



Deliverable 13
**Supporting the process of disseminating
solar water heaters in South Africa**
Experiences with the ESTEEM tool

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*Cultural Influences on Renewable Energy Acceptance and Tools for the
development of communication strategies to promote ACCEPTANCE
among key actor groups*

Project co-funded by the European Commission within the Sixth Framework
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Partners of Create Acceptance



**SIXTH FRAMEWORK PROGRAMME
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FP6-2004-Energy-3, SUSTDEV-1.2.8



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1. Background to the case studies in South Africa

The two South African case studies describe solar water heaters (case study 1) and electricity from solar home systems (case study 2). Both studies include the impact of poverty on the dissemination and acceptance of the technology. The solar electricity project was described and analysed under WP2. The solar water heater programme was also described under WP2 and in addition a demo was carried out testing the ESTEEM tool.

Subsidised solar home systems (SHSs) using photovoltaic panels to generate electricity were expected to light the countryside and bring light and television services to remote rural homes at a much faster rate than they actually did.

SWHs were rapidly distributed in the late 1970s and early 1980s and then their uptake substantially declined. They have been marketed to the general public and made available to poor households in specially targeted projects. The history of the SWH by-law in Cape Town is interesting, because it was inspired by the corresponding ordinance in Barcelona, another one of the case studies in the Create Acceptance project. The technology transfer from north to south began in 2003 when the deputy mayor of Barcelona was invited to speak about the experiences at a workshop in Cape Town.

Disseminating solar water heaters addresses two major concerns: reducing peak load at a time when electricity generation can no longer meet demand and reducing GHG emissions. At the household level solar water heaters save electricity cost in the long run. South Africa has abundant sunshine and solar energy is ideal to heat water. But solar water heaters are generally not accepted. There are several explanations for it: lack of information and social advocacy, very cheap electricity tariffs and little awareness of environmental concerns.

The South African SWH case study is slightly different from the European case studies. Disseminating solar water heaters is a broad programme supported by different stakeholders. Projects within the programme address specific targets and target groups, e.g., setting up testing procedures or the poor and mid- to high-income groups. It follows that there is no single project manager for the programme. Stakeholders on their own or as a group drive the process initially and once opportune framework conditions are achieved individual projects are initiated and project managers drive individual projects. It is important that the stakeholders in such informal programme act and act together to promote SWH and the challenge is to get them together and drive the programme.

The ESTEEM tool is applied in this case and in the absence of a project manager the consultant undertakes some of the tasks of the project manager.

2. The process of the Demo project

The phase in which an informal group of stakeholders promotes a RE technology often proceeds the formulation of individual projects. This stage is often necessary to sort out a number of barriers, which the implementation of the new technology faces. It appears that the risk for individual projects is quite high at this stage. Stakeholder and environmental groups if they exist are generally not very active in South Africa as compared to the EU.

The PM/consultant approach of the ESTEEM tool requires that a company is introducing a new RE or RUE technology and a project manager is appointed to manage the project. The South African solar water heater is not a specific project with a project manager but a broad programme supporting solar water heaters.

It is challenging to apply the tool to an early stage of renewable technology dissemination. I am aware that it is not what was intended at this stage of tool development but it is the situation I am faced with in both case studies. For these reasons the PM/consultant roles as given in the present process did not apply to the South African case studies. It may be worthwhile to widen the PM/consultant roles in a future phase of the ESTEEM tool to include cases such as this.

3. Applying the ESTEEM tool

The steps and substeps of the ESTEEM tool were applied as far as the situation made it possible. In some cases adjustments were made to follow the tool in spirit rather than the exact guidelines.

3.1 Step1: Project history, context and actors

3.1.1 Project narrative

There is abundant sunshine in South Africa but very few homes have solar water heaters. The history of solar water heaters explains some of the reasons.

SWH dissemination in South Africa can be divided into three historical phases.

Phase 1: 1978-1983 Widespread acceptance and installation of SWH

The government supported the promotion of SWHs with effective communication strategies and projects, which motivated homeowners to install them. The industry flourished, and in 1983 about 27 000 m² of solar collectors were produced. In that year the SWH communication project came to an end and the market collapsed and has not yet recovered since although there are encouraging signs of an industry revival more recently.

