SOLAR COOKING COMPENDIUM

Making the case for commercializing solar cookers in South Africa:
Justification for the development of a commercially viable renewable energy cooking technology industry

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Abstract

The Solco Project[1] is premised on an understanding of the problematic contribution that current widely used cooking practices make to environmental problems nationally and regionally. These practices are often based on the inefficient use of biomass energy sources, or on alternatives that may be affordable but unsafe. They also contribute to economic problems in poorer families and to health problems, gender inequalities and overall impoverishment of the quality of life at the individual level. In South Africa, particularly in Living Standard Measures (LSM) groups[2] 2-5 (rural and urban), the groups on which the business case focuses, the issue is more complex. The multiplicity of fuel sources used by South Africans in the LSMs considered in this business case creates opportunities for promoting a combination of fuel efficient and alternative fuel source cooking appliances.

On the demand side, the core issue is the basis on which consumers make decisions about what cooking appliances to purchase and what energy sources to use for cooking. Consumers are driven, in their choices, by the need to produce meals. Availability and accessibility of the technology and energy source are crucial here. Clearly, these link closely to supply issues. The developed industries around existing appliances, served by traditional sources of energy, have an enormous advantage over the under-developed R/A energy options. On the regulatory side, the South African government, despite a policy commitment to renewable energy, has tended to favour electricity and paraffin, both of which enjoy direct support in the form of subsidies. Government indicated willingness to provide focused support for the development, demonstration and application of renewable energy.

Based on the research done in the preparation of the business case, the Solco Project believes that the best way, and probably the only way, to realise the vision of extensive use of R/A household energy technologies in South Africa is through the establishment of a commercially viable and sustainable R/A household energy market and industry. The research shows that an R/A household cooking appliance industry in South Africa is commercially viable. The obstacles are largely on the supply (or industry) side. The key issue is to ensure that there is investment on the supply-side. This requires that there be a convincing potential for a reasonable return relative to investment risk. The Solco Project believes that a target of 250 000 total unit sales at an accelerating rate over a period of five years is a highly realistic objective. This equates to an industry generating about R 125 million in sales revenue in five years. This is large enough to attract investment interest and address the supply-side challenges.

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[1] A GTZ initiated project.

[2] LSMs (Living Standards Measure) are a tool that was developed in South Africa as a broad indicator of standard of living or "affluence" based on a diverse range of twenty variables including amenities available in one's home, use of specific financial services, consumer products and retail channels, and ownership of certain appliances. After clustering groups of consumers according to these variables, the demographics of each group are determined.

Foreword

The Solar Cooking Compendium (SCC) is about the viability of solar stoves as a solution to the scarcity of household energy. Viability is measured in commercial terms. It means manufacturing and marketing of solar stoves without subsidies. In the future, this will be the criterion for judging projects promoting solar cooking.

The SCC is based on the experience gained in implementing the Solar Cooker Field Test (SCFT) in South Africa from 1996 to 2003. It consisted of Phase 1 – Global market situation of solar stoves and social acceptance test (1996 - 1998) and Phase 2 – Estimate the market potential in South Africa, manufacture of solar stoves, and test marketing (1999 - 2003). The SCFT, a pilot program, was performed under a bilateral Technical Cooperation Agreement between the Governments of the Federal Republic of Germany and the Republic of South Africa (RSA). Executing agencies were the Department of Minerals and Energy (DME) and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).

What were the reasons for implementing the pilot program in South Africa? The answer is as simple as the related challenge was difficult to meet: The will and commitment of both Governments to significantly contribute to solving the shortage of household energy, and more specifically the fuelwood problem, by coming up with a market oriented solution in South Africa; once and for all it had to be shown that solar stoves are not only a niche solution. Ideally such a solution is expected to be suitable in principle for replication in other countries where similar fuelwood problems prevail. Moreover, the SCFT is in line with the energy policy heralded in the White Paper on Renewable Energy (RE) compiled by the DME in 2002 to bring renewable energy into the mainstream energy economy of South Africa.
It also responds to improving the extent of basic energy needs satisfaction addressed by the Bundesministerium für Wirtschaftliche Zusammerarbeit und Entwicklung (BMZ). Finally, it contributes to achieving the goals of the Agenda 21.

Household energy shortage is an issue in many regions of the world with an estimated two billion people being affected. In the past two to three decades, fuelwood scarcity became a major constraint for people in rural and semi-urban regions, notably on the African continent. The problem involves social, economic, technical, health, and environmental aspects.

In turn, an array of solutions has been offered and discussed time and again by politicians and specialists alike. Some follow conventional patterns; others focus on new technologies, in particular tapping renewable energies. One option is solar cooking.

The magnitude and complexity of this global challenge call for an integrated, multi-disciplinary approach, addressing the associated issues from various angles and putting equal emphasis on all-important features. In doing so, the underlying basic rationale is clear: In countries with high solar irradiation of 500Watt per m^2 (this is 50% of the usual maximum irradiation) the use of solar stoves as an additional cooking option can contribute to alleviating energy shortages. The vision for the future is the availability of low cost solar stoves of high quality so that they will be affordable for everyone on the African continent.

In the past, measures to introduce solar stoves were often effected by enthusiasts favoring a technology driven approach. These activities did not result in the sustainable use of solar stoves because they neglected their social acceptance by the target group, notably low income people living in rural and semi-urban areas, and underestimated the mechanisms of the market. The successful marketing of solar stoves, covering the whole chain from the demand oriented design and production to their appropriate use in households, is a complex endeavor. It involves many players with various tasks and responsibilities.

The challenges, accomplishments, and lessons learnt in implementing the SCFT in South Africa have been channeled into the SCC. It provides a comprehensive account of this pilot program, starting from the project idea all the way to the final assessment of the achievements. Thus, the SCC illustrates

- Why have solar stoves been selected as a means to fight energy scarcity of households?
- What have been the key activities of the pilot program?
- How have they been planned, implemented, monitored, and evaluated?
- Which were the lessons learnt for shaping future programs or projects?

To keep it as a user-friendly manual-type document the SCC has been edited in five volumes. It has been edited in five volumes:

Main Report	Challenges and achievements of the Solar Cooker Field Test in South Africa.
Volume 1	Scarcity of household energy and the rationale of solar cooking.
Volume 2	Social acceptance of solar stoves in South Africa.
Volume 3	Making the case for commercializing solar cookers in South Africa. Justification for the development of a commercially viable renewable energy cooking technology industry.
Volume 4	The solar cooking toolkit. Conclusions from the South African Field Test for future solar cooking projects.

The concept, the various features of implementation, and the accomplishments of the pilot program have already been shared with policymakers and professionals in many fields throughout the last three years, e.g. at the international conferences in Varese, Italy (1999), Kimberley, South Africa (2000), and Adelaide, Australia (2001) as well as the International Workshop on Solar Cooking in Johannesburg, South Africa (2001) as well successfully participating in the World Summit on Sustainable Development (WSSD) during 2002. These events also generated valuable feedback for advancing the SCC. It was also presented to the German Ministry of Development Co-operation (BMZ) in November 2003 with the result that solar cooker programmes have been included in their standard set of development instruments and further proposals have been invited for projects of this nature.

The SCC compendium was updated at the end of 2003 to reflect the development of an expanded approach to the concept of commercialising solar cookers. The expanded approach entailed the broadening of the initial narrow focus on solar cookers, to that of a complete renewable cooking industry (including solar cookers, improved wood and coal stoves). The Energy Development Corporation (EDC), a division of CEF(pty)ltd. of South Africa expressed potential interest to become the champion of a renewable cooking industry provided that the potential commercial viability could be confirmed, calculated and quantified. After successfully demonstrating the "business case", for the development of a renewable energy cooking industry, the project has been incorporated into the structures of the EDC.

The Solar Cooker Field Test has received the attention and appreciation of South African and German politicians alike. They visited solar cooking demonstrations and tasted dishes cooked with the sun. The most prominent of them are:

- Ms Phumzile Mlambo-Ngcuka
  Minister of Minerals and Energy, South Africa

- Ms Susan Shabangu
  Deputy Minister of Minerals and Energy, South Africa

- Mr Johannes Rau
  President of the Federal Republic of Germany

- Ms Heidemarie Wieczorek-Zeul
  Federal Minister for Economic Cooperation and Development, Germany

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Abbreviations

AE	Alternative Energy
BMZ	German Ministry for Development Co-operation
CDM	Clean Development Mechanism
CEF	Central Energy Fund
CER	Certified Emissions Reduction
CIDA	Canadian International Development Agency
DANIDA	Danish Government Development Aid
DBSA	Development Bank of SA
DfID	Department for International Development (British)
DME	Department of Minerals and Energy
DNA	Designated National Authority
DOE	Designated Operational Entity
DTI	Department of Trade and Industry
EE	Energy Efficient
ETEF	Empowerment Through Energy Fund
GEF	The Global Environment Facility
GHG	Greenhouse Gases
GRI	Global Reporting initiative
GTZ	German Organisation for Technical Co-operation
ICLEI	International Council for Local Environment Initiatives
IDC	Industrial Development Corporation
IFC	International Finance Corporation
IUCN	World Conservation Union
JICA	Japanese International Co-operation Agency
KfW	German Development Bank
LSM	Living Standards Measure
NGO	Non-governmental Organisation
ODA	Overseas Development Agency
PDD	Project Design Document
R/A	Renewable/Alternative
RAPS	Rural Area Power Solutions
RDP	Reconstruction and Development Programme
RE	Renewable Energy
SALGA	South African Local Government Association
SEA	Sustainable Energy Africa
SME	Small and Medium-sized Enterprises
SSN	SouthSouthNorth Trust
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WESSA	Wildlife and Environment Society of South Africa
ZAR	South African Rand

Equivalent of 100 ZAR

	1997	1998	1999	2000	2001	2002	2003
DEM	37.65	32.14	30.02	30.63	25.72	10.10 Euro	11.72 Euro
USD	21.17	18.07	16.36	14.42	11.62	9.51	13.22

✍ Average annual figures published by the South African Reserve Bank

Overview

This document makes the case for supporting the development of a commercially viable renewable and alternative energy household cooking appliance industry in South Africa. Such support is presented as the only effective way to promote the use of renewable and alternative (R/A) energy options for cooking in order to achieve a desired social and environmental agenda. The business case rests on the achievement of the "triple bottom line": commercial viability, environmental sustainability and progressive social development. It shows clearly that the "triple bottom line" is achievable with the support of a co-ordinating and facilitating institutional champion.

Introduction to the project concept

1. Background: Why alternative cooking energy options. The Solco Project[3] is premised on an understanding of the problematic contribution that current widely used cooking practices make to environmental problems nationally and regionally. These practices are based on the often inefficient use of biomass energy sources, or on alternatives that are affordable but unsafe. They also contribute to economic problems in poorer families and to health problems, gender inequalities and overall impoverishment of the quality of life at the individual level. In many parts of Africa, the issue is largely one of the depletion of biomass in the form of wood. In South Africa, particularly in Living Standard Measures (LSM) groups[4] 2-5 (rural and urban), the groups on which this business case focuses, the issue is more complex. While these groups are not as dependent on wood fuel as others in Africa, paraffin is the most-used energy source for cooking, and consumers are concerned about its safety. They do not see themselves as having realistic alternatives. Even where electricity is available, when its availability is limited and/or when its cost is high, people choose to use it for lighting rather than for cooking. Where wood and coal are used, current appliances are often not fuel efficient, adding to the cost to the consumer, and to the environment. The multiplicity of fuel sources used by South Africans in the LSMs considered in this business case creates opportunities for promoting a combination of fuel efficient and alternative fuel source cooking appliances. The challenge for the Solco Project is to find a viable and sustainable way to make the use of R/A energy for cooking a popular option in the South African context.

[3] A GTZ initiated project.

[4] LSMs (Living Standards Measure) are a tool that was developed in South Africa as a broad indicator of standard of living or "affluence" based on a diverse range of twenty variables including amenities available in one's home, use of specific financial services, consumer products and retail channels, and ownership of certain appliances. After clustering groups of consumers according to these variables, the demographics of each group are determined.

