Attitudes of South African environmentalists on the domestic use of renewable energy sources

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ABSTRACT

The paucity of literature on the perceptions and attitudes of South Africans on recycling, reusing, and reducing the number of resources used suggests the need for an exploration of these environmental issues. The current energy situation in South Africa may impact on South Africans' perceptions on quality of life issues that are thought to accompany the use of renewable energy sources such as solar power. This research aims to explore the attitudes and perceptions of environmentalists towards renewable energy, and to explore the lack of implementation from a psychological perspective. Attitudes and perceived implications for quality of life were explored by means of in-depth interviews with eight participants. A three stage qualitative analysis of the data culminated in six pattern categories: These are: participants' learned attitude toward the environment, the role of responsibility and its influence on perceived quality of life, risk perception as inhibitor of action, renewable energy and the perception of self, renewable energy as available medium, and the possibility of change of attitude toward renewable energy sources. Each of these categories is discussed in depth. Specific recommendations for future research are outlined.

Keywords: environment; environmental attitudes and perceptions; quality of life; renewable energy sources; solar power; systems theory

The necessity of finding alternative means of energy generation is evident from the current energy crisis in South Africa. Statements made by the World Council for Renewable Energy, which indicate that the current world dependence on the

provision of energy through the burning of fossil fuels cannot be sustained for much longer than 40 years (Olivier, 2004) only emphasises this problem. Considerable resources are spent in developing and marketing sustainable and efficient solutions for energy provision (Bothma, 2004; Napier, 2000).

In South Africa, as in elsewhere, there are both personal and policy challenges to saving energy and converting to renewable energy use. Perceptions of changes to quality of life may be one of the challenges that an individual faces. Quality of life is defined in terms of satisfaction with those aspects of life that the individual values most. The individual is seen to be the only accurate judge of quality of life, for only individuals are able to judge what they value (Ferrans, 1996). Physical and emotional comfort impacts on the lifestyle of the individual to a large extent (Greenhaus, Callanan, & Godshalk, 2000). The use of energy plays a vital role in the satisfaction of our wants, and influences our quality of life by sustaining our basic needs such as movement, warmth, and nourishment.

According to Bothma (2004), obstacles and challenges include the relatively low cost of electricity to the South African consumer and a lack of legislation to drive the process of reducing energy use. As long as members of parliament, journalists, scientists, and the general public believe that renewable energy cannot replace conventional energy, the use of fossil fuels will continue (Olivier, 2004). Furthermore, many individuals and companies in South Africa may still claim that the protection of the environment is not their responsibility. Environmental problems tend to be externalised (Carley & Christie, 1992), thus emphasising the need for governments, companies and environmental activists to know what individuals think, what they are willing to give up, what they cherish, and why they maintain habitual patterns of behaviour.

Behaviour, and the thought processes behind the behaviour, has formed the cornerstone of the exploration of environmental behaviour. Environmental values (Poortinga, Steg, & Vlek, 2004), concern for the environment (Carlson & van Staden, 2006; Poortinga et al., 2004; Teisl & O'Brien, 2003) and the intention to act in an environmentally friendly or responsible way (Knussen, Yule, MacKenzie, & Wells, 2004; Ouelette & Wood, 1998) are used to explicate the basis for action and behaviour. Knussen et al. (2004) and Thøgersen (2004) have studied the planning of behaviour, which has lead to an emphasis on behavioural habits. Similarly, Ouelette and Wood (1998) emphasise that intentions tend to be repeated in a semiautomatic, non-habitual manner, without being based on conscious reasoning – similar to simple habits. Habits are defined as an association between stimulus and response (Shaffer, 1999). These habits have the potential to become highly automated after continued exposure to the same or similar stimulus response loops and could eventually become 'stable aspects of one's personality' (p. 47).

Complex action may become routinised when a person does not execute the action as force of habit, but in a more semiautomatic response pattern (Bargh, 1989). These kinds of semiautomatic responses and habits have received much attention in the literature because of the impact that high-frequency behaviours have on the environment (Thøgersen, 1994; Verplanken, Aarts, van Knippenberg, & Moonen, 1998). In this regard, past behaviour and intentions could also be a predictor of the perceived level of behavioural control towards the environment (Terry, Hogg, & White, 1999).