Phase 2: 1984-2003 Collapse of the SWH market

In this period, SWH installations dropped and annual glazed collector installations were about half of what they had been in the previous phase. Some solar water heaters were installed in social housing projects, such as that in Lwandle near Cape Town, where a workers' hostel was transformed into family units (Photo on cover page).

Phase 3: New initiatives starting about 2003/2004 - the SWH by-law for middle- and high-income households and SWH for the poor

The White Paper on Renewable Energy gave a new perspective and created renewed interest in the field. The City of Cape Town has taken the initiative to support RE and is committed to ensuring that 10% of households have SWH systems by 2010, and has initiated a number of activities to promote the technology such as the solar water heater bylaw for middle- and high-income homes.

- The Ubushushu Bendalo – meaning 'heat from nature', strategy is to harness the expertise, knowledge and capacity in Cape Town to provide a channel for resources to enable effective and efficient implementation of RE and energy efficiency technologies, in particular SWHs.
- The City plans to retrofit 2 300 SWHs in low-income homes in Kuyasa in Khayelitsha township at no or minimal cost to the home owners.
- The Central Energy Fund (CEF) subsidised 500 SWHs in the three major cities (Johannesburg, Durban and Cape Town).The project was advertised in the newspapers and it had a positive demonstration effect and renewed customer interest in SWH and encouraged the SWH industry.

The poor cannot afford SWHs and need financial assistance if they are expected to install them. A project to explore the institutional, financial, social and technical feasibility of providing the poor with retrofitted SWHs is being implemented in the township of Kuyasa, Khayelitsha in Cape Town (Table 3.2). A pilot project has fitted ten houses with SWH. Besides the water heater, a ceiling is added and compact fluorescent lights (CFLs) are distributed, to improve the thermal performance of the houses and the lighting and water heating efficiency. This will result

in reduced electricity consumption and avoided CO₂ emissions (from coal-generated electricity). The project developed the methodology and procedures for receiving certified emission credits of the Clean Development Mechanism (CDM) and the CDM credits were approved.

Very recent developments

The SWH industry is currently experiencing a revival. The media have included more coverage. SESSA50 is another project which installed subsidised SWH and collected data for a detailed assessment of the technology.

At the SWH workshop held at the International Conference on the Domestic Use of Energy in Cape Town in April 2007, Eskom presented its new approach to solar water heating and its inclusion into Eskom's Demand Side Management Programme. In June 2007 the Eskom Board approved the investment of R2bn to be made over five years (€1 = R9,30 in April 2007). This will have a major positive impact on the SWH industry.

3.1.2 Defining moments

Applying the ESTEEM tool three major defining moments were identified. The first was in 1983 when the SWH communication project came to an end and customer demand dropped sharply and the SWH market collapsed. The unprecedented blackouts in the winter (March – July) of 2006 were the second turning point in the programme when the electricity company Eskom could no longer meet the demand. A number of alternatives to reduce electricity consumption were proposed such as using gas for cooking and replacing incandescent light bulbs with CFLs. Some pilot projects are carried out to find out what the costs and benefits are. Renewable energy alternatives were considered to reduce the load of the national grid. The alternatives had to be such as to be implementable immediately and solar water heaters were the least expensive options to reduce load in the short term.

The third defining moment was in response to the second moment. In early 2007 Eskom decided to choose SWH as a means to reduce electricity load and to roll out 150 000 subsidised solar water heaters as part of its demand side management programme.

3.1.3 Actors table

The actors were identified in late 2006 when making the invitation list for speakers at the workshop. An organising committee was set up for the SWH workshop and it selected the major actors. They were then invited to the workshop and asked to give a presentation of the aspect of SWH they are working on or have a major stake in.