2. Conceptual linkages. ***The vision of the Solco Project is significant and sustainable penetration of renewable and alternative (R/A) household energy technologies, particularly for cooking, in South African households***. ***The mission of the Solco Project is to establish an enabling body that will pool and concentrate resources to facilitate the development of a commercially viable and sustainable R/A household energy industry and market in this country.***

3. The vision and mission of the Solco Project rely for their achievement on the complex linking of certain key concepts. These include:

   - Commercial viability and sustainability, built on supply and demand.
   - Industries and markets as tangible manifestations of supply and demand.
   - Value propositions that present to the consumers a unique way of meeting their requirements in terms of quality, real and perceived, needs and price.
   - A reasonable expectation on the part of entrepreneurs that investment in R/A household energy in South Africa is commercially viable. Without an industry, the consumers' requirements are unlikely to be met, and the extensive use of R/A household technology will remain the dream of environmental enthusiasts.
   - The understanding that a sustainable society does not deplete its capital, whether business capital, social capital, human capital and environmental or resource capital. The "triple bottom line" which measures the performance of companies against economic, social and environmental standards is a key component of the Solco Project vision and mission.
   - The understanding that consumers focus on application outcomes and not on energy sources. Most consumers do not choose a cooking appliance because its use is better for the environment. They want a meal on the table in the safest, convenient and most cost effective way possible. This means building consumer confidence in less traditional methods through the use of a range of R/A energy sources to complement one another.
   - An understanding that, in order for the concept to work, it needs to be championed. This is seen as the role of an "enabler". The enabler would be responsible for popularising the concept of R/A household energy cooking, thus stimulating demand, for mentoring the development of an R/A household energy appliance industry to meet the demand, and for encouraging the development of a supportive policy and regulatory framework.

4. The key elements of the strategic framework for this business case. This conceptualisation requires an understanding of the key elements of the demand-side profile, the supply-side profile and the policy environment and regulatory framework. Analysis showed that, within each of these areas, there were key factors likely to influence the success or the failure of efforts to implement the business case in practice, and that there were interconnections between these factors.

On the demand side, the core issue is the basis on which consumers make decisions about what cooking appliances to purchase and what energy sources to use for cooking. Consumers are driven, in their choices, by the need to produce meals. Availability and accessibility of the technology and energy source are crucial here. Clearly, these link closely to supply issues. The developed industries around existing appliances, served by traditional sources of energy, have an enormous advantage over the under-developed R/A energy options.

5. The Solco Project has been doing research and piloting the introduction of R/A cooking technology since 1996. The research initially focused on user acceptance and produced encouraging results. SInce 2001, the research has accelerated and has focused on both the demand-side and the supply-side possibilities. This research is dealt with in detail below.

6. Issues of supply and demand also link directly to the issue of policy environment and the regulatory framework. On the regulatory side, the South African government, despite a policy commitment to renewable energy, has tended to favour electricity and paraffin, both of which enjoy direct support in the form of subsidies. However, the government believes that renewable sources of energy can, in many cases, provide the least cost energy services, particularly when social and environmental costs are included. It is willing to provide focused support for the development, demonstration and application of renewable energy. What is needed is a champion for R/A energy applications to push the government in this regard. The Central Energy Fund (CEF) has now agreed to provide an institutional framework for a unit to do just that, acting as an enabler in the development of such applications. International donor organisations such as the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF), as well as the German Organisation for Technical Co-operation (GTZ), have invested considerable amounts of time and money in this area in South Africa, providing a strong foundation for the work of the proposed unit.

Demand analysis

7. The research on the demand-side was conducted in two phases: the first was a desk study to analyse the potential target market in detail, and the second was primary research aimed at quantifying the real opportunity.

8. The target market: desk study. The desk study focused on LSMs 3-5. These comprise relatively poor people, but with sufficient income at least to be able to purchase an R/A household energy cooker, and more likely to be able to physically access such products than those even less affluent in LSMs 1 and 2. According to the desk study of existing secondary databases, members of LSMs 3-5:

   - Number about 17.2 million, or just over 39% of the South African population.

- Are largely black and speak a range of home languages. Between 60% and 80% understand English. Most have some high school education and are functionally literate.

- Account for 22% of purchases of large household appliances.

- Average earnings of around R 1 803 per household (relatively low).

- Are found in all nine provinces, with the highest concentration in Gauteng, and with the biggest concentration living in rural areas and metropolitan areas.

- Have relatively few amenities in the home, and do not seem to prioritise electric cooking appliances even when electricity is available. They are more likely to own a television than to own an electric stove, even if they use electricity for lighting purposes.

- Buy their appliances primarily from chain stores offering HP.

9. Demand analysis using primary research. The desk study provided a picture of a promising potential market. The primary research was aimed at determining whether there was a genuine latent demand for R/A energy cooking appliances and, if so, how great a latent demand. A number of studies were done. The biggest and most critical, from which the most important conclusions concerning potential demand were drawn, was "The Renewable Energy Survey".[5] This involved qualitative and quantitative interviews, product demonstrations and feedback, and in-house observations. Findings included the following:

   - Consumers use more than one household energy technology for cooking. They aspire to electricity but often cannot afford to use it for cooking.

   - The 10% who use gas are generally unhappy with it for safety reasons. Almost half those in LSMs 3-5 use paraffin which is also seen has being a safety and health hazard but is used because it is relatively inexpensive and safer choices are not available.

   - More affluent households in the target group also use coal, and less affluent households use wood.

   - There is a high awareness of solar energy as an option, and a strong willingness to consider it because there are no fuel costs and it is safe.

[5] All the surveys are available in an Appendix to the full business case.

10. The study concluded that a) there is an opportunity for more fuel efficient wood and coal burning stoves to replace current less efficient wood and coal stoves, at the expense of paraffin and gas; and b) any approach to developing the use of R/A energy appliances for cooking should be inclusive so that consumers can use appliances that complement one another. Even if positive about solar energy, consumers will continue to use more than one energy source, given the limited availability of sunshine.

11. The study indicated that R/A household energy is commercially viable in the primary target group. However, its successful development requires that supply-side issues be addressed. Currently people are not using R/A energy cooking appliances because they are not widely available or familiar.

Supply analysis: meeting the demand in a commercially viable way

12. A key premise underpinning the business case is that unless the latent demand for R/A cooking appliances is met through successful mass production and delivery, it will never be practically realised. This requires commercialisation.

13. Current supply-side limitations. While there are significant players, both in terms of energy supply and in terms of manufacture and supply of cooking appliances, in the ***non-renewable*** energy field, the R/A cooking appliance industry lags far behind. There are a limited number of products in the form of energy efficient coal stoves, solar cookers and "hotbag" or "hotbox" type products that cook through retaining heat. Most of these are produced by "enthusiasts", not as commercial ventures. They currently occupy a niche market, rather than a mass market. On the supply-side, if there is to be successful penetration of the primary target group by R/A energy cooking appliances, diversity needs to be strengthened, both in terms of products available and the way in which they are distributed. The problems with supply of R/A energy cooking appliances impact on distribution because there are not enough suppliers, those that exist do not necessarily have an entrepreneurial drive, or commercial experience, and most do not benefit from economies of scale. These factors impact on quantity and continuity of supply and hence on distribution.

14. Distribution channels. There are four main distribution channels that could be used by R/A household energy cooking technology product suppliers: direct response marketing ("outbound" as in direct mail or "inbound" as in advertising), retail distribution, personal selling and institutional channels. Each of the four has advantages and disadvantages. Within the context of establishing a new market and industry, it is useful to see many of the disadvantages as challenges or opportunities.

15. Formal retail distribution is the most pervasive route for marketing in the primary target market. Chain groups have obvious advantages here (location, economies of scale, mass advertising, high visibility, customer trust and loyalty, HP options, and regional supply networks).

Independent retailers have advantages such as familiarity with local communities, personal selling and service, support for local promotions and in-store demonstrations. Personal selling is an ideal route to the market in this field. Here the advantages include dedication of the salesperson, the ability to go out to the customer, his/her familiarity with the customers and institutions in the area, and the personalised attention. While there are disadvantages, such as problems of co-ordination with multiple distributors, post-sale services and demand-side financing (HP), there are innovative ways to overcome these (see Appendix 7: Stakeholder Profiles: EMS). Institutional channels (municipalities, refugee organisations, non-governmental organisations etc) are able to move relatively large quantities through a single channel at a time. They also have the advantage of critical mass visibility and experience-sharing in one location. In using this route, it is important that the products are not seen as "specifically for the poor" which would undermine their desirability, and that the institutional approach does not undermine the parallel development of commercial channels by distorting prices through subsidies.

16. In distribution, as in all the supply-side challenges, the enabler will need to assist existing suppliers to develop commercial know-how, but also to facilitate the entry to the industry of many more diversified players. The enabler will also have to prioritise achievement of scale, even to the extent of facilitating the development of wholesalers who are able to do on behalf of suppliers collectively what they may not be capable of doing independently.

Facilitating options within the environment

17. There are a number of enabling and supporting mechanisms that could facilitate the development of a healthy R/A energy cooking appliance industry in South Africa. They include:

- Supply-side financing options such as national, bilateral and multilateral funding institutions, promoters of SMEs, corporate foundations and funds specifically available for renewable energy business initiatives.

- The potential supply-side financing option of setting up of a Clean Development Mechanism (CDM) project to exploit the sale of Certified Emissions Reduction credits. Finance generated in this way could be used to support the development of an R/A cooking appliance industry.

- An existing network of organisations explicitly concerned with alternative energy issues and loosely grouped under "Local Agenda 21". The aim of these organisations is to develop communities and cities in a sustainable way. They include NGOs and Section 21 companies, municipalities and government line departments.

18. While the R/A sector is still in an embryonic phase in South Africa, the Solco initiative is emerging at a time when there are opportunities for synergy and co-operation between initiatives that complement one another.

The way forward

19. Based on the research done in the preparation of the business case, the Solco Project believes that the best way, and probably the only way, to realise the vision of extensive use of R/A household energy technologies in South Africa is through the establishment of a commercially viable and sustainable R/A household energy market and industry. The longer term critical outcome of success in this regard would be, we believe, a positive impact on social, economic, health and environmental problems, particularly in the more marginalised sectors of South African society. In other words, the achievement of the commercial/economic bottom line is a prerequisite for the achievement of the social and environmental bottom lines.

20. The research shows that an R/A household cooking appliance industry in South Africa is commercially viable. The obstacles are largely on the supply (or industry) side. The key issue is to ensure that there is investment on the supply-side. This requires that there be a convincing potential for a reasonable return relative to investment risk. What is needed is an enabler to ensure that the necessary steps are taken. CEF has agreed to provide an institutional home for an enabling unit. ***It is now essential and urgent to get this unit up and running.*** This means:

- ✍ The unit must be physically located on CEF's premises and the working/ administrative ground rules established.
- ✍ The additional (planned and budgeted for) human resources must be recruited.
- ✍ A methodology must be put in place for identifying and screening potential projects, with preference being given to projects that address the issue holistically in terms of supply and demand management. These initiatives have the greatest chance of success. The enabler needs to gain essential experience in discriminating between project proposals as quickly as possible. Standards also need to be set for the evaluation of, and reporting on, the performance of projects, as well as the industry collectively in terms of the "triple bottom line".
- ✍ Resources need to be retained or accessed. These should include external consultants (for assisting in the development of business plans and proposals, and the ongoing transfer of relevant market knowledge and business skills) and a "resource centre" where interested parties can easily access relevant materials.

21. Thereafter, the key tasks for the enabling unit will be to:

- ✍ ***Quantify the size and potential of the opportunity*** through further research and ongoing refining of targets.

- ***Quantify the societal benefits that result from the initiative***. The business case documents likely societal benefits from increased use of R/A household cooking appliances. These include fuel cost saving, a decrease in biomass depletion, a decrease in harmful emissions, health benefits, and the easing of pressure on the electricity grid. It will be the task of the enabler to monitor and quantify the benefits.

- ***Popularise the results of the research for this business case*** as a marketing exercise. The findings of the business case research need to be widely communicated to potential investors and consumers to provide an impetus on both the demand-side and the supply-side.

22. The Solco Project believes that a target of 250 000 total unit sales at an accelerating rate over a period of five years is a highly realistic objective. This equates to an industry generating about R 125 million in sales revenue in five years. This is large enough to attract investment interest and address the supply-side challenges.

1 Introduction

1.1 Brief description of the project concept

The Solco Project was initiated by the German Organisation for Technical Co-operation (GTZ) in 1996, in conjunction with the Department of Minerals and Energy (DME), and in the context of a need to address household energy shortages as well as serious environmental concerns related to energy use. The purpose of the project was to explore ways in which renewable and alternative (R/A) energy sources can be exploited to complement other sources of cooking energy in South Africa.

Initially, the Project focused on developing solar cooking technology that was efficient and marketable. Then, as concerns about meeting a range of consumer needs, and developing a market and distributing products arose, it investigated how the social and environmental agendas could be linked to a commercially viable supply-side approach. Now it promotes the concept that the best way to meet the social and environmental agendas is, in fact, through a commercially viable approach. Key elements in this are the contextual policy and regulatory environment, the supply-side profile and the demand-side profile.

