in developing theory and practice relating to sustainable consumption.

Design for sustainability therefore has a major requirement to understand consumer actions in their many modes of operation. As exemplified above, more sustainable patterns of consumption are restricted — not by innovation, technology or the products themselves — but by people's behaviour, something not central to the product focus of design for sustainability to date. Thus in addition to consuming redesigned, 'greener' versions of existing products, more effective solutions may be sought by consuming in different ways.

4. Results Focus

Design for sustainability strategies also investigate the way existing products and combinations of resources are distributed, organised and used. Under this banner, some significant attention has been paid to the development of products — and systems of products — which are compatible with, and advance, product sharing. Shared products meet the same needs with fewer units by intensified product use. Many examples of product sharing exist, such as laundry facilities in densely populated urban areas, which make use of community or local authority-run machines. Such schemes it is popularly argued are successful and are held up as examples of 'good', efficient design (see for example, von Weizsaecker *et al.*, 1997). The centralised, community laundry reduces the number of machines in use, so lessening materials and processing costs; it reuses warmth and water by washing continuously rather than in inefficient batches; its single location allows the easy introduction of more sophisticated, efficient machines; and, its local site means that polluting transportation is reduced to a minimum. Further benefits of community- and locally-based laundering schemes can promote other, more sustainable practices. They may, for example, promote conviviality and encourage communication within and across communities and stimulate a range of other services such as childcare facilities.

However, while the technology and product infrastructure to support resource efficient community laundries is already in place, the necessary accompanying social infrastructure, of environmentally appropriate consumer behaviour and cultural acceptance, is less well developed. Thus it can be argued that it is the 'people' element of a community laundry that limits environmental improvement. Consumers are free to continue bad laundry practice such as the incorrect dosing of detergents; unnecessarily high washing temperatures; and semi-full loads. What is more, without changes in consumer behaviour, there are no major environmental benefits to be gained from using fewer washing machines more intensively. While a product-sharing scheme employs *production* resources more efficiently (one machine meets many people's needs), it does not address resource efficiency in *use* (clothes are still washed as frequently). And when the environmental cost of the use phase of the lifecycle is significant, as with this case, intensified use does not address areas

of major impact. Thus the actual number of washing machines in service makes little difference to the overall environmental impact of laundering. Rather, it is how the machines are used — consumer behaviour — which is most significant. A product-sharing scheme, such as a community laundry, therefore will bring few benefits if no change is made to consumer behaviour at the product interface. Further, these benefits will be dependent on cultural acceptance of the new scheme. In this instance, the social acceptance of community laundering would have to overcome obstacles that include the perceived inconvenience of clothes washing outside the home and the social stigma of laundries that are linked in many minds with poverty.

Many of the barriers to achieving significant environmental benefits from product-sharing schemes are also likely to affect the success of services. Preparing for the switch from the consumption of products to the utilisation of services is regarded as a key strategy in design for sustainability. Its basic premise is one that sees products as mere instruments or means to produce the needed functions to consumers (Meijkamp 1997), and thus the material components of the product are *utilised* rather than *consumed* by the user through a service or lease arrangement. The environmental benefits of selling utility or results rather than products arise out of the different role played by materials in the two schemes' drive for profit. In selling products, profit is maximised by selling more materials. In selling services, profit is maximised by serving more people with fewer materials. As the financial success of a service relies on resource efficiency; energy and materials inputs and associated environmental impacts have the potential to be reduced to a minimum.

There are already well-established laundry services that clean a range of textile products, most commonly hotel and hospital linen. These services offer wide-ranging environmental benefits: efficient, centralised operations reuse warmth, water and detergent; automatic dosing and loading of machines overcomes inefficient consumer behaviour; no direct access to washing machines dissuades consumers from 'casual' laundering. Yet, as with the design of product sharing schemes, it is unclear whether the design of services will bring unconditional environmental improvements. As argued above, intensified use of a product that causes most environmental impact as it is used, does not address key environmental problems. What is more, the requisites for a laundry service: higher washing temperatures (to maintain hygiene standards); clothes drying; and, transportation mean that a laundry service consumes more energy than private laundering (van den Hoed 1997).