Thøgersen (2004) links environmentally- responsible behaviour to locus of control by stating that a lack of perceived control influences the level to which an individual acts responsibly toward the environment. On a social level, Thøgersen and Olander (2003) state that individuals may discount the moral *status quo* governing acceptable behaviour by absolving themselves of the responsibility arising from their current behaviour and denying any serious consequences that may arise from their continued behaviour.

Thøgersen (1994, 2004) explains cognitive dissonance, perceived control, and locus of control in more detail. Dissonance arises when actions are inconsistent with perceptions or beliefs and the degree of dissonance is a result of a person's perception of the association between behaviour and the overall goal, and a person's perceived control over the behaviour: 'i.e., whether the reason for performing a behaviour is attributed to intrinsic motivation or external forces' (Thøgersen, 2004, p. 94).

The paucity of literature on South Africans' attitudes towards recycling, reusing, and reducing the number of resources used, suggests the need for more exploration of this topic. The specific focus of the study is the problems experienced by environmentally-inclined individuals in exhibiting environmentally-friendly behaviour. The decision to explore the perceptions and attitudes surrounding the domestic use of renewable sources of energy followed from this.

The study aims to explore the attitudes and perceptions of people towards renewable energy and its lack of implementation. It also focuses on the perceptions of South African environmentalists of the implications of using renewable sources of energy in the home for improving quality of life, as well as their more general attitudes towards renewable sources, in an attempt to identify key issues that will allow for further investigation. We define environmentalists as professionals who concern themselves with environmental issues on a daily basis. Environmental issues would include aspects of sustainability and conservation of finite natural resources and would refer, for instance, to the impact of large-scale pollution on communities, the mitigation of this impact, as well as the prevention thereof. From the nature of their work, we assume that the attitudes of environmentalists may be more indicative

of prevalent environmental issues and constraints for implementation of renewable energy sources than the attitudes of the general public. We do not assume that environmentalists are a homogenous group or tend to have positive attitudes toward the use of renewable energy sources, but rather that their exposure to inhibitors to environmentally-friendly behaviour could be a rich source of information.

Bothma (2004) points out that the –

> South African climate is virtually ideal for several climate-responsive energy-efficient techniques. Especially due to the high solar radiation levels there is potential for various active and passive solar design techniques and technologies. (p. ii)

The type of renewable energy explored in this study was solar energy for domestic use.

METHOD

The use of a qualitative methodology supported the study objective of exploring the perceived implications to quality of life and the attitudes toward the domestic use of renewable energy sources, specifically solar energy. Miles and Huberman (1994) note that a qualitative methodology is particularly useful when information pertaining specifically to the experiences of individuals is desired. An in-depth interview was used to lift the perceptions, assumptions and prejudices of the participants from their subconscious (Miles & Huberman, 1994) and yielded detailed information about the way in which the participants, as energy consumers, perceive the energy environment. The use of an in-depth interview enabled the participants to respond in a natural manner and made it possible for the researcher to elicit the psychological and social world of the participant (Smith, 1998).

Participants

Interviews were conducted with eight South African environmentalists. An equal number of females and males were interviewed ranging between the ages of 27 and 59. The mean age of participants was 37.5 years. The criteria for choosing participants were that they should work in the environmental sphere on a daily basis, and that they should receive remuneration for their services in this sphere. Some participants were identified by the principal researcher (first author), based on these criteria. Once some participants who met the criteria had been included in the sample, snowball sampling was used to identify additional participants. Snowball sampling is particularly useful when taking some form of interaction or linkage into account throughout the research. Participants thus referred the researcher to

other possible participants, whom they thought would be inclined to take part in the study.

All the participants resided in the Gauteng region (the hub of economic activity in South Africa). All participants had degrees or postgraduate qualifications relating to environmental management or impact assessment.

Interview guide

An interview guide was developed and piloted with two participants. As a result of the pilot study the researchers included a vignette in the interview guide. This was done in order to elicit important points in the study of perceptions, beliefs, and attitudes from participants in a more natural manner (Hughes, 1998). Some themes for discussion were suggested by means of the questions that followed the vignette. The suggested themes included:

(a) Exploring the daily life of the participant in order to understand their level of exposure to environmental issues on a daily basis;

(b) The level of environmental concern;

(c) The level of understanding of available renewable resources;

(d) The necessity of the use of renewable resources;

(e) The cost implication to the environment of conventional energy generation versus generation by means of renewable energy sources;

(f) The cost of the domestic use of renewable energy sources;

(g) The perceptions coupled with the domestic use of renewable energy sources;

(h) The implications (on a micro-, meso- and macro level) of the domestic use of a renewable energy systems; and

(i) The perceived change in lifestyle as a result of the domestic use of a renewable energy system.