While governments and non-governmental organisations (NGOs) are concerned about the "big picture", in terms of societal and environmental imperatives, the consumer's priority is the provision of meals for the family. The energy cost and the environmental savings will only be realised if consumers choose to cook with R/A energy appliances on an ongoing basis. And, they will only do so if they believe that these cookers will be able to provide – at least – an equivalent quality, quantity and diversity of meals as timeously and conveniently as their traditional cooking technologies. If this credibility is to be achieved, then issues of mass accessibility, economies of scale, variety of options all need to be addressed. The best mechanism for addressing these issues is the market. Only a truly commercially-driven approach integrates the different but parallel objectives of society, individuals/families and suppliers efficiently. There needs to be both a "value motive" that drives the demand or market-side of the equation, and a sustainable "profit motive" that drives the supply or industry side.

The purpose of this document is to make the case for a process that meets the "triple bottom line" – social, environmental and commercial.

1.2 Strategic rationale: why alternative cooking energy options?

✍ The problem

Most of the world depends on biomass[6] to fulfill its domestic energy needs. This depletes the world's biomass resources, leading to environmental degradation, and exacerbates CO_2 emissions. In addition to the scarcity of fuelwood, its use is also problematic. When biomass is burnt, carbon dioxide is set free. This disturbs the biological balance and contributes both to climate warming and to a loss of bio-diversity. For environmentalists this is a major global concern.

At the individual level, in the past two to three decades, fuelwood scarcity has become a major constraint for people in rural and semi-urban areas, especially in Africa. It also generates smoke, often indoors, and this is a major cause of acute respiratory illness, eye infections, lung cancer, and low birth weights of infants. These illnesses, many of them chronic, affect mainly women, children and the elderly. Where wood is available free, women and children are usually the fuelwood gatherers, adding to the work load, particularly of women. As wood becomes scarcer, they are forced to walk further to find it, and may keep children out of school to help with the carrying. Increasingly, too, people are forced to pay for fuelwood, making less money available for other needs such as education, health and food.

Poverty, in the form of low or unreliable incomes, perpetuates the dependence of households on energy sources that are either free (such as fuelwood) or which can be purchased in small quantities on a daily basis (such as paraffin or coal). In rural areas in South Africa, wood accounts for over 75% of fuel consumed and it is estimated that 10 million tons of fuelwood are used in rural areas every year.

However, in the research done in South Africa for this business case, encompassing Living Standard Measures (LSMs) 2 to 5 (rural and urban), it was found that 54% of the sample currently use paraffin for cooking, 31% use coal, 26% wood, 8% use gas, 6% use electricity and 3% use dung. For heating, 37% use coal, 25% wood, 18% paraffin, 5% electricity, 2% gas and 17% none. For lighting, 54% use candles, 41% electricity and 11% paraffin. This suggests that South Africans are not as dependent on wood burning as some other African countries. The multiplicity of fuel sources used by South Africans in the LSMs which, were of concern for the development of this business case creates opportunities for promoting a combination of fuel efficient and alternative fuel source cooking appliances. While paraffin is the most-used energy source for cooking, consumers are concerned about its safety. The potential dangers include fires, noxious fumes and poisoning. Where coal and wood are used, current appliances are often not fuel efficient. Our research suggests that, while consumers are aware of the dangers and problems, as they affect them immediately, they do not see themselves as having alternatives. Even where electricity is available, where its availability is limited and/or when its cost is high, people choose to use it for lighting rather than cooking. This highlights a gap in the market for alternative/renewable energy cooking appliances which, either reduce the problems with traditional sources of energy, or provide alternatives.

[6] Mainly fuelwood, but also charcoal, agricultural residues and dung.

✍ The host country response

Despite a policy commitment by the government towards renewable energy, there is a distortion in the regulatory environment towards two dominant energy sources: electricity and paraffin, both of which enjoy direct support in the form of subsidies. This has had a crowd-out effect on other energy forms. A decision on the use of nuclear pebble reactors is expected in the near future, and a positive decision may well have negative consequences for those proposing renewable energy sources of energy. As yet, no champion for renewable energy in the industry has emerged.

Nevertheless, the Republic of South Africa ratified the United Nations Framework Convention on Climate Change on August 29 1997. On December 2 1998, the Cabinet approved the White Paper on Energy Policy of the Republic of South Africa. This White Paper sets objectives and specific priorities for the South African energy policy within the broader policy framework of the Government's Reconstruction and Development Programme (RDP). Among the objectives of the White Paper are:

- Increasing access to affordable energy services;
- Improving energy governance;
- Stimulating economic development;
- Managing energy-related environmental and health impact; and
- Securing supply through diversity.

Currently, a draft White Paper on Renewable Energy is being discussed. The Government believes that renewable sources of energy can, in many cases, provide the least cost energy services, particularly when the social and environmental costs are included, and is, therefore, willing to provide focused support for the development, demonstration and applications of renewable energy. Where a project would lead to the introduction of a new technology and possibly new industry into South Africa, with a high potential for job creation, as in the case of the Solco Project, this is even more likely to be the case. What is needed is a champion for renewable energy resources to push the government agenda in this regard. There are specific agencies within government, such as the Central Energy Fund (CEF), which could fulfill this championing role. The Department of Minerals and Energy (DME) has been reorganised to undertake government's planning in the field of energy supply, regulation and distribution. Everything concerned with renewable energy, efficient energy and climate change has been handed from the DME to the CEF to follow-up, provided that commercial viability can be demonstrated. Currently, the AE/RE focus of CEF is on developing a wind farm, reducing smoke emission from coal, and researching natural gas options. As yet it is not involved in any solar projects. CEF has also looked at the financial possibilities for funding clean energy projects through Clean Development Mechanisms (CDMs). The Solco Project offers an opportunity to the CEF to look at the AE/RE sector creatively and as having potential commercial benefits.

This opportunity is further enhanced by the fact that international donor organisations such as GTZ, the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) have invested considerable amounts of time and money in this area in South Africa. GTZ's aim is to shape the political, economic, ecological and social development in partner countries positively, in order to improve people's living conditions and prospects.

UNDP is the development arm of the United Nations. It provides support to countries in the development of effective policies and institutions, such as those that integrate environmental and development objectives to protect the environment as well as to reduce poverty. The GEF is a financial mechanism structured as a trust fund for the purpose of achieving global environmental objectives. All three of these organisations have supported the Solco Project and contributed extensively to the development of this business case for a commercially-driven process to achieve a social and an environmental agenda in the alternative energy field in South Africa.

The response of South Africa, as the host country for this initiative, to the problem as defined in Section 1.2.1, can be summarised as having been tentative but positive in terms of renewable energy options, at least at the policy level. The regulatory framework, however, supports conventional energy sources through subsidization. Potentially, the infrastructure exists to support a R/A energy initiative. The Central Energy Fund (CEF) appears to be an appropriate institutional framework for hosting a unit that could focus on the development of a commercially viable R/A energy household cooking technology sector. The Solco project offers an opportunity to the CEF to look at the AE/RE sector creatively. This opportunity is further enhanced by the demonstrated commitment of several international donor agencies to support initiatives of this kind.

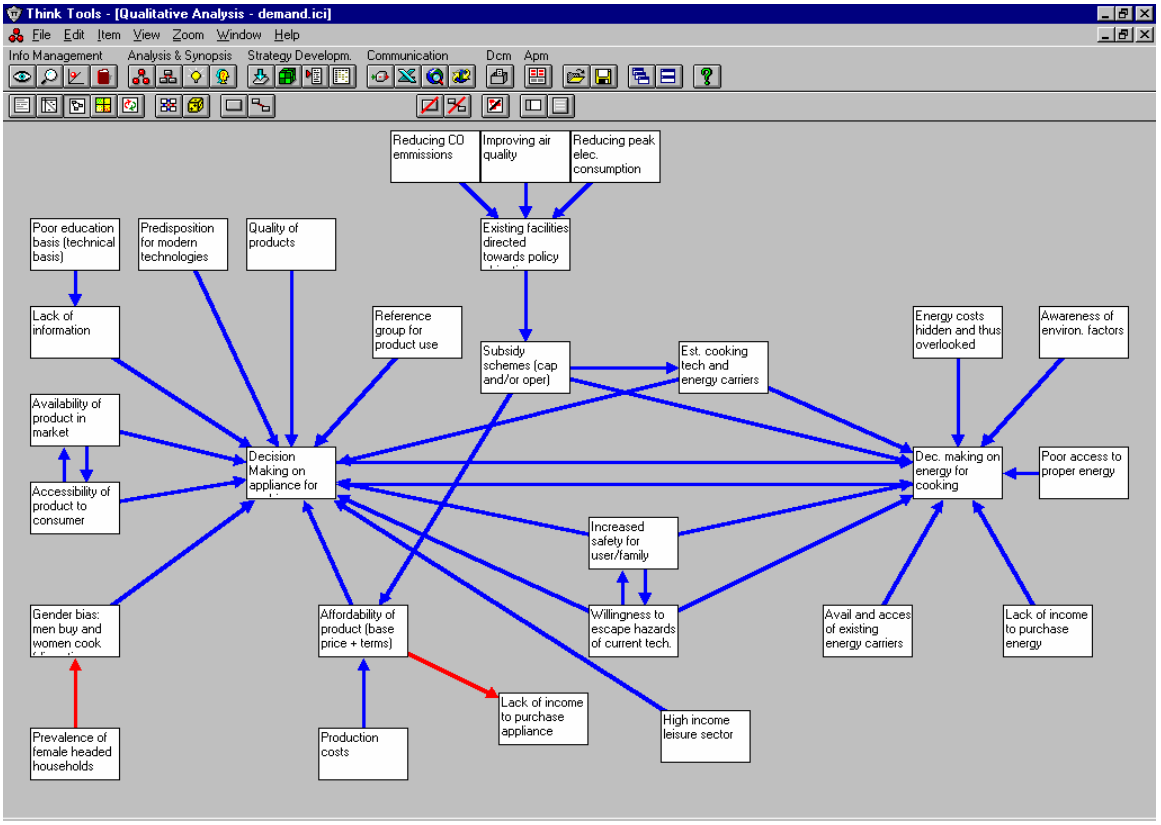
1.3 Strategic framework

In the course of this project, independently facilitated workshops were conducted involving knowledgeable representatives of relevant commercial, government and non-government organizations. The purpose was to "brainstorm" a strategic framework for the construction and evaluation of a business case for a R/A household energy cooking market and industry.

Measured in terms of consumer demand and product sales, renewable energy for cooking in South Africa can currently be described, at best, as a "depressed", whereas other energy and appliance options are established and performing well. It must always be kept in mind that markets and industries do not develop or exist in a vacuum. Many issues influence success or failure, and these very same issues influence one another. Therefore, important considerations for this (or any other) strategic framework are gaining a better understanding of the context and of the connections between relevant issues within the context. To this end, three interrelated analyses were conducted, covering: the demand issues; the supply issues; the policy and regulatory issues. The following three figures, with accompanying commentaries summarise the conclusions reached in these analyses.

✍ The demand issues

Figure 1:
The demand chain



The two key issues influencing "demand" and the potential for market development are the decision-making processes of consumers in terms of choice regarding appliances used for cooking, and choice regarding the energy powering these appliances. Ultimately, the need driving consumer choice derives from the provision of meals. Any analysis must follow a path originating at this point.

The issues of appliance and energy choice are separate, but interdependent, and the conclusion drawn at the workshop was that the first consideration of consumers will be the appliance, as this is more directly associated with meal preparation. Other issues influencing appliance choice include the availability of, and accessibility to, products in the market, the presence or lack of information about these products, product quality, reference groups for product use, gender differences (an hypothesis is that men often purchase such products, but it the women who use them), growing predisposition for "modern" products and the affordability of products.