3.2 Step 2: Vision building

3.2.1 Present vision

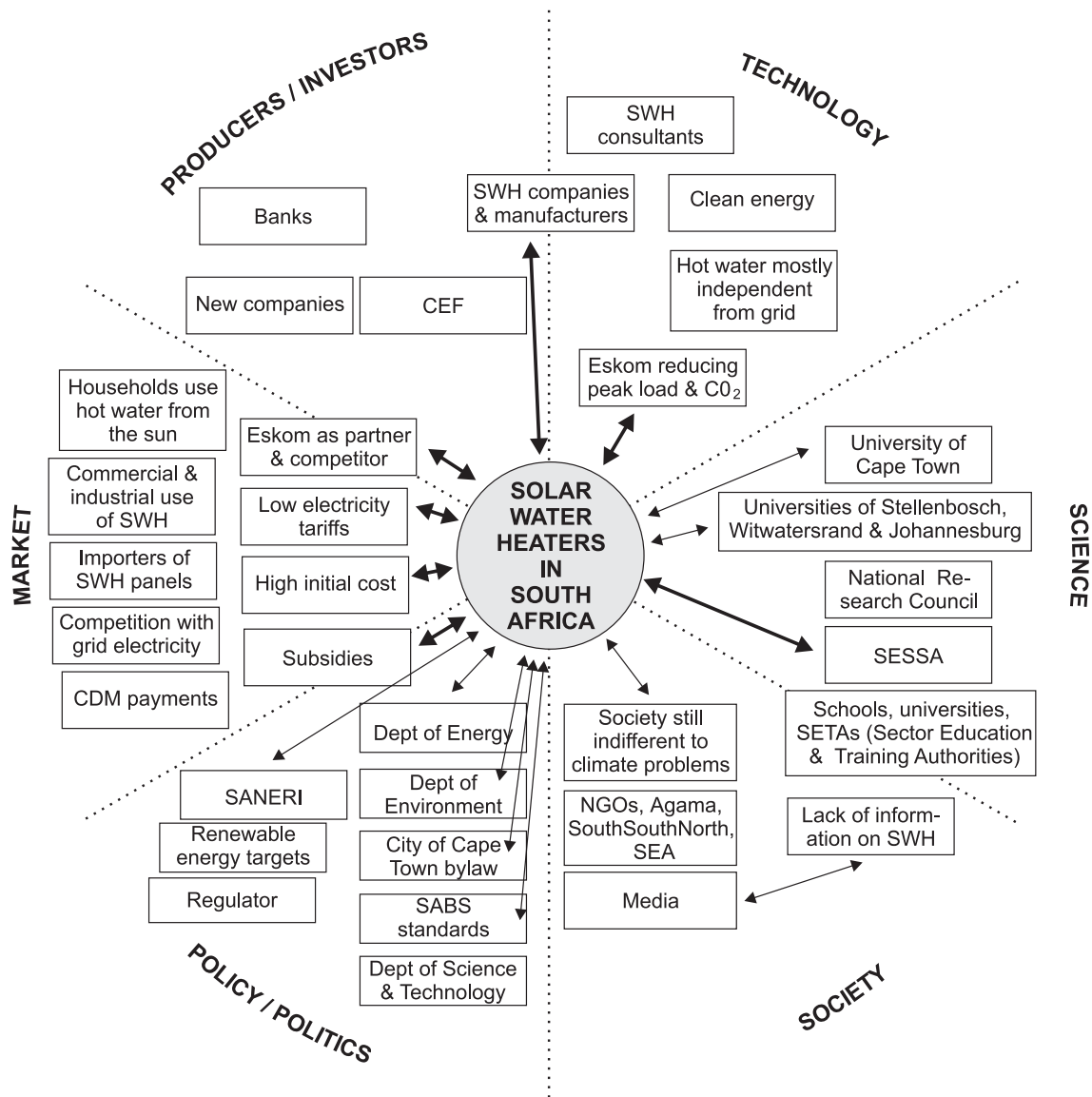


Figure 3.1 Social network map for solar water heaters in South Africa

The national RE strategy supports the use of RETs generally. In Cape Town the SWH byelaw to be passed by the city council in early 2008 creates a favourable environment for the SWH market. Pilot projects such as SESSA50 and CEF150 have introduced the technology in the three major cities (Johannesburg, Cape Town and Durban) and many homeowners have now been exposed to the technology. Media reports have informed the public and highlighted the benefits of SWH.

The 2006 blackouts in Cape Town and national load shedding which will continue for the next five years are a turning point and present a good opportunity to switch from grid to decentralised solar for water heating.

SWH will lower electricity demand from the grid and will reducing load, blackouts and load shedding. They will also reduce high GHG emissions from the coal-fired power stations.

3.2.2 The BAU scenario

People continue to heat water with grid electricity supplied from the national grid. As electricity demand is increasing power cuts will become more frequent in the near future. In the medium- to long-term future the shortfall of supply would be addressed by building new coal-fired and nuclear power stations. The cost of investment for new power plants has driven up electricity prices. Electricity tariffs will go up by 14% in 2008 and will rise annually by similar amounts. Energy efficiency measures have offset some of the cost.