Data collection

The principal researcher contacted potential participants via e-mail and sent them an information sheet that outlined the purpose and duration of the study, their rights, and the criteria for participation, and asked for their consent to be recorded. All participants took part in the study voluntarily and signed consent forms to this effect. Arrangements were made to conduct interviews at locations which suited them best, resulting in most of the interviews taking place either at the participants' or the

interviewer's workplace. The principal researcher conducted all the interviews, which she recorded and later transcribed, thus enabling her to remain close to the data (Henning, van Rensburg, & Smit, 2004).

ANALYSIS

A systems theoretical approach was adopted during the whole study, which became particularly relevant throughout the analysis stage. Systems theory emphasises the interconnectedness of the experiencing individual (the energy-consumer system) and the experienced environment (Bateson, 1972). This theory also advocates that the researcher becomes part of the research through the process of interpretation (Bateson, 1972) both during transcription and the data analysis that follows (Mouton, 1996). Analysis of the data was done in three stages. The first stage of analysis involved the researcher in the data. The researcher got to know the data by means of repeated reading. During this repeated reading, 64 topics were identified, by way of phrases, sentences or words describing feelings and perceptions participants raised during the interviews. The 64 identified topics contained value statements such as a positive or a negative attitude toward solar energy. A topic schedule was developed to enable the researcher to group the topics into categories.

Preliminary categories emerged from the reading and topic identification phases. As part of the first stage of analysis, 16 categories consisting of the identified topics were identified (Henning et al., 2004). Categories were initially identified through the use of sentences and phrases identifying a topic. These categories were then appropriately named and value statements of the topics were made redundant by the value-free category descriptions. A description of these categories enabled a conceptual construction of themes that suited the data.

The second stage of analysis involved a higher order classification of the categories identified during the first stage of analysis. Six pattern categories were identified and consisted of grouping the identified categories in the first stage of analysis. A description of the categories was repeated in the third stage of analysis; however, greater emphasis was placed on the relationships between the identified categories and the individual. These relationships are discussed for each pattern category and the link between the categories is highlighted where applicable.

RESULTS AND DISCUSSION

Six pattern categories were identified through the process of analysis. Each pattern category (PC) (second stage of analysis) will be discussed below with its first order categories and their topics presented in table format. The third level of analysis is briefly discussed in the conclusion section.

Participants' learned attitude toward the environment (PC 1)

Table 1: First order categories and topics for PC 1

First order category name	Topics included in category	Direct quotes
Cost – maintenance	Maintenance costs are high	*Because once that thing gets damaged, there's a lot of cost, particularly with a lot of movement and that (#5)*
Cost – environmental	Effects on the environment	*. . . the electricity that we have available in the grid actually doesn't reflect the cost to the environment (#6)*
Financial feasibility of electricity	Price of electricity is low	*And if you take South Africa, although it is a developing country, it can't just shake that responsibility, because we have the lowest energy price on earth (#8)*
Psychological inertia	Slow change Importance of change of current practice Unexpected change	*You can't expect people to now start doing things in a completely different way, with possible financial implications, you know, you have to give a little… (#1)*
Maintenance	High and low maintenance Predictability of maintenance	*. . . the more high tech things are more visible, you have to have a panel on your roof and something on the side for water, so . . . I think people are reluctant to let into their lives something that requires a lot of maintenance and operation and whatever… (#1)*

Perceived impact on comfort	Personal benefit observation Lifestyle changes (positive and negative) Visual impact is high Trust in the system (high and low)	*You know what? It is too much hassle to change, because you have got it [conventional electricity] now, so why bother? (#3)* *There's obviously changes you will have to make in your lifestyle, but not that much (#3)* *The panels have to be big enough but at this stage I don't think it is possible to have a panel that is big enough (#7)*
Effort	High effort levels	*I believe most people are aware of the concept [of renewable energy] but that they don't create (...) the actual schlep to use the high tech system that it takes, or they couldn't be bothered (#1)*
Commitment to environment	Political will and drive to implementation is high	*But solar energy, specifically solar water energy . . . there's quite a significant grant from the government's side, or a lot of talk in that direction at least (#1)*
Legislation	Legislation as tool to force use	*I think what lacks is the legislation to support it. There isn't legislation to force people to use renewable energy in the first instance . . . (#7)*
Positive and negative stigma around environmentalism	Negative attitude toward renewable energy in general Positive attitudes toward renewable energy in general Importance of energy efficiency is high	*Solar is obviously a big one all over. A lot of people use cow-dung (#7)* *We have the solar potential, and we could look much more at wind energy as well. The other possibilities in terms of energy generation could be explored as well . . . (#8)* *If you look at what is happening world wide, there is a big move for energy efficiency and against global warming (#8)*