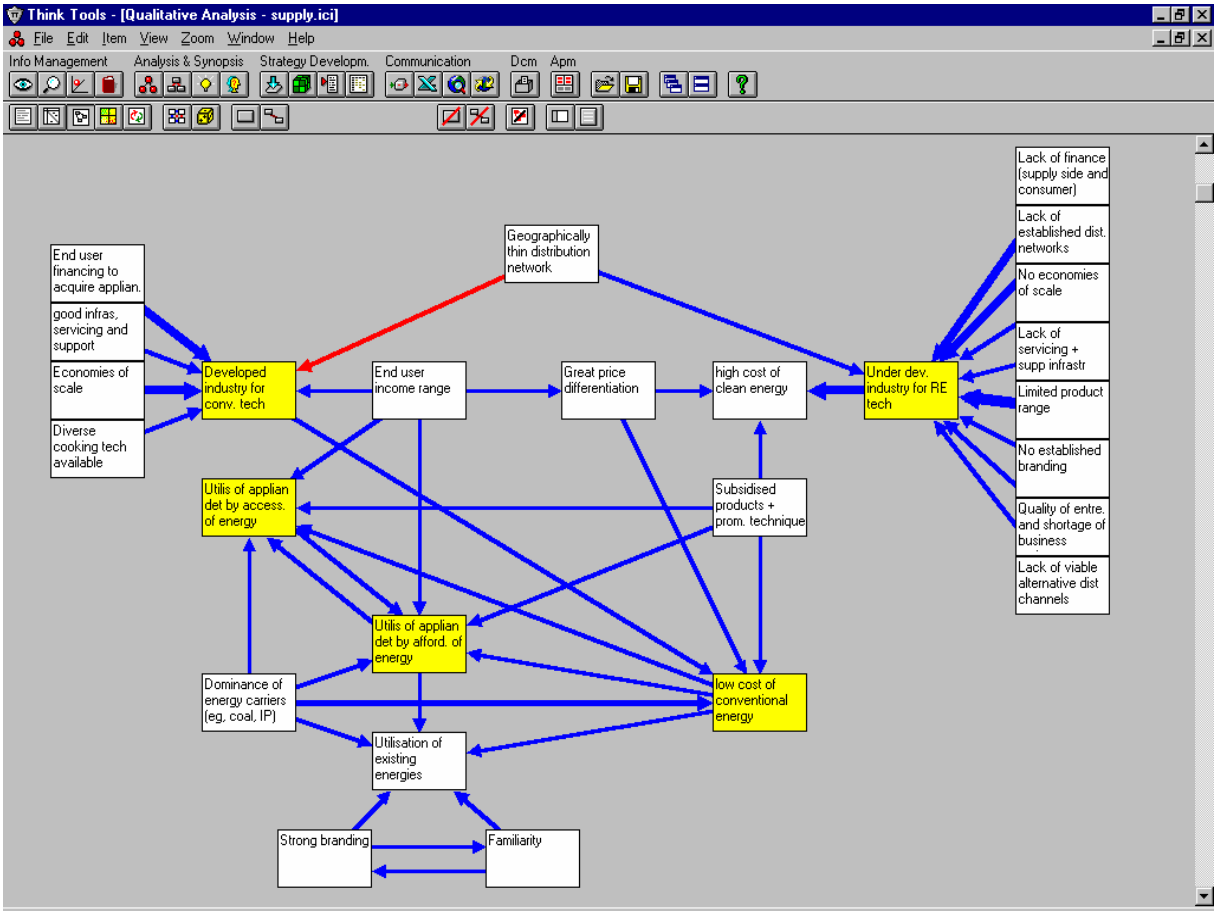
In turn, these issues are influenced by others. For example, product affordability is a function of one's income, the cost of products, the presence or absence of financial terms facilitating acquisition, and price subsidies. These last, in turn, are a function of policy considerations such as reducing CO_2 emissions, improving air quality and/or reducing peak period electrical consumption.

The decision around energy choice is critical. Key issues driving this are the availability and accessibility of energy carriers, awareness and concern over environmental and health and safety factors and, again, affordability and its drivers (although an hypothesis is that energy costs are often hidden and overlooked).

"Comfort zones" experienced by consumers in using established appliance technologies and energy carriers, and increasing concern over user and family safety, impact on both appliance and energy choices.

✍ The supply issues

Figure 2:
The supply chain

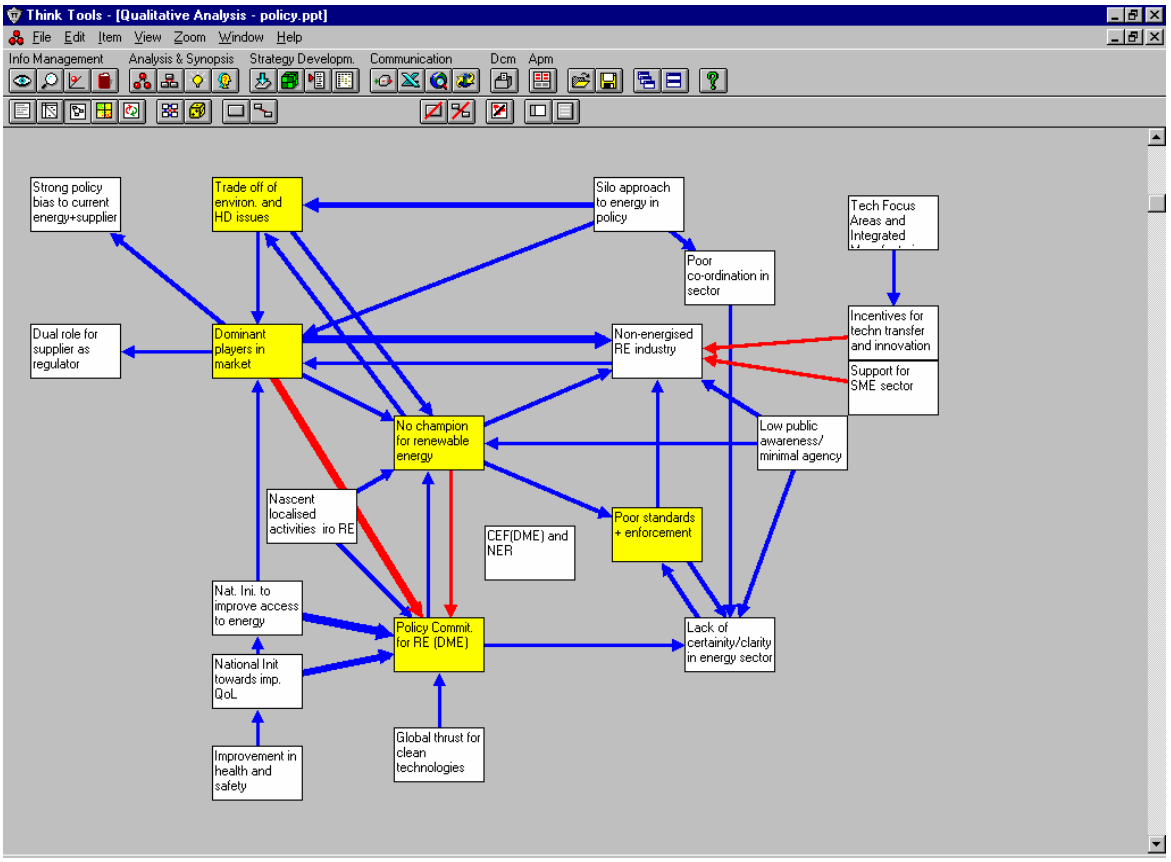


Analysis of the supply side, again, identifies two key issues. These are the developed industries for supplying "conventional" appliances and energy, and the under-developed industry for supplying R/A household energy cooking technologies. The developed industry is characterized by drivers of all successful consumer goods industries: diverse choice, viable and differentiated distribution channels, good service and support infrastructures, strong brands, the availability of consumer finance to facilitate purchase where necessary, and the availability of finance for supplier investment and growth. Importantly, the industry reflects the benefits of economies of scale. These characteristics are generally conspicuous by their absence in the under-developed R/A industry.

The demand analysis summarised above highlights the importance of energy choice in driving appliance choice. Two key issues on the demand side are the accessibility to, and affordability of, energy carriers. In the main, the existing energy carriers are strong in these areas as well, while the benefits of R/A energy sources in this regard are largely unknown.

✍ The policy and regulatory issues

Figure 3:
The policy environment



Finally, an important issue is how enabling, or disabling, the current policy and regulatory environment for R/A household energy cooking is.

On one hand, there is a policy commitment by government towards renewable energy, driven by the global thrust for clean technologies. On the other hand, dominant players characterise the "conventional" energy industries. Often, as in the case with Eskom, the national electricity provider, the supplier is also the industry regulator. These dominant players enjoy a strong policy bias in their favour (such as the removal of VAT on the sale of paraffin) and historically have benefited from direct investment by government. To a great extent this has led to a crowding out on other energy forms.

There is nothing necessarily sinister in this. Policy is driven by a national initiative to improve access to energy by all, and the R/A energy industry is certainly not energised!

There is low awareness by both the public and the policy makers of the issues and the potential in R/A energy. Initiatives in this area have been small, badly coordinated and lost in the various decision-making "silos" that characterize energy policymaking. But, there have been initiatives, and there are important factors that could further influence policy, including national initiatives to improve health and safety, and support/incentives for technology transfer, innovation and the small business sector.

At the crux of the matter is that, up until now there has been no strong and plausible champion for the industry. The important issue going forward is whether there can be such a champion and who it could be. This will be critical to the successful application of the business case.

This section presents the broad strategic framework for the business case in both diagrammatical and narrative format. The framework was determined in independently facilitated workshops involving representatives of relevant commercial, government and non-government organisations. The key areas identified for analysis were:

- Demand issues;
- Supply issues; and
- The policy environment.

There was agreement that the business case needed to look at those issues which were likely to influence success or failure, and at the interconnections between them. On the demand side, the key issue is the basis on which consumers make decisions about what cooking appliances to purchase and what energy sources to use for cooking. Consumers are driven by the need to produce meals, with availability and accessibility of the technology and energy source being crucial here. Clearly these link closely to supply issues. The developed industries around existing appliances, served by traditional sources of energy, have an enormous advantage over the under-developed R/A energy options. This also links into the issue of policy environment and regulatory framework. Despite a rhetoric that supports the use of R/A energy, dominant players tend to be the conventional suppliers of energy and government policy has been biased towards them. There is a low awareness among both the public and the policymakers of the potential of R/A energy. The key issue here is the need for a strong and plausible champion for the nascent industry. This will be a critical factor in taking the business case forward.

1.4 The vision and mission: conceptual linkages

The vision of the Solco Project is significant and sustainable penetration of renewable and alternative (R/A) household energy technologies, particularly for cooking, in South African households. The envisioned outcome is tangible support in overcoming the varied economic, social, health, environmental and problems facing South Africans, particularly those in lower income groups and in marginalised groupings such as women, children and the elderly.

The mission of the Solco Project is to establish a body that will pool and concentrate resources to better enable a commercially viable and sustainable R/A household energy industry and market in this country.

The purpose of this section of the business case is to introduce the vision and mission, and to elaborate on their meaning through defining and explaining the guiding principles, parameters and terminology. This is intended to provide a sound basis of understanding for the specific strategies for execution enumerated later.

✍ Commercially viable and sustainable

Conceptually, the dissemination of R/A energy cooking technology need not take a commercial route. But a commercial approach provides the best potential for success in achieving the vision for the project in South Africa: to achieve and sustain significant market penetration and usage.

South Africa has a unique and intimate mix of "first world" and "third world" elements. Consequently, even the poorest and most physically remote components of the population have exposure to, and participate in, a market economy. They have access to both formal and informal retail distribution of branded consumer products, and regularly receive advertising exposure about products and services through mass media. Brand awareness and loyalty are high across the population. Commercial initiatives, therefore, have familiarity and resonance. While a sub-segment of the population will not have the means, the majority of South Africans - even from the economically disadvantaged population - has the disposable income to make a commercial strategy for R/A household energy/cooking technology viable. A detailed discussion of the target consumers and their characteristics will be found later in this business case.

Perhaps even more importantly, only a commercial approach will be able to address the diverse and complex requirements of this project on a sustainable basis. These requirements are around the need to build both an industry and a market.

- **Industries and markets**

These are the tangible manifestations of supply and demand. An industry is defined by the products and/or services sold. A market, by contrast, is defined by what customers buy. Controversial as it might first appear, these are not the same. All companies sell products and/or services. For example, there are companies that sell automobiles, life insurance or drill bits. Consequently, there are industries in each of these areas. But, from the perspective of the customer, products and services are always a means to an end, and not an end in and of themselves. In the examples above, customers are actually buying, respectively: transportation, peace of mind regarding family financial security and holes.

An industry includes more than the manufacturers of products. It encompasses an entire "value chain": all the people, processes and systems that must be integrated and coordinated to provide consumers with the products in questions. A value chain may start from the source of raw material supply and extend through the entire process of inbound logistics, warehousing, product assembly, distribution, marketing, sales and post-sales service and product support. Players in the value chain could include, in addition to manufacturers: importers, wholesalers, retailers, financiers, providers of professional services, etc.

The proper definition of a market includes the following elements:

- people with a specific need or want
- the resources (e.g. money) to spend in the satisfaction of this need or want, and
- the willingness to spend it.

