

# The Dominant Stances on Ecodesign: A Critique

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## Introduction

Environmental issues are not new to the design professions. William Morris was among the first to consider the environmental as well as the social implications of his work. Buckminster Fuller in the 1930s and Victor Papanek until recently, have carried the environmental baton and explored the numerous ecodesign concepts found today. Although not designers, Fritz Schumacher in his seminal work *Small Is Beautiful*<sup>1</sup> and Ivan Illich in *Tools for Conviviality*,<sup>2</sup> have helped shape many of the social, structural, and economic arguments that can facilitate design for healthy, equitable, and autonomous living. Yet, while designers have long drawn inspiration from critiques on the industrial economy; environmental policy making; alternative technology movements; systems thinking and city planning, among other subjects; it is only recently that there has been evidence of a reciprocal action: a growing interest in these quarters in design. For example, explicit reference now can be found to the significance of design in achieving environmental, economic, and social policy goals at national, regional, and international levels.<sup>3</sup> In many ways, this acknowledgment of the role of design in creating more sustainable forms of living and working is a reflection of the broadening concerns and issues that are increasingly accepted as influencing the work of designers. Such extension of the design space is evidenced through the shift from design for environment contained within the “factory gates,” to issues such as energy efficiency and recycling, to design for the whole product lifecycle and, more recently, to functional innovation and the integration of new design concepts within systems of service delivery.

It is within the above context, of an expanding and increasingly complex role for the design professions, that this paper is written. While it already is recognized that the scale of environmental impact depends on population size, what this population does, and the technology it uses,<sup>4</sup> the consideration in ecodesign of consumption, human choices, and actions has been overshadowed by an emphasis on pollution and resource use during production as the main object of environmental concern. Greater consideration in the ecodesign of anthropogenics and the social, cultural, and economic processes that shape environmental change seems overdue. This paper, therefore, examines dominant design approaches to environ-

1 E. F. Schumacher, *Small Is Beautiful* (London: Abacus Books, 1973).

2 Ivan Illich, *Tools for Conviviality* (London: Calder and Boyars, 1973).

3 See, for example: UK Foresight Programme in *Sustainable Technologies for a Cleaner World* (London: Office of Science and Technology, 1998), which sets out some key areas to integrate design thinking, sustainable development, and government action.

4 This is commonly referred to as the IPAT identity, (I=PxAT where I is impact, P population, A equates to a measure of affluence, and T a characteristic of technology) and is discussed in Paul Ehrlich and Ann Ehrlich, *The Population Explosion* (London: Hutchinson, 1990), 58.

mentalism with particular reference to consumer (human) behavior. Our context is clothes washing, or more specifically, the design, production, and consumption of washing machines; the provision of clean clothes; new developments in textiles, washing, and clothing services; and the socially and culturally determined need to keep clean. The social and cultural phenomena which are the subject of this paper are necessarily situation-specific—particular to the UK at the end of the twentieth century. Gaining such specific knowledge about a narrowly defined area is a small step in developing and understanding the dynamics of a broader framework or methodology, and once this task is complete, the issues identified can be expanded towards other sectors, countries, and models of development.

The environmental implications of consumer behavior are not just underrepresented in design but also in other disciplines, where there is no shared definition of consumption suitable for studying environmental effects nor a community dedicated to studying its dynamics. There are many factors that influence the environmental significance of consumption, influences which are “both direct and indirect; that are interdependent, acting in combinations rather than additively; that it will take many disciplines working together to understand; and that act on different time scales.”<sup>5</sup> This multidisciplinary, multi-temporal requirement represents a significant challenge for those involved in examining the human behavior/environment interface. It is a challenge which transcends the formalized boundaries of the natural and social sciences to include a necessary role for those who make decisions about the technologies we use, which includes the design professions.

### Ecodesign

For the purpose of this paper, the term *ecodesign* is used as shorthand to represent the wide range of design-environment approaches that are variously labeled “green design,” “ecological design,” and “sustainable (product) design,” among others. Distinctions between these terms have been set down elsewhere,<sup>6</sup> and embody differences between these approaches on issues of scale, ease of implementation, potential environmental benefits, and the focus of design activity.

This paper is organized around three broad clusters of *ecodesign* strategies, 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 satisfied. Rather than investigate terminology, it is the aim of this paper to show that the success of a range of approaches to *ecodesign* is at least partly contingent on people and that this largely has been overlooked to date.