Trust in technology	Inconveniences of the system Efficiency of renewable technology	*One difficulty with the system is, of course, if your geyser heats up during the day and at night time you empty it, there isn't hot water for a warm shower if you need one the next day (#6)* *We haven't gone up to look at it once, it just works (#6)*

Pattern category 1 (see table 1) suggests that social learning plays a role in the acquisition of attitudes; in this case attitudes towards the environment and attitudes towards renewable energy (Pennington, 1986). The perceived cost of maintenance and the cost to the environment as well as the general stigma attached to environmentalism could be perceptions learned from parental and wider social examples. The learned attitude can become a habit that is less flexible and more subconscious (Pennington, 1986). It constitutes a level of unwillingness to change – referred to in this case as psychological inertia. The tendency of being psychologically inert seems to indicate that participants act in accordance with their current behaviour in order to avoid disharmony between their attitudes and behaviour (Festinger, 1957).

Another aspect of habits includes a certain level of automatism. In general, people tend to prefer little change in the responses expected of them (and their learned attitude) and therefore, perceive a limited amount of unease when confronted with aspects such as maintenance of the renewable energy system, perceived level of effort necessary to operate such a system, positive and negative stigma around environmentalism, and trust in the available alternative technology (Thøgersen & Ölander, 2003). These categories are all perceived to include a level of undesired change in automated (habitual) action of the participants.

The role of responsibility and its influence on perceived quality of life (PC 2)

Table 2: First order categories and topics for PC 2

First order category name	Topics included in category	Direct quotes
Cost – installation	Feasibility through outside funding	*If you don't get outside funding like USAID or the World Bank and get funding structures in place, those sorts of renewable energies are just not financially viable (#7)*

Cost – environmental	Effects on people	*I represent a whole lot of communities who live in the Vaal Triangle, there the air pollution problem is not only concerned with the two power stations in the area, but power stations play a very important part . . . There's such a lot of health benefits, if one could use renewable energy sources (#6)*
Financial feasibility of electricity	Impact of price perception	*I don't think we pay too much for electricity because the actual cost and then the impact it has . . . if you think how much it costs to put up transmission lines . . . (#3)*
Effort	High effort levels	*I think people are reluctant to let into their lives something that requires a lot of maintenance and operation and whatever . . . (#1)*
Responsibility	Governmental responsibility (a) Central generation and implementation (b) Need for political will (c) Financial aid (d)Incentives and encouragement Community level responsibility Personal responsibility – accepted Personal responsibility – rejected	*I mean there must be political will behind it otherwise it depends largely on private concerns to get it pushed and that is not going to have the massive impact that we would like to see it having. If the political will is there the policies will come into place and that will ensure that it [implementation] happens much faster and much easier (#6)* *I am not trying to say that everything must come from government, but they could play a very important role in this, because they are spending a lot of money on housing . . . (#4)* *But I think architects also have the responsibility to be more proactive and provide these systems from the start (#8)* *I don't mind fixing my own system myself, but sometimes you are dependant on a specialist . . . so I would think twice there (#4)*

Commitment to environment	Political will and drive to implementation	*I think a lot more needs to be done from planning and from your detailed design. And from what I've heard from people, it is slowly starting to happen … (#1)*
Legislation	Legislation as tool to force use Bureaucracy inhibits drive from government	*I think what lacks is the legislation to support it. There isn't legislation to force people to use renewable energy in the first instance . . . (#7)* *I know from experience how difficult it is for renewable energy to get into the grid, just because of the bureaucracy. The fact is that the policies aren't in place, the systems aren't in place that type of thing (#6)*
Incentives	Incentives should be financial Need for incentives are high	*I think at the end of the day it talks to their pockets . . . you will be able to contribute to the national grid . . . and accordingly that gets deducted from your account . . . (#5)*
Trust in technology	Impact of small scale implementation is low Industry will have a large impact	*. . . I think if you have a system that is properly designed and built, as I have seen in Botswana, those systems that weren't built in a backyard; they come from a production line. I don't think there should be major, regular maintenance required . . . (#4)*
Impact of level of implementation	Large industrial impact Large individual impact	*It might not have a huge impact because a lot of electricity demand is created by industrial users, but cumulatively, if it makes a bit of a difference, it could either delay the need to build new power stations, or obviate that need completely (#8)*