The importance of this definition is that a market is independent of specific product solutions. Therefore, solutions are not limited or prescribed. The size, scope and potential for success of any commercial opportunity can be derived from the calculations flowing from this definition. Products and services that cannot establish a genuine relevance to a customer's need or want are simply "solutions in search of problems", and will fail in the marketplace. Similarly, products and services that are relevant, but for which there are no able and willing buyers, will also fail.

It should be apparent from these definitions of industry and market that products and services from different industries can compete to satisfy the same customer need. For example, if the need is for transportation to commute to work, two brands of motorcar (Volkswagen Citi Golf and Mercedes S 500, for example) may not be competing for a consumer's expenditure, whereas Citi Golf and the public bus may compete as alternative modes of transportation. The importance of this perspective is the need to gain an understanding of what consumers are really buying if and when they consider R/A cooking technologies. Only then can businesses and industries genuinely satisfy that demand (to this end, specific consumer market research has been commissioned as part of this project, the results of which are appended to this business case, see Volume II).

Industries and markets are the measurable and physical manifestations of the economic principles of supply and demand. One can only sell as much as others are prepared to buy, and one can only buy what is available. Generally speaking, supply rises to meet demand, but conversely, demand can be managed and driven by the availability of supply.

Previous initiatives with regard to R/A household energy/cooking technologies have not succeeded, in part, because they were incomplete - not addressing the issues of both supply and demand/ industries and markets. These initiatives typically were driven either by an altruistic or a technological agenda. As well intentioned as these initiatives may have been, in both instances, neither the needs of the user nor all supply side considerations were taken fully into consideration.

While the societal benefits of R/A cooking technology can be considerable, it must always be kept in mind that, first and foremost, for the consumer, the issue is the provision of meals for the family. The energy savings, cost savings, environmental savings or health benefits will only be realised if people choose to cook with these stoves. They will only do so if they believe that, at least, the alternative methods will be able to provide their families with a quality, quantity and diversity of food equivalent to traditional cooking technologies. In addition, they will require that the alternative technologies do this timeously and on an ongoing basis, as do the traditional technologies.

Simply building a "superior mousetrap" - a better technology - does not guarantee that that the world will beat a path to your door. A complete supply infrastructure that facilitates both acquisition and ongoing usage is essential to commercial success.

A commercial approach is holistic. It integrates the different objectives of society, the individual/family and the participating businesses in the most efficient way - by "letting the market decide". There is both a "value motive" that drives the demand or market side of the equation, and a sustainable "profit motive" that drives the supply or industry side.

- **The value motive**

"Value" is the basis on which a willing seller and a willing buyer exchange products for money. Consumers assess value according to a simple equation with three variables:

- The first is "*quality*". This is measured in terms of both the functional benefit of a product or service (what the product physically can do), and the perceived or emotional benefit (how the user feels about using the product, or thinks others will feel about the user for using the product). This latter consideration has led to market rejection even by the targeted low income consumers of products perceived to have been developed specifically "for poor people". Every product or service has both functional and perceived benefits in varying amounts.

- The second determinant of value is "*price*", both in terms of monetary expenditure and the time/ hassle/ sacrifice associated with acquiring/ using a product.

- The third determinant is the *"perceived risk"* in terms of the surety the consumer has, before the fact of purchase and use, that the product or service will perform at least according to expectations.

The value equation for any individual product or service is encompassed in its "value proposition". This is a simple sentence which identifies how this product's particular package of value can satisfy an identified need or want of the consumer in a way no other product or service can. Consequently, a value proposition has two important dimensions:

- The relevance to the satisfaction of a genuine consumer need or want. As has already been discussed, irrelevant products will fail.

- Differentiation - the ability to satisfy the need uniquely. Differentiation is necessary for consumers to be able to distinguish between competitive offerings and make choices, and a lack of differentiation has been identified as the single biggest reason for the failure of new brands.

Dynamic and robust commercial markets are characterised by the availability of products and services with ever-evolving and competing value propositions. The perspective of competition and choice must inform the activities of this project. The objective is to facilitate the availability of a range of viable R/A cooking technology options - complementing, supplementing and competing - and not to try to outguess the market and predetermine a single "winner". In so doing, the process is intended to engage and expand the market, and to push suppliers to develop value propositions that meet the consumers requirements on quality, price and perceived risk, while maintaining relevance and extending the parameters of differentiation.

- **The profit motive and sustainability**

The profit motive underpins any commercially viable enterprise. Entrepreneurs and companies enter an industry with the expectation of a financial return. The viability of any business, and the industry from which it comes, is a function of its ability to achieve returns in line with risks taken and in excess of its cost of capital, on an ongoing basis and without artificial support that can be removed at any time. There is, of course, no guarantee of success even in a commercially viable industry. The freedom to succeed is also the freedom to fail.

The purpose of the above discussion is not to provide a primer in basic economics. Rather it is to make the point that the relative absence of entrepreneurs and investment in R/A household energy in South Africa is, to a great extent, a function of the lack of perception and expectation of profit potential. Facilitating, demonstrating and communicating the commercial viability of the industry are critical to its future success. Having an industry, we are arguing, is critical to meeting the consumer demands for value, with all the dimensions that that implies.

Furthermore, worldwide, the issue of the sustainability of business and its ongoing profit streams is growing in importance. From the perspective of individual business, the emphasis is shifting away from a primary focus on short-term improvements in operational efficiencies and cost savings to a primary focus on sustainable revenue growth. A genuine understanding of the needs, wants and motivations of consumers, and then the ability to develop an aligned and focused value chain to single-mindedly deliver a relevant and differentiated solution has never been more critical for business survival and prosperity.

✍ Sustainability in business

The World Commission on Environment and Development has refined the concept of sustainability in business as "that which meets the needs of the present without compromising the ability of future generations to meet their own needs". The underlying thought is that a "sustainable society" does not deplete its capital, but rather, invests its capital for growth and lives off the income. There are different kinds of capital other than just the financial capital that is typically accounted for in a business. This includes social and human capital (measured in the improvement in the human condition - health, safety, security, freedom, etc.) and environmental or material capital (renewable and non-renewable resources).

Initiatives such as GRI (Global Reporting Initiative) seek to improve business sensitivity and receptiveness to sustainability through more transparent disclosure and reporting. One important concept is the so-called "triple bottom line" which measures the performance of companies against economic, social and environmental standards. It is a holistic measure that looks at both inputs and outcomes (for example, a company that consumes more energy in the production of "energy efficient" products than these products actually save would have a negative environmental "bottom line").

Given the overall societal objectives motivating this project, sensitivity to the triple bottom line is essential. What is important to understand, however, is that for commercial players, the financial bottom line is the necessary precedent condition. In the absence of profit potential, there will be no investment and no societal gain. Furthermore, there cannot be one absolute standard triple bottom line for all R/A household energy/ cooking technology products and service providers. Just as different products have different value propositions, they will also have different triple bottom lines. What is important is the collective and cumulative effect of the industry on society at large.

✍ Renewable and alternative household energy

The original scope of this project was, specifically, solar cooking technology. It has been expanded to encompass all renewable and alternative energy household cooking technologies that can improve energy efficiency and contribute positively to the social and environmental "bottom lines". There are several reasons for this expansion:

- First, there are already a large variety of energy sources in use, and different fuels are more or less available in different places at different relative costs. Historic research has demonstrated that consumers, including those in the lower economic groups, use a

repertoire of cooking technologies depending on both the availability of energy sources and food preparation requirements. Therefore, the concept of owning and using more than one technology is not foreign. Where solar cooking devices have been placed in the home, they are used a significant but minority percentage of the time.

- While certain of the solar cookers tested in South Africa performed well in research against specific functional criteria, there is no one "ideal" cooker, nor is there any point in trying to develop such an ultimate appliance. Individual cookers have different applications, strengths, and weaknesses for different consumers. Furthermore, consumer understanding of cooking appliances is more focused on application and outcome than on energy source. In other words, all solar cookers are not "bundled together" in the minds of consumers any more than are all electrical cookers (e.g. a 2-plate hob that runs on electricity is not the same as a microwave oven which also runs on electricity). It can be assumed that the same situation prevails for appliances driven by other energy sources.

- Both historic research and the research conducted in developing this business case illustrate that the stated intention to purchase a solar cooker is significantly higher than actual behaviour. This reflects both demand constraints (in particular, a reluctance to move away from tried and trusted traditional cooking habits to something less familiar, particularly when there are other priorities for household expenditure) and supply constraints. Offering a repertoire of energy technologies, including those that may, initially, be more acceptable to consumers will allow for commercial, personal and societal benefits to be realised (and reinvested) while the demand for specific technologies such as solar are being developed.

- There are also obvious synergies and economies of scale in activities focused on developing industries and markets working across all technologies, with consumers having the ultimate say in the choice of benefits.

For all of these reasons, the scope of this project includes all R/A household energy cooking technologies and not simply solar. This is consistent with the experience of GTZ in other countries where successful projects have been site-dependent, requiring different strategies and a tailored package of measures including a range of appropriate technologies.

- **Pooling of resources – the "enabler" concept**

A pooling of resources will enhance the chances for success in the introduction, rollout and growth of R/A household energy cooking and other household energy technologies in South Africa. Capacity, and a body of experience and knowledge, currently reside with the Solar Cooker Project funded and supported by UNDP/GEF and GTZ. The proposal made in this plan is to physically consolidate and coordinate the management of these resources to pursue economically viable opportunities that promote universal access to energy and the increasing use of renewable and alternative energy sources. The instrument that would make this possible is the "enabler", a term that is used here to describe a facilitating agency that would mentor the development of an alternative energy household technology industry.

Experience has shown that household energy projects are relatively small, and that the administrative inputs are relatively high as a share of the overall costs.[7] Generally, too, there is no single government institution which is responsible for co-ordination between the institutions involved. This is the motivation for a pooling of resources and the proposed role for this enabler. In broad terms, the role of the enabler will be three-fold:

- To disseminate knowledge and understanding of the benefits of R/A household energy cooking, and stimulate the demand for and the growth of a market for R/A household energy cooking solutions.

- To engage in activities that reduce the time, costs and risks or improve the economies of scale of businesses that wish to participate in the R/A household energy industry, thereby improving commercial viability. This includes, but is not limited to, activities that improve understanding of market-suitable products and the removal of "roadblocks" to their successful introduction.

- To monitor and report on the progress of the development of the industry and market in terms of the triple bottom line to as great an extent as possible

To this end, the enabler will engage in a range of projects that will be discussed in detail later in this business case. These projects will generally share certain characteristics, including:

- A holistic and integrated design that incorporates both demand and supply considerations. For these reasons, projects will typically be localised and comprehensive in approach.

- Participation from all relevant stakeholders, including suppliers, funders, public and private partners, policy makers, influencers and consumers.

- Of sufficient time frame to have a realistic chance of success. It is acknowledged that while the purpose of the Project is to accelerate its success, achieving the vision will still be a "slow burn". Again, this is consistent with GTZ experience and practice, which recommend a project-planning horizon of ten years as "the only way for the products to become established on the market and to ensure that they will be properly used".