Emissions from the coal power stations would continue to contribute increasingly to the high national GHG emissions. Fewer people would be employed in the new coal and nuclear power stations than if the same amount of power would be generated from solar sources. As electricity prices go up household expenditure for hot water will also go up. The target of generating 10% of the countries electricity demand from RE by 2013 is not met.

3.2.3 Future vision

Solar water heaters are widely disseminated and are the preferred option for water heating in the domestic, commercial and industrial sector. A vibrant industry is manufacturing and installing SWH. Technological innovations have increased efficiency and the economy of scale has reduced prices so that most people can afford the SWH. The industry has absorbed many of the unemployed particularly young people. Technical colleges offer courses on different aspects of solar water heating and the enrolment has steadily increased over the years.

Homeowners are conscious and proud of saving GHG emissions and doing their part for the environment and reducing climate change.

3.2.4 Selecting the group of core stakeholders

The core stakeholders were selected when preparing the workshop. The organising committee listed the people and organisations, which could make a major contribution to or negatively influence the project. Areas of expertise, which are useful and important to the programme were also considered. The members of the organising committee invited the core stakeholders by phone and this was followed up by an explanatory email of what presentation was expected from them. Some stakeholders wanted to expand their topic, have more time etc. These requests were negotiated and agreement was reached. Personal contacts of the committee members greatly helped to motivate the speakers to come. If the selected person was not available a replacement was chosen. The core stakeholders were requested to give presentations on the areas of expertise relevant to the programme.

3.2.5 The stakeholders' future vision

There being no project manager there were consequently no differing visions of the two parties. The future vision of the stakeholders is similar to what I have described under 4.3.1 Present vision and 3.2.1 Future vision. The vision itself was not conflicting but the most effective way to get there differed in some instances and is discussed below under 3.2.3.

3.3 Step 3: Identifying conflicting issues

3.3.1 Identification of conflicting issues and features

Five major issues have been identified which if resolved might lead to greater acceptance of SWH.

- *Necessary subsidy and who should pay for it?*
It had become obvious that homeowners would not install SWH until there was an incentive of a subsidy. Electricity prices are among the lowest in the world and it just did not seem worthwhile to spend the initial capital to buy a SWH.
- *Subsidy level*
The subsidy level raised some controversy. The organisations, which pay the subsidy want to keep it as low as possible so as to benefit a larger number of people. The SWH industry wants higher subsidies because they know people will not order SWH unless there is a substantial subsidy. Homeowners also want a high subsidy so as to reduce the upfront capital cost.
- *Adherence to standards and quality control*
The SWH industry suffered a serious loss of reputation and credibility in the past when fly-by-night companies installed unreliable SWH. The established companies are keen to prevent this happening again.
- *Communication*
The public knows very little about solar water heaters and this contributes to the lack of acceptance.
- *Free SWH for the poor: Are SWH their priority?*
The poor cannot afford SWH and they have other priorities such as adding a room to their fully subsidised small house.

3.3.2 Ranking key actors and issues according to their strategic importance

The key actors were ranked and the strategically most important ones were invited to give a presentation at the workshop. They are listed in Appendix 2. Other actors were invited or made aware of the workshop.

3.4 Step 4: Portfolio of options

Step 4 identifies the variety of options the PM/programme can take to enhance social acceptance, and their implications. The four key issues and possible solutions are given in Table 3.1.

Table 3.1 *Issues/solutions table for the solar water heater programme in South Africa*

SWH case	Possible solutions		
Key issues	<i>Equipment/environment Improved adaptation</i>	<i>Knowledge gap reduction</i>	<i>Financial incentive</i>
1. High initial capital cost	Negotiate bank loans, CDM mechanism	Communication of benefits of SWH, long-term savings on electricity cost	Subsidy Economy of scale
2. Lack of communication	Pilot projects	Design communication and education campaign	
3. Standards	Introduce testing	SABS to issue mark of approval	
4. Poor cannot afford SWH and may have other priorities	Explore financial contribution from CDM mechanism		Need 100% capital subsidy

The upper part of Table 3.2 is derived from Table 3.1 and the lower part ranks the solutions.