Pattern category 2 (see table 2) consists of statements that focus on externalising responsibilities and ascribing them to institutions, organisations, government, and professionals. Aspects such as little or no commitment to the environment, no political will and the lack of appropriate legislation are cited as reasons why government has

not succeeded in implementing renewable energy sources as the main source of generating electricity or at least an incentives framework. Also, the perceived high cost of the installation of renewable energy systems often leads people to the natural conclusion that it should either be encouraged by means of financial aid organised through government from organisations such USAID or the World Bank or paid for by the government itself, by means of incentive programmes. Industry and professionals, such as architects and engineers, are also seen as more responsible for the implementation of renewable energy than individuals themselves.

Thøgersen (2004) linked environmentally-responsible behaviour to locus of control by stating that a lack of perceived control influences the level to which an individual would act environmentally. Aspects such as accepting responsibility for change and acknowledging the impact that conventional energy generation methods have on people gives an indication of an internal locus of control. Employing some form of effort in order to increase knowledge and by expressing the belief that small-scale implementation of renewable energy could make a difference are also related to a personal sense of responsibility of the participant. Interestingly, participants who have already exhibited environmentally-friendly behaviour in some sense placed emphasis on personal responsibility. Also, people with an internal locus of control tend to exhibit high instances of environmentally-responsible behaviour (Sia et al., 1985-1986). People with an external locus of control tend to engage in environmentally- responsible behaviour less often than people with an internal locus of control (Rotter, 1966, 1982).

Cognitive dissonance (Festinger, 1957) could be applied to both internal and external locus of control and the accompanying actions. In the instance of an external locus of control, cognitive dissonance may play a role in the attribution that 'other' organisations and groupings are responsible for the implementation of renewable energy sources. An individual might experience cognitive dissonance when stating that he or she supports the use of renewable energy without exhibiting behaviour that is consistent with the statement. Thøgersen and Ölander (2003) state that people may neutralise the moral attitude or norm dictating pro-social behaviour by denying that continuing their current behaviour has any serious consequences or by denying their own responsibility for solving the problems produced by their current behaviour. This is one way in which cognitive dissonance is handled.

Similarly, the desire to act consistently with the views and attitudes expressed may cause people who have already exhibited some form of environmentally-friendly behaviour to express beliefs in accordance with those acts. Locus of control, the level of perceived control an individual has, and the emotionally disturbing and unpleasant experience of behaving inconsistently with stated beliefs or values are intimately intertwined.

Risk perception as inhibitor of action (PC 3)

Table 3: First order categories and topics for PC 3

First order category name	Topics included in category	Direct quotes
Cost – maintenance	Maintenance costs are high	*I think the one thing which you need to consider in all of these aspects is maintenance, and maintenance cost (#5)*
Cost – installation	Installation expenses Cost benefits	*The second thing obviously is cost. And I can't wait for the day that those kinds of solar energy become much more readily available. And even in our instance, the cost meant that we could only install up to a certain level. Our entire house cannot run on what we have, a very large part of it can . . . (#6)*
Cost – environmental	Effects on people	*Global warming, acid rain, and health effects, the coal comes from somewhere obviously, so mines, the people who live and work close to the mine . . . (#8)*
Reliability	Conventional energy to support renewable energy	*. . . but during summer we use it all the time, and it is quite sufficient, unless it is a cloudy day, but then we have a dual system. So I don't buy the argument . . . if you already have an existing system, it still makes sense... (#8)*
Psychological inertia	Unexpected change	*I don't know, it is a new thing for a lot of people. I think some might know why to change and others might know but they don't want to change.(#3)* *I think, people, it is just inertia, they are used to what they have . . . it is within their comfort zone and they are not prepared to look outside that comfort zone . . . (#8)*