In addition to overcoming resource inefficiencies, successful services have to engage with social, cultural and psychological issues, such as those surrounding material ownership and the need for display of status by means of prestige goods. While many services are based on material or product combinations of some sort (in this case, washing machines), the materials are not owned by, and in some instances are not visible to, the consumer. Yet, as is especially evident in Western culture, material ownership is a key symbol of wealth and social differentiation; materials being a culturally accepted satisfier of psychological needs. Against such a context, the lack of material presence of services may be seen to afford them dubious prestige. It is the prestige and the high levels of cultural attractiveness of alternative scenarios, such as services, that are widely accepted as imperatives for a smooth transition to a more sustainable system of production and consumption (Manzini 1994). Further, there is some concern that the disassociation

between object and source of satisfaction in service design may threaten moves towards sustainable consumption. Evidence to support this negative influence can be seen in services that use products as a mechanism to deliver results, but which place little value on the products themselves (such as mobile phones). The products, and the associated embodied materials and energy, are thus seen as expendable, and are frequently discarded or updated with changing technological or fashion trends.

Given that behaviour in laundering restricts the resource efficiency of garments, it would appear therefore that one possible solution would be to design clothes never to be washed. In that way, consumer behaviour in, and attitudes towards, clothes washing would be irrelevant. Hygienically and culturally, durable, no-wash clothes are currently unacceptable. Less contentious in conventional cultural terms, disposable clothes may offer a means to reduce environmental impact arising out of washing. The concept of disposability, however, undermines the culture of sustainability's traditional message of longevity; the implications of which could be far-reaching and impact upon how all garments — durable and disposable — are used, maintained and discarded. While disposable clothes prevent significant environmental impacts arising as a result of laundering, other impacts associated with the environmental cost of production: materials extraction, processing, distribution, reclamation and disposal have to be assessed. Disposability also has considerable implications for the perceived value of textile materials and textile aesthetics. Aesthetics in particular is likely to play a key role in making any alternative and more environmentally preferential system more attractive to consumers. Thus, the environmental compatibility of this system is still dependent on individuals. Without consumer acceptance and understanding of their role in the product lifecycle, the value of a highly organised and efficient system of producers, distributors and reclaimers would be reduced. This acknowledgement of the need for behavioural change in the success of design for sustainability strategies emphasises that a results focus, like the product focus described earlier, requires broader, more inclusive, more heterogeneous design priorities than those currently in operation.

5. Needs Focus

Heterogeneity necessitates that in addition to strategies that focus on products and results, design for sustainability explores fundamental human needs. Max-Neef (1992) identifies these specific, identifiable, underlying needs that are the same, regardless of nation, religion or culture as: subsistence, protection, affection, understanding, participation, creation, recreation, identity and freedom. The nine needs fall into two broad categories: physical (material) and psychological (non-material) needs. Crucially, while these needs stay the same, what changes with time and between individuals is how these needs are met or *satisfied*. Different satisfiers have different implications not only for those involved, but also for external factors such as the environment. This relationship between satisfiers and resource use, waste generation and pollution is particularly acute in the consumer society, where most satisfiers (for both categories of need) are materials-based and personal psychological well-being is equated with owning things and activities (Goodwin 1997).

Where satisfiers are manifest as products or services, they are the traditional — if unconscious — focus of design. In making needs (not satisfiers) the conscious centre of design activities, solutions can be approached in a non-conventional way. As each way of meeting needs has different social, material and environmental implications, new solutions, which are both more appropriate to people's needs and less resource-intensive, have the potential to be developed. Thus, in the context of this chapter, the shifting design emphasis can be plotted and shown to move from clothes washing (a product focus) through conceptions of clean clothes (a results focus). Finally it arrives at considerations of cleanliness and clothes use as a direct influence on the fundamental human need of subsistence (a needs focus). This is not just a semantic shift but describes a substantial conceptual leap for problem-solvers (designers and others associated with satisfying needs) and makes explicit a requirement to resolve traditional divisions between industrial or academic sectors, as needs are not sector specific.