Table 3.2 *Solutions ranking table*

Solution	Description	Strategic impact				Costs/benefits		Preferred process	Rank
		Urgent	Necessary	Feasible	Fit	Costs	Benefits		
1. Cost Solution 1	Introduce subsidies								
Solution 2	Negotiate bank loans for SWH and use CDM mechanism to contribute to cost								
Solution 3	Explain benefits of SWH such as long-term savings on electricity bill								
2. Communication Solution 1	Make pilot projects more visible, e.g., media spots, newspapers								
Solution 2	Design a communication campaign to educate the public about SWH								
3. Standards Solution 1	Improve the image of SWH by testing procedures carried out by the South African Bureau of Standards								
Solution 2	Attach a mark of approval to the equipment								
4. Poor cannot afford, have other priorities Solution 1	Explore financial contribution from CDM mechanism and government housing subsidy								
Solution 2	The poor need 100% capital subsidy because they have other more urgent priorities such as additional space								
1. Cost/ Solution 1		1	1	1	1	High	High	Compromising	1
Solution 2		4	4	4	4	50 000			4
Solution 3		1	1	1	1	2 Billion	High	Compromising	1
2. Communication Solution 1		2	2	2	2				2
Solution 2		2	2	2	2	200 000			2
3. Standards/quality control/ Solution 1						40 000 for company	High		1
Solution 2						Included in above	High		1
4. Poor cannot afford, have other priorities Solution 1						CDM covers about 15% of cost	High		
Solution 2						100% of cost	High	Compromising	

There is not a single and unique preferred solution. Several solutions have the rank 1 because one solution alone will not achieve the desired result. Several things have to happen almost at the same time.

3.5 Step 5: Getting to shake hands

3.5.1 The preparations of the workshop

It is difficult to get the major actors together for a workshop because they are very busy people and some of them hold senior positions in their organisations. The cost of air tickets – it is a two-hour flight from Johannesburg/Pretoria and Durban where most of the major stakeholders work - and accommodation is another consideration. The yearly International Conference on Domestic Use of Energy is held in March/April and usually workshops on topics of general interest are added on or held simultaneously. A colleague and I had organised a SWH workshop in 2006 and there was demand for holding another one in 2007. I thought that was a good opportunity to get all the major actors together and try out step 5 of the ESTEEM tool. The attraction would be twofold to attend the Conference and to attend the SWH or other workshops and professional meetings. Being in the organising committee of the Conference provided me with additional resources to put the workshop together and to access the major stakeholders. As in the year before a small organising committee was formed with colleagues from Johannesburg/Pretoria and Durban. My colleague from industry, Will Cawood, who has worked on SWH in South Africa for the last 35 years knew all the actors and played a vital role in approaching and inviting them. The framework of the Conference gave importance to the workshop we could not have had if we had organised the workshop as a stand-alone event of the CA project. The workshop was a public event, which everybody could attend.

The major actors presented their point of view and position and in the subsequent discussion other major actors and the audience including stakeholders and interested persons debated the issues. The format of the workshop – patterned on meetings in which researchers present their findings – is well known to all participants and is designed to bring critical issues into the open. The poor are not present at such workshops and their interest is generally represented by NGOs.

The preparation of the workshop started in the third quarter of 2006. The major actors were selected on the criteria of involvement in the SWH programme. They were asked to give a presentation of their SWH-related work. If the people approached could not come replacements were selected until qualified speakers covered most relevant areas of SWH. Having a small organising committee consisting of four well connected professionals in Johannesburg/Pretoria, Durban and Cape Town helped greatly to contact people or remind them when confirmations were outstanding. The major communication tools were email and telephone.

A detailed programme was drawn up, agreed upon by all presenters and it was part of the Conference programme. This gave the SWH workshop wide exposure.

3.5.2 Realization of the workshop

The workshop took place on 12 April 2007. It was open to everybody who was interested. The major stakeholders attended because they were presenting their work and other stakeholders and generally interested public were also present. Interest and activist groups who might wish to capture a workshop for their own interest and publicity do operate only very sporadically in South Africa and we did not think that it would happen and it didn't.

The speakers presented their work and point of view and I as the chairperson invited the audience to ask questions or comment. The audience asked many questions to clarify issues and

there were at times lively discussions. Many issues were explained and people were generally satisfied with the outcome.

I had intended to draw up a research agenda of the outstanding problems as one of the outcomes of the workshop and had asked the key stakeholders to send me or present at the workshop outstanding problems that needed further investigation or research. Labelling them research problems, which anybody who wished to could solve, reduced personalised controversy. Towards the end of the workshop I presented the submitted issues and most were discussed and resolved then and there and I gave up my idea of presenting a list of research topics to the research funding agency of the government.