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- 5 Paul C. Stern, Thomas Dietz, Vernon W. Ruttan, Robert H. Socolow, and James L. Sweeney, “Consumption as a Problem for Environmental Science” in *Environmentally Significant Consumption* Paul C. Stern, Thomas Dietz, Vernon W. Ruttan, Robert H. Socolow, and James L. Sweeney, eds. (Washington, DC: National Academy Press, 1997), 3.
- 6 See, for example: Pauline Madge, “Ecological Design: A New Critique,” *Design Issues* 13: 2 (1997): 44-54.

### Product Focus

Ecodesign strategies with a product focus attempt to influence environmental impact by making existing products more efficient. Most ecodesign activity to date has been concerned with this focus, and considerable research is being undertaken on the development of methodologies (such as lifecycle assessment<sup>7</sup>) to further refine current systems. 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 seventy percent if the most efficient washing machines replaced existing stock.<sup>8</sup>

For a typical washing machine, ninety-five percent of its total environmental impact arises out of the use phase of the lifecycle.<sup>9</sup> Consequently, it is this stage where most design attention is directed and, in particular, at issues associated with energy, water, and detergent use.<sup>10</sup> It certainly is possible to create washing machines which use these consumables more efficiently. Indeed, 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 sacrificing cleanliness. In addition, the simple detergent ball or tablet is not only more effective than the dispensing tray in delivering the detergents to the clothes, but also reduces resource consumption because less detergent is required or wasted during the wash cycle. Such simple ideas remove the need for complex water heating and detergent-dosing mechanisms, as well as the sophisticated controls required to provide the range of wash programs found in many machines.

Consumers' acceptance of these design outputs is, however, inhibited due to the sometimes conflicting barriers of product status, performance, and cost. These new features—or rather the lack of them—are seen by some companies as unacceptable platforms from which to launch and market new products. One UK firm conducted its own market research, which convinced it 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. While this is a comfortable conclusion for a white goods manufacturer to draw as it endorses current business practice, it also is indicative of the enhanced image, choice, and control (regardless of usefulness) which customers have come to expect of new products. Further, it is a signal, borne out by evidence from other sectors, that products commonly are consumed as expressions of wealth, lifestyle, and identity.<sup>11</sup>

A further factor limiting the acceptance of these technologies is that white goods is a saturated market, with most washing machine purchases bought as replacements. This means that it is

7 Lifecycle assessment (LCA) is a method by which all environmental burdens associated with a product, process, or activity are recorded and assessed so that opportunities for improvement can be identified.

8 Ernst von Weizsaecker, Amory B. Lovins, and L. Hunter Lovins, *Factor Four: Doubling Wealth, Halving Resources* (London: Earthscan, 1997), 30-31.

9 PA Consulting Group, *Environmental Labeling of Washing Machines: A Pilot Study for the DTI/DOE* (Royston, Hertfordshire: PA Consulting Group, 1991).

10 See, for example: Robin Roy, "Designing a Greener Product: The Hoover 'New Wave' Washing Machine Range," *Codesign: The Interdisciplinary Journal of Design and Contextual Studies* 5&6 (1996): 34-39.

11 Neva R. Goodwin, "Overview Essay" in *The Consumer Society*, Neva R. Goodwin, Frank Ackerman, and David Kiron, eds. (Washington, DC: Island Press, 1997), 3.

unrealistic to expect immediate and widespread substitution of existing washing machines with the most efficient alternatives. Cost also inhibits extensive take-up, because environmentally superior machines tend to be more expensive than their less-efficient equivalents. This effectively excludes a substantial section of the market from using the most efficient machines, with the implication that those with less money have little choice but to pollute more than the rich. Compounding this further, it appears that, not only do the poor use less efficient machines than those who are more well-off, but they use these machines *more* frequently to do *more* laundry. It has been suggested that this is because they 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.<sup>12</sup>

In addition to improvements in the design of washing machines, ecodesign strategies with a product focus extend to 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.<sup>13</sup> Yet it is the case that the environmental approach of the textile and clothing sector has not focused on use but instead on remedial “cleanup” treatments and resource management in textile processing. Thus, the design of “environmentally friendly” garments and “environmentally friendly” systems of laundering these same garments have developed in isolation.<sup>14</sup>

The 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 resistant to soiling and odor. Stain-blocking coatings form a barrier around the fibers, giving stain and soil repellency, and deodorizing fibers or layers act to control bacterial growth on the fiber 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 four kg of textiles.) few benefits are likely to be gained. Since it is only when the removal of dirt is the principal motive for laundering, and then only when laundering is delayed until the dirt shows, that coatings begin to affect washing frequency, and hence, resource consumption.