Maintenance	High maintenance Predictability of maintenance	*. . . usually nothing much happens, but when something does go, the maintenance is absolutely horrendous . . . (#5)*
Perceived impact on comfort	Small or low lifestyle changes Visual impact is high Negative impact on lifestyle Trust in the system is high Trust in the system is low	*No, just, when you forget to switch on the electricity when it is cloudy there is obviously not going to be hot water in the morning when you want to shower, but if you switch it on there's usually warm water within half an hour. So it is not really a constraint (#8)* *. . . you cannot run a colour TV; you can only run a small black and white TV on that. You cannot power a fridge or a freezer (#7)*
Effort	High effort levels Effort level need to be lower	*I think a lot more needs to be done from your planning and your detailed design . . . (#1)*
Responsibility	Personal responsibility – acceptance Personal responsibility – rejection	*So I think it was perhaps one of the first hurdles to take the decision, to put in the effort, the research the idea and to see what is available on the market, to see how does it work (#6)* *I think it might not be practical [individual units] and it is more the sort of thing you know, put it out there, not as such out of mind's way, but I think it just makes more sense than putting it in every single unit in suburban areas (#5)*
Acceptance through exposure	Perceived level of risk	*If you take a geyser system, it has more risks than a passive solar system, a geyser can explode, but what can a solar system do? (#8)*

Trust in technology	Quality system is a need Inconveniences of the system Solar potential is low Renewable technology is efficient Existing technology is insufficient	*. . . if one starts with a good system, not with a slap dash type of thing, then one will probably not need much more maintenance than a normal system (#2)*

Pattern category 3 (see table 3) addresses participants' perceived risk as an inhibitor of action. Cost implications, expected and unexpected implications on lifestyle, trust in the available technology, and the implications thereof are perceived as risks and translate into an inhibition of action. Costs in terms of installation and maintenance are perceived to be high. Cost implications to the individual are perceived to be a direct risk for which the individual will have to accept responsibility; as such, perceived risk and responsibility go hand in hand.

Unexpected impacts on lifestyle, such as the reliability of the system, the possibility of unexpected change, and unexpected maintenance may cause participants to become uneasy when the use of renewable energy sources is suggested. Perceptions of high effort levels to repair and maintain the systems imply a certain level of personal responsibility. According to Bell, Greene, Fisher, and Baum (2001) perceived risks tend to be higher if the activities associated with them are seen as unknown or uncontrollable. Trust in the conventional technology and the available renewable technology plays another role in risk perception. When trust is not applicable to the use of renewable energy sources in the home, and constant unease is the norm, it once again poses a threat to the lifestyle of participants as described in the paragraph above.

Expected implications on lifestyle such as a change in lifestyle through lower aesthetic qualities and high visual impacts, and the perception of the inability to maintain the current lifestyle because of less available resources often de-motivate environmentally friendly behaviour. According to Weidemann, Anderson, Butterfield, and O'Donnell (1982) perceived physical qualities of a residence are important factors that contribute to the experience of satisfaction. When the lifestyle satisfaction or satisfaction with a living environment is perceived to be endangered, the probability of environmentally-friendly behaviour also decreases.

Renewable energy and the perception of self (PC 4)

Table 4: First order categories and topics for PC 4

First order category name	Topics included in category	Direct quotes
Cost – environmental	Benefits to the environment Effects on people	*. . . from wind generation or whatever, I guess there's less cost to the environment, and you actually get the same product in the end . . . (#3)* *. . . the environmental cost used to be concealed for various reasons and its only now that people are beginning to realise . . . (#2)*
Psychological inertia	Slow change Change of current practice is important	*I don't know, it is a new thing for a lot of people. I think some might know why to change and others might know but they don't want to change (#3)* *. . . we have the lowest energy price on earth. And that makes us very energy inefficient. So I think we use too much energy (#8)*
Perceived impact on comfort	Perceived personal benefit Visual impact of system is high Negative impact on lifestyle	*. . . when people start to realise themselves that something needs to be done. We don't feel the impact, yet when people start to experience it . . . (#1)* *. . . the more high tech things are much more visible, you have to have a panel on your roof and something on for water . . . (#1)* *. . . in ten years you have paid it off and thereafter you have free electricity . . . but [you have to show] that it is not going to affect the TVs and all the other things that one gets, the other things that one gets so used to. And luxury, like underfloor heating and all of that . . . (#5)*