In the laundering context, a needs focus questions the resource efficiency of wearing and laundering clothes — as without clothes there would be no clothes washing; and it also encourages designers to engage with societal and cultural perceptions of standards of cleanliness. Naturism, as a means to achieve more sustainable patterns of consumption, brings with it requirements for major attitudinal and infrastructural change. Assuming nakedness was acceptable, to protect the body and keep it warm (the ostensible function of clothing), resources would likely be consumed in other ways. If hirsute bodies with a high proportion of fat were promoted, there would be greater requirements for calorific foods. If body warmth were maintained by taking more exercise, from living and working in hotter climates, buildings or in closer physical proximity with people and/or animals, there would be concomitant resource implications.

Similarly, a modification in the collective definition of 'clean' has implications associated with changing washing behaviour. Cleanliness, while originally motivated by disease prevention, is now driven by social competition and is linked to cultural values such as success, acceptance and happiness (Hoy 1995). Thus, keeping clean, a practice legitimised and amplified by the marketing and product world built up around a culture of 'whiter than white', is used to satisfy not only the fundamental (and physical) need to prevent disease and so survive, but also as a means to meet other fundamental (but not physical) needs such as participation, affection and understanding. Likewise, clothes do not just meet the physical need for subsistence, but are also used as a means to satisfy other needs, which include identity, participation and creativity, among others. This makes the apparent function of both clothing and cleanliness of less importance than their symbolic function, that is as a sign of wealth, as a signal of belonging to a particular social group, of differentiation from that group, of self-esteem and so on.

Thus to avoid depriving people of their fundamental human needs, the conspicuous consumption of clothes and cleanliness cannot be dismissed without first promoting alternative ways of signalling who and what we are to others and advancing new parameters of social acceptance. In other words, the significance of products as complex satisfiers of human needs has to be understood before consumption of these same products can be reduced. The sociology of consumption and the semiotic value of goods and services thus become crucial to the development of design strategies that promote ideas of more sustainable consumption. To move towards the dual goals of meeting needs more effectively and

reducing material throughput and associated environmental impact, the relationship between needs, satisfiers and design output has to be disentangled. Thus enabling designers to engage with 'material' problems (like resource and energy efficiency) while at the same time, being aware of other needs and devising appropriate non-material satisfiers.

6. Conclusions

This chapter has explored the role played by design in achieving more sustainable patterns of consumption and has examined in detail a variety of approaches associated with clothes washing. While specific, the discussion has obvious relevance for all designed surroundings and includes various levels of approach which can include a focus on products, results and needs and also issues associated with materials, technology, systems, economics and consumer behaviour.

We have argued that achieving optimal environmental improvement through design is contingent on people and on understanding the way in which people respond to their material surroundings. Yet the most common approaches to design for sustainability tend to focus on pollution reduction and resource efficiency rather than human choices and actions. In contrast to this, design for sustainability with a focus on people considers ways of satisfying fundamental human needs. Here lies the greatest potential benefit: different satisfiers have different implications not only for people but also for other factors such as the environment. A focus on needs and the ways that needs are satisfied does not exclude the design and production of products, services or systems. Conversely, a focus on the design of products, services and systems cannot promote sustainable consumption without consideration of people's needs. Implicit in this is a requirement for designers to engage with issues underlying consumer actions, to understand behaviour in many contexts, and to connect with people's aspirations and expectations.

There is a dyadic relationship between design and policy where design not only makes policy real through practical output, but policy is also informed and revisited in the light of design practice. Design has potential as an agent of change for influencing more sustainable consumption. The design process itself is reflective, informed by other disciplines and areas of expertise and makes connections between people, policy and practice. As such, an effective manifesto for sustainable consumption can also be seen as a manifesto for design.

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