Where the potential environmental benefits from developments such as coatings are determined by changes in behavior, inquiry into current behavior can also provide scope for environmental improvement. For example, studies reveal that different fiber types are laundered on different temperatures. Cotton items are

12 Diana E. Uitdenbogerd, Nienke M. Brouwer, and Ans P. Groot-Marcus, *Domestic Energy-Saving Potentials for Food and Textiles: An Empirical Study* (Wageningen, The Netherlands: Agricultural University, 1998), 42.

13 Franklin Associates, *Resource and Environmental Profile Analysis of a Manufactured Apparel Product: Woman's Knit Polyester Blouse* (Washington, DC: American Fiber Manufacturers Association, 1993).

14 Kate T. Fletcher, *Environmental Improvement by Design: An Investigation of the UK Textile Industry* (Ph.D. thesis, London: Chelsea College of Art & Design, The London Institute, 1999), 27, 268.

commonly washed at the boil (70°C), while synthetics are washed at 40°C. This means that, by substituting synthetic fibers for cotton, there is considerable potential to reduce the environmental impact associated with consumer care. Indeed, estimates suggest that making this switch may result in saving up to seventy percent of the energy consumed in laundering. Thus, it seems that selecting fibers 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. While there are approximately the same number of natural and synthetic textiles in circulation, cotton or cotton blends make up the bulk (eighty-nine percent) of washing loads.<sup>15</sup> This indicates that cotton fabrics are laundered more frequently than synthetics (as well as on higher temperatures) and, subsequently, have a higher environmental impact (and therefore should be avoided). An alternative explanation, however, is that consumers are unsure of the fiber content of textiles and unconsciously launder non-cotton articles as cotton. If this is the case, careful specification of particular fibers in the design stage would be ineffectual, because the majority of textiles are laundered as cotton regardless of their actual fiber content.

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 color and not fiber type. These variously sorted loads then are then laundered at hotter temperatures if they are white or light colored than if they are made up predominately of darker shades. This suggests that color, as well as fiber type, influences the way in which a textile is laundered, and provides some potential for an alternative and lower impact way to satisfy the need for clean clothes. The volume of laundry is another variable that can be influenced by textile and clothing design. However, observations of actual laundering practices again reveal that a reduction in the volume of laundering (perhaps through modular design, for example detachable collars and cuffs) would only bring environmental benefits through less frequent washing in particular households. While it is the case that large households, which generate large volumes of laundry and normally wash in full loads, probably would be affected positively by modular design and have wash frequency reduced, small households would not. One- or two-person households (of which there are an increasing number) tend to wash when dirty items are needed, rather than wait for a full load to accumulate. By reducing the volume of laundry further via modular design, small households would likely continue the same frequency of washing, but with ever smaller load sizes, resulting in progressively less-efficient resource use.

Ecodesign, therefore, has a major requirement to understand consumer actions in their many modes of operation. Thus, we

15 Ans P. Groot-Marcus and Mirjam van Moll, "Textile characteristics, Laundering and the Environment," *Journal of Consumer Studies and Home Economics* 20 (1996): 261-273.

return to the recurring theme of this paper, personal (human) behavior; and it is chiefly the constraints of this, rather than determinants of a technological or conceptual nature, which are the main barriers to the introduction of a range of ecodesign strategies.

### Results Focus

Ecodesign strategies also extend to investigating the way existing products and combinations of resources are distributed, organized, 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.<sup>16</sup> The centralized, 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. Community or locally based laundering schemes can promote other, more sustainable practices, too. They may, for example, support conviviality and encourage communication within and across communities, as well as stimulate other services such as a local notice board or child-care facilities.

However, while the technology and product infrastructure to support resource efficient community laundries already is in place, the necessary accompanying social infrastructure, of appropriate consumer behavior and cultural acceptance, is less well developed. The result is that community laundries (and, by implication, product-sharing schemes in general) do not necessarily bring major environmental benefits. Such a conclusion may be seen as antithetical to accepted stances on ecodesign, yet it provides us with evidence—which will be further supplemented throughout this paper—of the need to regroup our thoughts, actions, and priorities on ecodesign. There is a need to reorganize in such a way that the major factor constraining assumptions about the success of ecodesign strategies, human behavior, is brought to center stage. According to David Orr<sup>17</sup> it is only then, and through recognition of the “limited and fallible” nature of people, that we can begin to propose a process of redesigning and rebuilding a more sustainable world from the bottom up and, in so doing, engage a more “active and competent citizenry.”