3.5.3 Returning the results of the workshop

At the end of the workshop I asked all presenters if they agreed to put their presentations on the conference website. They all agreed except one presenter who first had to submit his findings to the organisation who funded the work. Shortly after the workshop the presentations were on the website. This added greatly to the information exchange and gave the presenters a greater feeling of being part of the workshop. For some the public exposure added value to their work or business.

3.6 Step 6: Recommendations for action

3.6.1 Identifying acceptance and feasibility

Table 3.3 *Acceptance and feasibility: Project redesign and stakeholder negotiation options*

1	2	3	4	5	6
Key issue	Alternative solutions	Acceptance (stakeholder response)	Type of action(s) required	Does it require collaboration by others?	Feasibility
High capital cost	Subsidies	High	Eskom to roll out subsidised systems	Industry	High
	Loans, CDM	Medium	Negotiate with banks, CDM body	Banks, CDM body	Medium
	Explain long-term savings	Medium	Communication campaign	Funding source and communication project	Medium
Standards	SABS testing	High	SABS to buy and install testing equipment	SABS	High
	Attach mark of approval	High	SABS to attach after testing	SABS and industry to pay for it	High
New issue (from step 5) Quality control	SESSA as umbrella organisation to oversee industry	High	To influence industry	SESSA and industry	High

3.6.2 Sorting the options: Capacity for action

Eskom stated at the workshop that it will subsidise 150 000 systems over the next three years. The level of subsidy was not resolved and was further debated in the subsequent Eskom workshops and email discussions. The SABS will certify the SWH and the installation. SESSA (Solar Energy Society of South Africa) stated that as a representative body of the industry it will look after quality control and people appeared to be happy with this solution.

Homeowners accept SWH when they are subsidised as the quick uptake of SWH under the SESSA50 and CEF500 projects has proved. Solar water heater companies urged to roll out the Eskom subsidised SWH as soon as possible so that the momentum of acceptance is seized as an opportunity and is not lost in lengthy delays.

Communication strategy

The stakeholder thought that a communication strategy would be good but there was no decision made. No stakeholder took ownership of the issue.

3.6.3 Evaluation of the Create Acceptance process

Participating in the process of developing the ESTEEM tool has been a very valuable experience, which added insight and value to my work. Comparing the acceptance or lack of RET in Europe and South Africa it emerged that RETs may not be accepted for different reasons but the tool is still applicable and valuable in many different circumstances as the demos have shown. The local circumstances in South Africa - particularly environmental awareness and the development of renewable energy technologies - lag far behind the European developments.

Overall I found the process extremely interesting and useful. The tool is definitely applicable to the South African situation although some adjustments will have to be made and this may be done when the tool is developed further to apply to a less specific PM/consultant situation.

4. Success and limitations of the CA-process and the ESTEEM tool in achieving acceptance in the region

The tool is of great help guiding the consultant. In the South African case I had to interpret the tool freely and follow the spirit more than the actual instructions. The absence of a project manager made this necessary. The consultant took over almost a double role imagining what a project manager would have done in a particular situation.

The tool appears to address primarily activist objections and lack of acceptance. In South Africa the activist movements are not very strong compared to Europe. People are often quite indifferent to environmental issues. This lack of interest translates into a lack of urgency to introduce, disseminate and use renewable energy technologies. I have tried to apply the tool to this situation and found that some adjustments have to be made. This could be done in a second phase of the ESTEEM tool development if there is one.

5. Exchange of Demos/Partners Interaction in CA

This was very encouraging and useful. Just to present the results of the case studies and receive expert comments at the presentation or later on the submitted report was valorising my experience.

5.1 Experiences with counter partner's support

So far the exchange was quite limited. I guess the counter partner is waiting for this report.

5.2 Lessons learnt

The tool is an excellent guide to be followed where applicable. Each project is specific and also in a different stage of development and adjustments for the specific situations have to be made.

The tool encourages the consultant to address the issues very systematically and find solutions to increase the chances of acceptance. If the tool is applied early in the project development when opposition has not yet firmly developed it is easier to engage opposing stakeholders.

The tool might also be of interest to workers in developing countries where technologies and practices new to a particular environment are continually introduced as part of the development process.