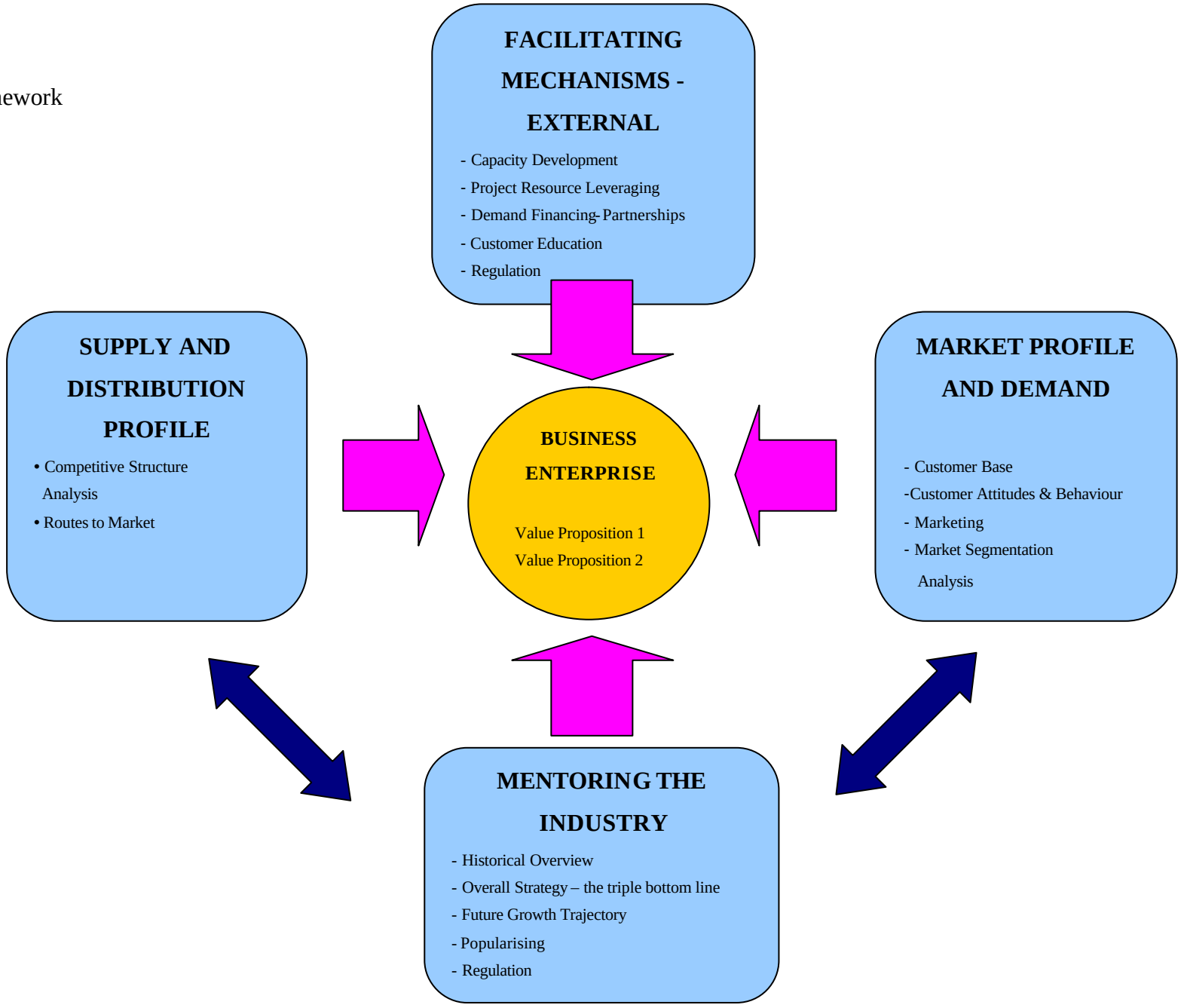
Additionally, the enabler may make strategic direct investments in particular capital projects to facilitate the achievement of the objectives. A graphic presentation of these concepts is given in Figure 4 and is then used to guide the reader through the business case**.**

[7] GTZ document, HEP, Household Energy Programme (Edition 1997 – revised version)

In summary then, the vision and mission of the Solco Project rely for their achievement on the complex linking of certain key concepts including:

- Commercial viability and sustainability, built on supply and demand;
- Industries and markets as tangible manifestations of supply and demand;
- Value on the basis of quality, real and perceived, price, and perceived risk in having expectations met. The value proposition presents to the consumer the way in which a supplier claims to satisfy the consumer's needs and to do so uniquely (differentiation).
- The profit motive and sustainability. If supply and demand are to be built, then entrepreneurs need to be convinced that an investment in R/A household energy in South Africa is commercially viable. Without an industry, the consumer demands for value, with all the dimensions that implies, are unlikely to be met.
- Sustainability in business. Here the key understanding is that a sustainable society does not deplete its capital, and that capital includes business capital, social capital, human capital and environmental or resource capital. The triple bottom line which measures the performance of companies against economic, social and environmental standards, is a key concept. This is particularly important in a project which has overall societal objectives but it is a concept that needs to be applied flexibly, towards a collective and cumulative effect of the industry on society at large. In the context of this project, which is driven by harnessing the impetus to profit, the economic bottom line is as important as the social and environmental ones.
- The need to use a range of R/A energy sources to complement one another, build on the consumer focus on application outcomes rather than energy source, and acknowledge the need to build consumer confidence in less traditional methods.
- The enabler concept which seeks to establish a mechanism for pooling resources which are rendered less effective and more costly by isolation. The enabler in this project would be responsible for popularising the concept of R/A household energy cooking, thus stimulating demand, supporting activities that would lead to economies of scale, and monitoring successes in terms of the triple bottom line.

Figure 4:
Conceptual Framework



1.5 Background to current project status

The only free energy source which could compete with wood in South Africa is solar energy. South Africa experiences some of the highest insolation in the sub-Saharan region, making it an excellent geographical location in which to use solar cookers. In fact, multiple fuel use, or the practice that utilises a range of fuels and appliances at the same time, or interchangeably, because of their availability and acceptability, is the norm in most developing households, including those in rural areas. The use of multiple fuels or "fuel switching" is mainly influenced by survival concerns. The use of solar cookers fits in with the multiple fuel use pattern of households: people are used to switching between fuels and appliances and the availability of solar cookers represents a broadening of choices in terms of satisfying household cooking requirements.

It was this understanding that informed the initial development of the Solco Project and its focus on solar cookers. Solar cooker development has had an up and down journey internationally. The reasons for failures included lack of money for development, problems technologically with performance, handling and durability, lack of interest from potential users, high prices and failure to make adaptations that would have made the solar cookers more user-friendly. There seems to have been a general perception that solar cooking was a solution looking for a problem, promoted by a small, vocal group of enthusiasts. But, despite discouraging results, proponents of solar cooking learned from failure and criticisms, and turned towards a more pragmatic, co-operative, and problem-oriented approach. This led to some successes so that, for example, during the nineties a significant dissemination of concentrator cookers was reported in Tibet.

In South Africa, individuals have experimented with solar cooker designs, but no commercial activity was associated with solar cooking before the SunStove Organisation started disseminating the SunStove in 1993. Then, in 1996, the Government of South Africa and the Government of the Federal Republic of Germany set up a joint solar cooker initiative to investigate the potential of solar cookers to reduce problems related to the supply and use of cooking fuels in mainly peri-urban and rural areas. The key questions posed in Phase 1 of the process were:

- If people have access to solar cookers, do they actually make use of them? and
- Once solar cookers are commercially produced and distributed, will there be customers willing and able to buy them?

The implications of negative answers to these questions would clearly be that solar cooking would not be a significant tool in addressing cooking energy needs, and that it would be unlikely to have the potential for massive and cost-effective application. In other words, it would remain a limited "niche solution". However, positive answers would indicate an opportunity for widespread commercial distribution.

The objectives of Phase 1 of the Project (up to 1998/9) were to test end-user acceptance (in households and at institutions) of different types of solar cookers in three communities within South African test areas. The following activities were undertaken:

- A baseline study to select three areas (villages/townships) with institutions and twenty families per area as an experimental group;
- Selection of a control group of families not using solar cookers;
- Selection and training of three monitors from each of the three study areas to assist in the field test (with data gathering and technical support);
- Placement of different kinds of solar cookers with willing families and institutions and training them in their use;
- Evaluating, through both quantitative and qualitative means, the use of the cookers, fuel consumption and other data from both the pilot users and the control group, to allow for comparisons;
- Contacting potential key role players and stakeholders in industries such as aluminum in Germany and South Africa;
- Establishing, in parallel, a preliminary overview of the market conditions (manufacturer, retailer, transportation networks and credit availability) and perceptions regarding possible commercialisation of solar cookers.

The key messages coming out of Phase 1, relating directly to user-acceptance of solar cookers, were:

- The high use-rate of solar cookers, on a par with wood use and above other fuels, indicated acceptance of solar cooking by families;
- Each kind of cooker had its own supporters. An obvious universal, single choice did not emerge. However, there was a clear user preference for certain cooker types which provided a sound basis for the selection of those solar cookers to be promoted during Phase 2 of the project.
- Considerable fuel and time saving through the use of solar cookers indicated the possibility of generating reasonable pay-back periods, except for the most expensive models;

- The willingness on the part of the pilot groups to buy the used test cookers suggested a viable market for solar cookers, and this was confirmed by an independent market study;

- The use of solar cookers caused a shift in cooking times and a re-organisation of household labour, but the use of solar cookers did not disrupt social relationships.

The results from Phase 1 were encouraging and a new objective was set for Phase 2: To investigate the possibilities of a commercial dissemination of solar cookers to institutions and households in the test areas. This involved exploring technology transfer from Europe to South Africa, and testing various marketing and financing schemes. From mid-2002 on, investigations on both the demand-side and the supply-side were intensified in order to provide information to inform the mass commercialisation of the process. The intensified research included an in-depth investigation of target markets and a commercial feasibility study. The Project has also looked carefully at the kinds of institutional frameworks that are likely to contribute to a social and commercial success, and has involved a range of stakeholders with the capabilities to fulfill the supply-side requirements. A number of pilot projects have been undertaken. It was clear that what was needed was a business case which would use the data and experience developed through these initiatives to lay out the key issues, and present potential solutions that are commercially viable as well meeting the social and environmental agendas that informed the initial concerns. That is the purpose of this document.

In summary:

- This business case is based on research going back to 1996.

- The research initially focused on user acceptance and produced encouraging results.

- One of the findings was that different people preferred different models for a range of reasons. This meant that it was not an issue of developing "the best mousetrap", but rather of providing a range of choices within the R/A energy technology context.

- Further research has now been done on both the demand-side and the supply-side possibilities, as well as desirable institutional frameworks. This forms the basis of the following sections in the business case.

2 Demand analysis

MARKET PROFILE AND DEMAND

- Customer Base
- Customer Attitudes & Behaviour
- Marketing
- Market Segmentation Analysis

This section deals with the demand, or potential demand, for R/A cooking equipment. It does so by looking in detail at the primary target market, and by analysing demand on the basis of current research.

2.1 The target market – desk study

In a previous section of this document, a market was defined as

- People with a specific need or want;
- The resources to spend or invest in the satisfaction of that need; and
- The willingness and ability to spend those resources.

Demographics (such as race, age, income, etc.) do not determine needs and wants. For example, being wealthy does not mean one desires a luxury car such as a Mercedes Benz, nor does being poor mean that one does not. The income demographic is simply a qualifier in terms of having the resources to spend in the satisfaction of the desire.

Likewise, the need or want for R/A energy cooking technology is independent of demographics. Even though it can be proven that many such cookers can dramatically reduce fuel consumption costs, it is wrong to assume this benefit is guaranteed to, or is more likely to appeal to poorer people. In fact, in certain consumer goods categories in South Africa, low income consumers are demonstrably prepared to pay *more* on average than their high income compatriots. For example, in the case of footwear, the most important need for poorer consumers is durability, as, because they do not own cars, they must walk more. Higher income consumers are more concerned with current (and, therefore, disposable) fashion and are, consequently, more price sensitive. In the case of tea, lower income customers are more likely to favour premium brands for reasons of social status, whereas more affluent consumers lean more to the discount brands. Lower income consumers are conspicuous in displaying the tea bag label when serving guests, whereas upper income consumers are not.

Of course, this does not necessarily suggest that low income consumers are *not* likely to be interested in reducing fuel consumption costs - research indicates precisely the opposite for many of them. The point is simply that when it comes to determining demand, one must evaluate each case independently, and not jump to conclusions based on assumptions about demographics.

However, as with the Mercedes Benz example, income can determine the ability of a person who does want an R/A household energy cooker to satisfy that demand. One cannot buy what one cannot afford. Another demographic that may matter is one's geographical location, particularly in regard to one's ability to spend one's resources. R/A energy cookers are not ubiquitous.

In the early stages of the development of the market and industry, their distribution and promotion will be restricted. Again, one cannot buy what is not readily available.

A working hypothesis about a primary target market was developed for the purposes of in-depth consumer research. This hypothesis was based on several factors:

- The preference of GTZ for projects that address the alleviation of poverty, therefore prioritising poorer people;
- Experience in other consumer goods categories, particularly appliances and cooking utensils; and
- Previous market and desk research.

The decision, therefore, has been taken to focus on consumers in the Living Standards Measure (LSM) groups 3-5. LSMs are a tool that was developed as a result of concern in the South African marketing fraternity that conventional demographics used in isolation, particularly race and income, could be misleading. LSMs are not a lifestyle typology or a psychographic segmentation tool. Rather, they are a broad indicator of standard of living or "affluence" based on diverse range of twenty variables including amenities available in one's home (e.g. flush toilets, electricity, domestic servant, etc.) use of specific financial services, consumer products and retail channels, and ownership of certain appliances. After clustering groups of consumers according to these variables, the demographics of each group are determined.

LSM groups are expressed as a continuum or spectrum. Initially, there were eight groupings of roughly equal size, with LSM 1 at the bottom end, and LSM 8 at the top. In the most recent surveys, the top two groups have been further segmented to provide more ability to discriminate between the most affluent South African consumers, with the "old" LSM 7 becoming LSMs 7 and 8, and the "old" LSM 8 becoming LSM's 9 and 10 respectively.