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: incorrect

16 von Weizsaecker, et al., *Factor Four: Doubling Wealth, Halving Resources*, 93.

17 David Orr, *Ecological Literacy* (Albany: State University of New York Press, 1992), 29.

dosing of detergents; unnecessarily high washing temperatures; and semi-full loads. Without changes in consumer behavior, 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). When the environmental cost of the use phase is significant (as with this case), intensified use does not address areas of major impact. Therefore, 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 behavior—that is most significant. A product-sharing scheme, such as a community laundry, will bring few benefits if no change is made to consumer behavior in the way products are used. Further, these benefits are dependent on cultural acceptance of the new scheme which, in this instance, would have to overcome such issues as the perceived inconvenience of clothes washing outside the home and the social stigma of laundries, linked in many minds with poverty.

Many of the barriers to achieving significant environmental benefits from product-sharing schemes also are likely to affect the success of services. Preparing for the switch from the consumption of products to the utilization of services is regarded as one of the cornerstones of the ecological approach to design. Its basic premise is that products are, "mere instruments or means to produce the needed functions to consumers,"<sup>18</sup> and thus the material components of the product are *utilized* 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 maximized by selling more materials. In selling services, profit is maximized by serving more people with fewer materials. Since 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 already are well-established laundry services which clean a range of textile products, most commonly hotel and hospital linen. These services offer tangible environmental benefits: efficient, centralized operations reuse thermal energy, water, electricity, and detergent; automatic dosing and loading of machines overcomes inefficient consumer behavior; and 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, the intensified use of a product which causes the greatest environmental impact as it is used does not address key environmental problems. Also, the requisites for a

18 Rens Meijkamp, "Changing Consumer Needs by Eco-efficient Services," *Towards Sustainable Product Design Conference Proceedings* (Farnham, UK: The Centre for Sustainable Design, 1997), unpaginated.

laundry service: higher washing temperatures (to maintain hygiene standards); clothes drying; and transportation mean that a laundry service consumes more energy than private laundering.<sup>19</sup>

In addition to overcoming such resource inefficiencies, successful services have to address social, cultural, and psychological issues, such as those surrounding material ownership and the 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 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 are a culturally accepted satisfier of psychological needs. Against such a context, the lack of material representation of services on consumption gives them dubious prestige. And it is prestige and high levels of cultural attractiveness of alternative solutions, such as services, that are widely accepted as imperative for a smooth transition to a more sustainable system of production and consumption.<sup>20</sup>

Consumers of services fulfill their need not by material ownership, but by buying results. There is some concern, however, that the disassociation between object and source of satisfaction in service design may further undermine environmental improvement. Evidence to support this negative influence can be seen in services which use products as a mechanism to deliver results, but which place little value on the them (for example, mobile phones). The products, and the associated embodied materials and energy, thus are seen as expendable, and are frequently discarded or updated with changing technology and fashion trends.

Clean clothes (rather than just cleaning equipment) also could be delivered as a service. A clean clothes service is not without precedent. Formal dress, for example, can be rented and then returned to the owner, who maximizes profit by minimizing the costs of upkeep. Potential environmental benefits arise from there being fewer items and from the economies of scale associated with laundering large volumes in an efficient way. However, many of the arguments raised above, such as there being few benefits from the intensified use of a product (in this case, a garment) which causes most impact as it is used, still stand. Clothes would have to be cleaned (or "serviced") on a very regular basis at significant cost and at the supplier's expense. Of paramount concern to the supplier, therefore, is the need to minimize the costs of consumer use, by reducing the frequency of laundering, making laundering more efficient, or avoiding it altogether.

Given that behavior in laundering restricts the resource efficiency of garments, it therefore would appear that one possible solution would be to design clothes never to be washed. In that way, consumer behavior in, and attitudes towards, clothes washing would be irrelevant. Hygienically and culturally, durable, no-wash

19 Robert van den Hoed, "Sustainable Washing of Clothes," *Towards Sustainable Product Design Conference Proceedings* (Farnham, UK: The Centre for Sustainable Design, 1997), unpaginated.

20 Ezio Manzini, "Design, Environment, and Social Quality: From 'Existenzminimum' to 'Quality Maximum,'" *Design Issues* 10:1 (1994): 37-3.

clothes are currently unacceptable. Less contentious in cultural terms, disposable clothes may offer a means to reduce environmental impact arising out of washing. The concept of disposability, however, undermines sustainable development's traditional message of longevity; the implications of which could be far-reaching and impact upon how all garments—long and short life—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.