Effort	High effort levels Effort levels should be low	*You know what? It is too much hassle to change, because you have got it [electricity] now, so why bother? (#3)*
Responsibility	Personal responsibility – accepted Personal responsibility– rejected	*I have experienced very few problems with it, so I don't expect any (#8)* *I don't really care where my electricity comes from, as long as it is a safe source of electricity (#7)*
Incentives	Incentives should be financial Need for incentives is high	*Whether it be paying less property tax, or cheaper water, but I think until people see it as beneficial to me and my pocket, you are not going to change their attitude to the environment just because it is good. People are just not like that (#7)*
Trust in technology	Inconveniences of the system	As you're not there every day you don't have that constant supervision over it to ensure that it is maintained (#7)

The perceived benefits to the self and the environment, the perception of self, and the cognitive dissonance experienced when moral norms do not coincide with actual behaviour and the way in which cognitive dissonance can influence behaviour form part of this pattern category.

Personal benefit observation is one of the most subtle but important categories that emerged from the research (see table 4). As indicated in previous pattern categories, participants and people in general experience cognitive dissonance when statements about beliefs and attitudes do not coincide with actual behaviour. In some cases, however, participants exhibited attitudes inconsistent to what they stated previously in the conversation, but consistent with their current behaviour. An example of this is one participant stating that it is good to make use of renewable energy and that people should use it more often. Later in the conversation, however, the participant stated that renewable energy is actually just too much hassle to install because of the convenience of conventional electricity.

Renewable energy as available medium (PC 5)

Table 5: First order categories and topics for PC 5

First order category name	Topics included in category	Direct quotes
Cost – installation	Expenses	*. . . it's expensive to install and especially to install a reliable system . . . (#2)*
Financial feasibility of electricity	Price of electricity is low	*Well unfortunately coal is still the cheapest form of energy (#7)*
Effort	High effort levels Effort levels should be low	*For instance I know about these solar stoves, which are those contraptions with the plastic covers that close that work very well. It is just not the type of thing that 'aunties' from Lynnwood would normally put out on the stoep to cook their meal in (#6)*
Positive and negative stigma around environmentalism	Availability of renewable energy Negative attitude toward renewable energy in general Importance of energy efficiency – high Importance of energy efficiency – low	*. . . it is quite a search to find the right product, you know, it is not like you walk into Builder's Warehouse and there it is . . . (#6)* *. . . the ideal to develop new sources of energy and solar energy is one of those things. I would like to support it, but I am also practical . . . (#4)*
Mainstream awareness	Personal awareness – high Public awareness – low Awareness making projects	*If you look at what is happening world wide, there is a big move for energy efficiency and against global warming (#8)* *I think the younger generation, they know more of what is going on in terms of the environment (#3)* *For the everyday man on the street, I think it is a matter of awareness, and I think that is the big issue . . . (#5)*

Acceptance through exposure	Level of environmental awareness by means of exposure – high	*The most common ones are solar, wind and the one that does not have a lot of application is tidal energy as well. And then there is stuff like bio-gas, although there are arguments out there that these things aren't terribly renewable, but rather sustainable (#1)*
Trust in technology	Quality system is a need Technology must be available	*. . . I will have to be convinced beforehand that I will not also need another source of electricity . . . (#7)*

In pattern category 5 (see table 5) knowledge about the state of the environment and electricity prices, the actual cost of renewable energy systems, functionality of renewable energy systems, and ideas toward environmentalism in general all form part of the perceived availability of renewable energy systems. Systems are perceived to be unavailable 'in the minds of people'.

The level of awareness of both the person-in-the-street and the participants themselves (as perceived by the participants) may provide an indication of the level to which the use of renewable energy sources are available to people. Participants suggested several techniques that could be employed in order to increase levels of awareness, education, environmental knowledge and the like. These form part of pattern category 6.

Very little literature on the impact of perceived availability of resources on the actual implementation thereof could be found. However, the removal of barriers to implementation (Stern & Oskamp, 1987) could include making physical resources and efficient systems more available by means of education, advertising, and actual availability in stores. Making resources psychologically more available by increasing people's exposure to even just the idea is discussed below.