LSM data is derived from the All Media Products Survey (AMPS), produced annually on behalf of the South African Advertising Research Foundation. This survey is consistently the largest and most representative probability sample of South African population, typically based on approximately 20 000 interviews nationwide. LSM data can be cross-tabulated with other data from AMPS and other surveys to gain very useful insights.

The decision to focus primarily on LSMs 3-5 is a function of the fact that these are relatively poor people, but with sufficient income at least to be able to purchase a R/A household energy cooker, and more likely to be able to physically access such products. There is a detailed discussion of these LSM groups below. The primary source of information (except where noted) is AMPS 2000A. This survey uses the 8 LSM scale. Although there have been two subsequent annual AMPS surveys (and where there have been significant changes, these are noted in the commentary), the use of the 2000 study permits its correlation and extension with another important database, the Futurefact 2000 Mindscape survey (see Appendix 1, Volume I). This survey, based on a representative probability of 2100 interviews, was a joint venture of several South African academic institutions, market research firms and consumer goods businesses.

One final comment concerning the primary target market is critical. The choice of this, or any other, target market is not exclusionary. Potential customers from other groups are, obviously, to be expected and welcomed. The choice of a primary target market is based on the need to focus limited time and resources where they are most likely to engender a positive outcome.

The Tables and commentary below are based on desk research which interrogated existing secondary databases (such as AMPS). They paint a detailed picture of our primary target group, covering a broad range of demographic and psychographic variables. LSMs 3-5 are looked at individually and collectively. By way of comparison and for context, data on LSMs 1-2 (the bottom groups) and LSM 8 (the top group) is provided where relevant.

✍ Demographics

Table 1:
Population

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Pop (millions)	6.3	6.5	6.7	5.5	5.0	17.2	4.1
% total pop	14.3	14.8	15.2	12.6	11.4	39.2	9.4
Households (millions)	1.1	1.2	1.3	1.2	1.1	3.6	1.2
% total households	12.0	12.7	13.9	12.8	11.4	38.1	13.1

Collectively, LSMs 3-5 include 17.2 million South Africans, or over 39% of the population. These people reside in 3.6 million households. Therefore, this primary target market is a large and important one. LSM groups are based to a great extent on ownership of certain goods and amenities. As the South African consumer economy grows, more and more people will acquire these over time. The long term trend, therefore, is population movement from the lowest groups (LSM 1-3) to the middle groups (LSM 5-7). This movement is, however, not greatly significant year to year.

Table 2:
Household size

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Avg. h/hold size	5.5	5.4	5.1	4.6	4.6	4.8	3.3
% 7+ in h/hold	33	31	27	22	22	24	3
% 2 in h/hold	8	10	10	12	11	11	28
% 1 in h/hold	5	7	9	15	13	12	6
Avg. no.	3.2	3.2	3.1	3.1	3.1	3.1	2.6

It is important to note that average household size declines with increasing affluence. The average LSM 3-5 household has just under 5 individuals compared to approximately 5 ½ in the lower LSMs and under 3 ½ in the highest. Importantly, there are many large households in our target group. Nearly a quarter of these households have seven or more members compared to only 3% as large in LSM 8. This needs to be kept in mind in determining factors such as stove capacities.

Table 3:
Income

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
H/hold avg. monthly inc.	746	869	1036	1469	2112	1503	13109
Index	50	58	69	98	141	100	872
Personal avg. monthly inc.	227	257	327	502	673	484	4987
Index	47	53	68	104	139	100	1030

Although these Rand income figures can be increased by approximately 20% to account for inflation since the time of the survey, it is important to note the relatively low income for the target group: a household average of R1503 per month and a personal average of R484. LSMs 3-5 are, indeed, relatively poor people. The indices show the relative disparities between LSM groups. The average LSM 8 household income is nearly 9 times higher than the average household income for LSMs 3-5. The exclusion of LSMs 1 and 2 from the primary target market definition is, to a great extent, because their average income is only half that of the average for LSMs 3-5. It is believed these very low incomes make the purchase of an R/A household energy cooker much less possible. A strategy that focuses on these LSMs is, therefore, not commercially viable.

Table 4:
Employment

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
WORKING	21	28	31	39	39	36	65
Full time	12	16	19	24	29	24	56
Part time	9	12	12	15	10	12	9
NOT WORKING	42	32	32	27	32	30	32
Housewife	5	6	5	4	6	5	15
Student	18	14	17	14	18	16	3
Retired	19	12	10	9	8	9	14
UNEMPLOYED	37	41	38	34	29	34	3

Our target market segments roughly into three equal groups according to employment status: working, not working (by choice) and unemployed. Of those working, only 2/3 are working full time. This compares unfavourably with LSM 8 where only 3% are unemployed, and the vast majority of those that work do so full time.

Table 5:
Geographic location – province

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Gauteng	1	4	12	24	34	23	38
KZN	36	30	17	14	16	16	14
Limpopo	15	20	21	9	6	12	2
E. Cape	33	20	11	12	10	11	7
Northwest	6	10	13	11	8	11	4
Free State	3	5	9	12	8	10	6
Mpumalanga	5	8	11	9	6	9	6
W. Cape	0	1	3	6	10	6	22
N. Cape	1	1	2	3	3	3	2

Affluence and poverty are not equally distributed geographically. The populations of KZN, Limpopo and the Eastern Cape are proportionally poorer, whereas those of Gauteng and the Western Cape are more affluent. Our target market, in comparison to other groups, is distributed across all the provinces as opposed to being concentrated in a few.

Table 6:
Type of community

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Rural	97	86	61	27	8	34	7
Village	2	6	14	19	19	17	12
City/large town	0	3	9	18	22	16	23
Metropolitan	1	5	16	35	52	33	58

Our target market is in transition. The lower LSMs are predominantly rural. The higher LSMs are predominantly metropolitan. LSMs 3-5 are found fairly equally across the community-type spectrum. This has ramifications for the range of R/A household energy cooking solution products that need to be brought to market and where they need to be brought to market. This point is further illustrated in the next Table on type of housing.

Table 7:
Type of housing

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Traditional dwelling	81	67	36	14	2	18	0
Shack/ informal	9	14	28	23	11	21	0
Backyard room/ flatlet	1	1	4	5	6	5	1
Matchbox/ RDP	6	12	20	41	59	39	5
Hostel/ compound	2	4	6	9	11	9	0
Flat	0	0	0	1	4	2	9
Cluster/ townhouse	0	1	1	1	2	1	5
Suburban type house	0	2	5	6	6	6	80

This Table, again, illustrates the transitional nature of the primary target market. Whereas the lowest LSMs primarily live in traditional dwellings and the highest in suburban homes, our group spans the spectrum. The largest percentage, but not the majority, lives in the so-called "matchbox" homes typical of South Africa's urban townships. This group also has the largest percentage of informal or "squatter" dwellings. And traditional dwellings are not insignificant among the less affluent and more rural members of this target groups. These different dwelling types will significantly influence which R/A household energy cookers are practical and acceptable.

Table 8:
Amenities in the home

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Electricity	23	46	73	94	99	88	100
Water in home	1	2	11	29	62	32	100
Hot water geyser	0	0	2	6	27	11	100
Flash toilet	0	1	7	21	50	25	100
Swimming pool	0	0	0	0	0	0	29
Domestic servant	1	1	1	1	2	1	62

The relatively low incomes and types of housing that define the primary target market are reflected in the amenities available in the home. Virtually none of the LSM groups 3-5 enjoy the luxuries of swimming pools or domestic servants. Only a third have running water in the home, and only a third of these have hot water. What is significant, however, is that most of them have electricity.

Given the priority areas for electrification, in time it will be virtually ubiquitous in this group. The electricity supply may be insufficient or too expensive to power cooking appliances (see the next Table). But electricity must be seen as a complement to R/A household energy technologies - an important distinction from other African countries where it is simply not available to poorer consumers.

Table 9:
Kitchen and cleaning appliances in the home

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
Electric stove	0	3	11	35	61	34	99
Primus or coal stove	13	24	31	26	20	26	9
Fridge/ freezer	3	15	37	60	79	57	100
Washing machine	0	0	0	1	9	3	98
Vacuum cleaner	0	0	0	1	2	1	93

While the overwhelming majority of LSM 3-5 households have electricity, it is important to note that only about one-third currently own an electric stove. However, these consumers are purchasers and users of other electric appliances as is clear when one reads this Table in conjunction with the next one on (non-kitchen/ cleaning) appliances found in the home.

Table 10:
Other appliances in the home

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
TV	7	33	53	74	82	69	99
Radio	80	86	88	90	91	90	96
Hi-fi/ music centre	7	23	38	50	62	49	93
VCR	0	0	1	5	15	7	89
M-Net decoder	0	0	0	0	2	1	55
Telephone	0	2	6	15	37	18	87
Cellphone	0	1	2	6	10	6	63
Computer	0	0	0	0	1	0	49
Internet connection	0	0	0	0	0	0	21
Any books	5	10	21	29	37	28	96

While LSMs 3-5 do not yet purchase top end entertainment or computer based appliances for the home, most have a television set, radio and hi-fi, and fridge/freezer. Increasingly, there is a telephone - landline and/ or cellular.

Table 11:
Purchasing behaviour - large appliances

	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 3-5	LSM 8
% total population	14	15	15	13	11	39	9
% purchasers large appl.	0	2	5	7	10	22	35

This Table demonstrates that those in the primary target market are, indeed, purchasers of large appliances. It compares the percentage of total population accounted for by each LSM group and the percentage of purchasers of large appliances in the past year accounted for by each LSM group. What is shown is that the two lowest LSMs make up nearly 30% of the total population, but account for virtually none of the large appliance purchasers. By contrast, our primary target market makes up nearly 40% of the population and accounts for over 20% of large appliance purchasers. While (reflecting the relatively low affluence of the group) this percentage is less than their share of the population, it is still significant, making this group commercially attractive.

The **Table 12** indicates the leading chain stores at which different LSM groups purchase large appliances (it does not list independents, smaller chains or alternative channels of distribution, all of which are also used by consumers). Stores marked with a red star attract the majority of their large appliance purchasers from the primary target market, LSMs 3-5. These include:

- Barnetts
- Ellerines
- Fairdeal/Savells
- Price ‘n Pride
- Protea Furnishers
- Score Furnishers

Table 12:
Where do they buy large appliances?

% LSM	1	2	3	4	5	6	7	8	9	10
Appliance City	0	0	2	5	8	11	8	15	20	31
Barnetts	2	7	18	25	27	13	5	0	0	3
Beares	0	1	4	6	14	27	13	14	13	9
Bradlows	0	0	1	3	12	26	16	12	19	12
Dion	0	0	2	1	8	12	13	17	17	28
Ellerines	1	9	17	26	19	15	2	4	4	2
Fairdeal/Savells	1	5	5	23	29	28	3	10	3	2
Furniture City	0	2	2	5	12	16	12	10	19	21
Game	0	1	1	2	6	11	12	20	20	26
Geen & Richards	0	1	3	0	3	6	15	15	25	31
Hi-Fi Corporation	0	0	1	3	5	14	13	17	22	26
Hirsch	0	0	0	1	3	5	16	14	18	42
Hyper house & home	0	0	0	0	1	11	15	20	26	28
Joshua Doore	0	1	4	6	9	26	16	13	15	10
Lewis	0	2	8	12	16	22	13	13	9	4
Lubners	0	0	3	2	12	26	15	21	14	8
Makro	0	0	1	2	6	12	8	22	18	33
Morkels	0	0	1	6	15	24	21	12	12	8
OK Furniture	0	3	7	8	16	23	10	14	12	8
Pick and Pay	0	0	0	0	4	6	14	17	24	34
Price 'n Pride	0	0	15	15	30	22	9	0	4	4
Protea	2	7	26	38	18	5	2	2	2	0
Russels	0	1	1	2	7	25	13	18	20	13
Score	4	7	29	33	11	13	0	4	0	0
Stax	0	0	0	0	3	3	7	10	17	60

Stores marked with a blue star attract a minority, but significant, percentage from these LSMs. These include:

- Beares
- Furniture City
- Lewis Stores
- Morkels
- OK Furnishers

Obviously, the highlighted chains should be primary targets for listings by suppliers of R/A household energy cooking technologies. The issues related to doing business with these chains (See Appendix 6, Volume I for more information on the different chain stores) are discussed in the section of this business case on routes to market.

✍ Other demographics

Table 13:
Race

	LSM 3	LSM 4	LSM 5	LSM 8
Black	95	93	85	10
White	0	0	2	75
Coloured	5	7	11	10
Asian	0	1	2	5

Overwhelmingly, members of LSM groups 3-5 are black.