There is no available evidence which compares environmental loadings arising out of the production of say, fifty disposable items to the cost of producing one durable item and laundering it fifty times. Environmentally responsible, no-wash garments presuppose an efficient product and processing sequence, low-impact materials, nonpolluting transportation, and an effective and economical cycle of materials reclamation and reuse. The efficacy with which current systems of textile and clothing production and reclamation could meet such requirements still is to be investigated. It would seem likely, however, that major improvements in materials, production, distribution, and reclamation efficiency would be necessary. While barriers to the introduction of no-wash garments are mainly organizational, technical and, to a certain extent, conceptual (indeed this article represents its nascent stage), the environmental compatibility of this system still is dependent on individuals. Without consumer acceptance, a highly organized and efficient system of producers, distributors, and reclaimers would collapse.

Just as the ecological implications of short life, no-wash garments are uncertain, so are their implications for a wide range of interest groups such as designers, producers, and consumers. Further, the necessary and frequent replacement of clothing in a short-life system will impact on fashion cycles, particularly in the short term, probably stimulating an increasing rate of change in fashion trends. Changing trends are problematic in environmental terms for products with materials and a structure designed to last, as they induce premature replacement and wasted resources. However, products with a life-span shorter than the fashion cycle are used up before they can become obsolete and, in part, appear to transcend fashion and the problem of fashion-induced obsolescence. This raises some interesting questions relating to the form a fashion trend would take in such circumstances and how rapid a rate of change the fashion industry could sustain. Disposability also has tremendous implications for the perceived value of textile materials and textile aesthetics. Aesthetics, in particular, are likely to play a key role in making any alternative, environmentally preferential system more attractive to consumers.

This acknowledgment of the importance of consumers and their behavior in the success of ecodesign strategies emphasizes that a results focus, like the product focus described earlier, requires broader, more inclusive design priorities than those currently in operation. The heterogeneous nature of consumer behavior means that ultimate resource efficiency will require different fabrics with different characteristics and different lengths of life to be linked to different end users.

### Needs Focus

Unlike strategies, which focus on products and results, a needs focus in ecodesign is, by definition, concerned with people. At this level, a particular human need can be approached in a nonconventional way, and because each way of meeting needs has different material and environmental implications, new and less resource-intensive solutions have the potential to be developed. Thus in the context of this paper, 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), and finally to considerations of cleanliness (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 sectors since needs are not sector specific. Examples of a needs focus in ecodesign are extremely limited, and yet it is here that the people-centered frame of reference for ecodesign activity has to be established.

In the context explored in this paper, the needs focus engages with societal and cultural perceptions about cleanliness, the ways in which we keep clean having major implications for consumer washing behavior and associated environmental impact. Cleanliness, while originally motivated by disease prevention and satisfying the fundamental human need for protection, now is driven by social competition and is linked to cultural values such as "success," "acceptance," and "happiness."<sup>21</sup> Thus, keeping clean has become a structurally determined need and one legitimized by the marketing and product world built up around a culture of "whiter than white." And just as with consumer reluctance to accept inexpensive and durable washing machines because of their perceived inferiority and lack of identity, cleanliness' dominant social status and complex cultural significance makes modification of present-day hygiene standards difficult. Cultural norms change constantly, but the ways in which they do so are not easily predicted or influenced.

The complex, interrelated, and constantly changing relationship between design and culture perhaps has restricted the evolution of design-led examples of alternative, and more environmentally responsible, ways to approach needs. It is likely, however, that these gaps in theory and practice are not found in

21 Suellen Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (New York: Oxford University Press, 1995), 171.

design alone, but also in other fields of study. Some of these gaps are starting to be addressed by ad hoc, informal moves to “down-shift” or embrace alternative lifestyles. Design is enriched by giving form and currency to this focus on needs, and thus maximizing opportunities for environmental improvement.

### Conclusions

This paper provides a critique of ecodesign, examining 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 include issues around technology, systems, economics, and perceptions of consumer behavior.

It is argued that achieving optimal environmental gains through design is contingent upon people and on understanding the way in which people respond to their material surroundings. Yet the dominant approaches to ecodesign to date tend to focus on pollution and resource use in production, rather than human choices and actions. In contrast to this, a people focus in ecodesign considers ways of satisfying fundamental human needs and, we would suggest, here lies the greatest potential benefits: different satisfiers have different implications not only for those involved, but also for external 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 continue without consideration of people’s needs. Implicit within this is a requirement to deal with issues underlying consumer actions, to understand behavior in many contexts, and to connect with people’s aspirations and expectations.