Change of attitude toward renewable energy sources (PC 6)

Table 6: First order categories and topics for PC 6

First order category name	Topics included in category	Direct quotes
Psychological inertia	Slow change	*We're still very lazy in South Africa, you know, in terms of cheap energy . . . (#2)*
Acceptance through exposure	Education by means of exposure Level of environmental awareness by means of education	*It would probably depend on the kind of publicity, broadly speaking, that is put into promoting it . . . making it an easy option (#6)* *I think if you want to have it, actually if you want to get the buy-in from the people because some have started using it, they will start using it . . . (#3)*
Incentive	Incentives should be financial Need for incentive is high	*Whether it be paying less property tax, or cheaper water, but I think until people see it as beneficial to me and my pocket, you are not going to change their attitude to the environment just because it is good. People are just not like that (#7)*
Trust in technology	Quality system is a need Impact on the quality of the system	*I think if you have a system that is properly designed and built, as I have seen in Botswana, those systems that weren't built in a backyard; they come from a production line. I don't think there should be major, regular maintenance required . . . (#4)*

Pattern category 6 (see table 6) demonstrates the participants' perceptions about changing people's attitudes towards renewable energy sources. Increased education on the use of renewable energy sources by means of lectures (Gifford, 1997) and pamphlets are not effective methods in which to influence environmental concern (Bell et al., 2001). Thus, awareness levels about low electricity prices and the tendency to over-consume, the need to change habits in order to more efficiently use the resources available, and general awareness about a pending ecological crisis do not necessarily change attitudes.

Increased exposure to trustworthy technologically-advanced renewable sources of energy could be one method by which attitudes could be changed. Advertising may be more effective than simple education, because of the level of exposure it offers (Zimbardo & Leippe, 1991), and not necessarily because of the cognitive message of persuasion it may contain (Bagozzi, Gürhan-Canli, & Priester, 2002). Thus, the availability of a product and constant reminders of what a product does and how it can be used, may be more effective strategies to encourage renewable energy use. Zimbardo and Leippe (1991) argue that exposure tends to lead to liking.

Introducing incentives can change the outcomes of renewable energy source implementation drastically. Larger incentives do not, however, bring about attitude change even though the desired behaviour may be exhibited (Festinger, 1957). Small incentives would more than likely convince a person that he or she does in fact agree with the requested behaviour and therefore is more likely to change his or her attitude in such a way that it corresponds to the requested behaviour. In contrast, if a large incentive is offered for the exhibition of certain behaviour, the person may reason that even though he or she does not agree with the behaviour he or she exhibits, an external form of motivation could be used to justify why the action was taken. Environmental education, exposure to the use of renewable energy sources and active marketing for the use of renewable resources may all influence environmental attitudes to some extent.

CONCLUSION

Barriers to acting in environmentally-friendly or responsible ways (Stern & Oskamp, 1987) should be removed as much as possible when motivation for environmental behaviour is planned. Thøgersen (2004) warns that, even though cognitive dissonance is unpleasant, 'the unpleasantness of the sacrifices needed in order to behave in an environmentally-responsible way may be even worse' (p. 101). According to Festinger (1957), most people opt for other than behavioural means to resolve this dissonance, or they may even choose to live with it.

Environmental education in schools and the general media should be increased, and even though education alone does not necessarily increase environmentally-responsible behaviour (Bell et al., 2001), it would increase awareness on a broad level. Any motivational campaign should focus on the individual's subjective perception (Thøgersen, 2004). From a systems theoretical point of view, individuals as part of a system will influence the systems with which they interact. The larger systems, such as the education system, the consumer and advertising system and the moral system of society, could all be employed as methods to disseminate information and motivate environmentally-responsible behaviour.

Recommendations

Implementing an integrated perspective in the system is necessary to enable better legislation, promote a higher level of awareness amongst the desired audience, implement better incentive programmes, and eventually decrease the dependence on natural resources, resulting in more sustainable practices.

Specific recommendations include further research on the following:

(a) Comparing the attitudes of the environmentalists explored in this research with those of ordinary citizens in order to establish what the need for environmental education is, and how exposure to environmental issues on a daily basis may influence environmental attitudes and perceptions

(b) Exploring the underlying values that are determinants of environmentally-responsible behaviour in South African citizens

(c) Determining the effectiveness of incentives on motivating more sustainable practices for the use of energy

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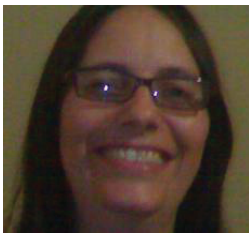

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