Table 14:
Languages

a. Home language

	LSM 3	LSM 4	LSM 5	LSM 8
English	0	1	5	45
Afrikaans	5	7	12	43
Zulu	24	24	26	2
Xhosa	15	19	17	2
S. Sotho	11	14	14	1
Tswana	12	13	12	1
N. Sotho	17	10	8	1
Others SA	17	12	6	3
Other	0	0	0	2

b. Language understood

	LSM 3	LSM 4	LSM 5	LSM 8
English	63	74	84	45
Afrikaans	29	35	40	43
Zulu	33	39	42	2
Xhosa	16	21	22	2
S. Sotho	17	23	22	1
Tswana	16	18	19	1
N. Sotho	20	14	12	1
Others SA	19	16	12	3
Other	0	0	0	2

The home languages reflect the profile of this group (predominantly black South Africans). However, English is widely understood, and for reasons of cost-effectiveness, will be an important language for consumer education and promotion - although the importance of communication in the vernacular languages should never be underestimated.

Table 15:
Literacy and education

	LSM 3	LSM 4	LSM 5	LSM 8
Literate	88	93	95	100
Illiterate	12	7	5	0
No schooling	12	7	5	0
Some primary	22	16	11	40
Primary complete	10	10	8	0
Some high	42	47	47	19
Matric	13	18	24	40
Artisan qualification	0	1	1	5
Some post-matric	0	1	3	12
University	0	1	4	29

Most of the target group is functionally literate, although levels of formal education are relatively low. Only a small percentage has completed high school.

Table 16:
Life stages

	LSM 3	LSM 4	LSM 5	LSM 8
At home singles	25	22	25	8
Starting out singles	6	7	9	4
Young couples	7	7	6	13
New parents	11	10	10	23
Single parents	21	23	21	5
Mature parents	18	15	15	9
Mature singles	3	5	3	2
Golden nesters	4	6	5	21
Left alone	5	4	6	6

Compared to LSM 8, LSMs 3-5 have proportionally more “at home singles” and “mature parents”, reflecting the larger households and extended families, and more “single parents” for a variety of social and cultural reasons. Similarly, LSM 8 has proportionally more “golden nesters” reflecting both an older age profile and the propensity of more affluent retirees to live on their own, while the less affluent live with family.

- **Psychographics**

Figure 6:

Feelings about life in SA past 5 years (Futurefact 2000 Mindscape)

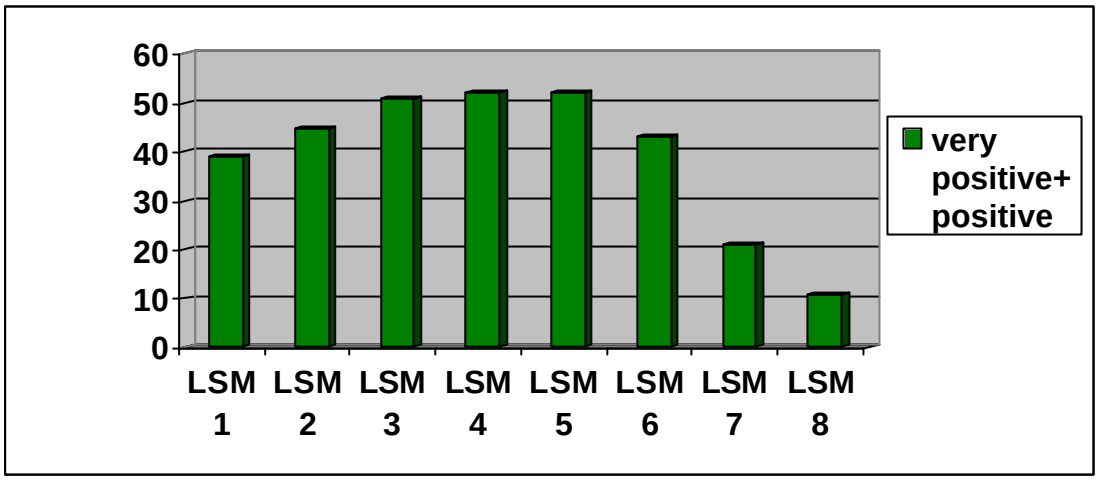
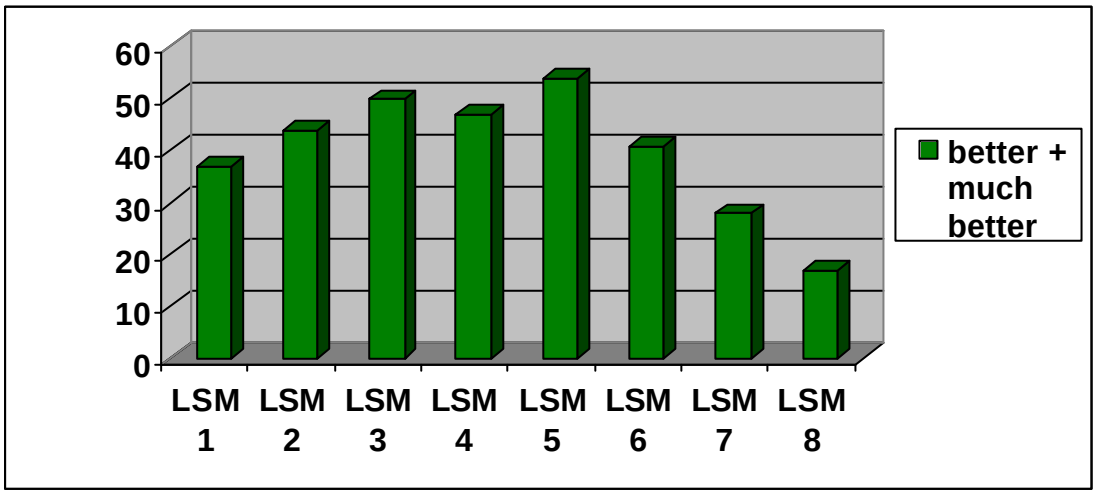


Figure 7:
Expectations for life in SA next 5 years (Futurefact 2000 Mindscape)



It is instructive to note that the primary target market LSMs are the most positive about the "new South Africa", both in terms of how their lives have benefited in recent years and in their optimism for the future. This is a target group that buys into concepts that can deliver a better life for themselves and their children. Consequently, they are more open to change and improvement than other groups, and more willing to accept new products that can deliver on this promise. These are important characteristics for marketers of R/A household energy cooking technologies to acknowledge. Such values should play a key role in brand positioning (see **Table 17**).

Table 17:
The importance of brands - percentages agreeing with the following

	LSM 3	LSM 4	LSM 5	LSM 8
"I am brand loyal"	51	48	49	54
"It is important to buy brands to create the right impression"	53	58	62	31

In summary, then, according to the desk research on LSMs, the members of the primary target market of LSMs 3-5:

- Number some 17.2 million South Africans, or over 39% of the population, living in 3.6 million households.
- Are largely black. While their home languages cover the spectrum of vernacular languages, between 60% and 80% of them understand English. Most of them are functionally literate. Most have had some high school education.
- Account for 22% of purchases of large household appliances. This makes them a significant market in this field.
- Have an average household size of about five individuals, an important factor in determining stove capacities.
- Have incomes that are relatively low, averaging about R 1 803 per household (corrected by 20% to bring up-to-date).
- Include a relatively high percentage of people who are unemployed (about one third), while of the one third who are employed, only two thirds work full-time. The remaining one third is not working by choice.
- Are distributed across all nine provinces, with the highest concentration in Gauteng.
- Are in transition between rural and urban areas, and are found fairly equally across rural, village, city/large town and metropolitan areas, with the biggest concentrations in rural areas and metropolitan areas.
- Span the spectrum of different types of housing, with the highest concentrations first in matchbox/RDP type housing, and then in shacks/informal housing, with a significant number still living in traditional dwellings.
- Have relatively few amenities in the home, and do not seem to prioritise electric cooking mechanisms even where electricity is available. Only one third have running water in the home and, of these, only a third have hot water. However, most of them do have electricity (88%) and this is likely to increase. Although they may not choose to use electricity supply to power cooking appliances, because of cost or level of availability, they do have this option. In fact, only 34% of them own an electric stove, and 26% own a primus or coal stove. Ninety percent own a radio, and 69% a TV. A much higher percentage (49%) own a hi-fi/music centre than own electric stoves. This gives some indication of how they choose to prioritise expenditure.

- Buy their appliances primarily from chain stores at the lower end of the market, offering HP terms.
- Are brand loyal.
- Are positive about life in South Africa in the past five years (more so than other groups) and have positive expectations for the next five years (more so than other groups).

2.2 Demand analysis using primary research

The research

The project had established a primary target market (LSM groups 3-5) that, in theory, could have a need for R/A household energy cookers, the necessary resources to spend on such technology and the potential willingness to spend these resources. The challenge then was to move beyond the theoretical and quantify the real opportunity. Is there genuine latent demand for such products? If so, how much demand? What will it take for this demand to be realised and converted into actual sales? Will sales translate into sustained usage of such technology? Where will the business come from - what cooking technologies are likely to be replaced or supplanted? How best can this process be encouraged and accelerated? What are the roadblocks standing in the way of potential success?

To answer these and other important questions, detailed research has been conducted in two phases. The first phase involved "desk research" – the interrogation of existing secondary databases such as AMPS (see above). The second involved "primary market research surveys" of several types, and of different markets. These research reports are included as appendices (Volume II) to this document. The findings are significant and cover a vast range of issues and topics. It is not the intent to duplicate these reports in this section, but rather to review the specific "top line" data that either makes or refutes the primary business case: the potential commercial viability of R/A household energy cooking technology.

One study conducted focused on participants in outdoor leisure activities (such as camping, fishing and climbing), which include the need to cook meals. These potential customers were not from the primary target market as they were mainly affluent and white. This study was based on 100 face-to-face interviews.

A second, telephone, survey focused specifically on a database of purchasers of solar stoves. These 60 consumers had owned either a Sunstove or a T16 for an average of 4 years. One consequence of the database chosen and the methodology employed is that, again, these were not, on the whole, consumers from the primary target market. They were mostly older and white, and typically (but not exclusively) used their solar stove for leisure and recreational cooking, and not regular food preparation in the home.

The main conclusion from these studies is that small niche opportunities do exist for solar cooking technology in such markets. But the real issue must be the commercial viability in the primary target market.

A survey to determine the awareness and understanding of solar energy and solar cooking technology was conducted alongside mass demonstrations of such technology in LSM 3-5 communities. This survey involved 200 random intercept interviews with respondents who displayed interest in the demonstrations. Two smaller surveys were also conducted: one of community leaders and others who could influence the purchase of a particular product, and the other of those who were potential bulk purchasers.

The biggest and most critical survey, from which the most important conclusions concerning potential demand are drawn, is an in-depth study of the primary target market entitled, "The Renewable Energy Study". This study involved a process of quantitative and qualitative interviews, product demonstrations and feedback, and in-household observation that lasted up to a full day with each respondent - the female member of household with primary responsibility for preparing meals. Four hundred and fifty-four respondents were randomly selected according to a structured sample including households in LSMs 2-5 (broken down by LSM so that the differences between them could be analysed; LSM 2 was included for comparison). These households were further segmented by province (interviews were conducted in six provinces), by age of respondent (according to the profile curve for the target market), the presence or absence of electricity in the home, and the type of community. Importantly, samples were selected so that comparisons could be made between the presence or absence of electricity in the home in similar (rural) environments, and across environments (comparing non-electrified rural communities to non-electrified urban informal squatter settlements).

Because of this sample structure, the collective total is not weighted in-line with the overall population. However, when one drills down into the individual cells (for example, a particular LSM or age group) the results correlate exceptionally well with the data drawn from AMPS in the desk research phase. Consequently, there is a high degree of comfort in the validity of the findings.

In the course of the in-depth primary target market study, respondents were active participants in different (not just solar) R/A household energy cooking technology demonstrations. The respondents worked with one of four technologies: a solar parabolic cooker (Koch), a solar box cooker (T16), a single plate LPG gas stove, or a highly efficient wood burning stove (Vesto). All were subsequently exposed to pictures and explanations of the other three technologies. Additionally, all respondents also worked with a Hot Bag retained heat cooker as part of the demonstration.

Figure 8:
T16 on display

Figure 9:
Parabolic cooker (Koch), SunStove, Hotbox and Hotbag during primary research

Figure 10:
The Vesto wood burning stove being tested

✍ Analysis

The overwhelming majority (two-thirds) of the target market uses more than one cooking energy technology (the average household uses two). The research corroborates the working hypothesis that the key issue for consumers is the cost effective and timeous provision of good meals for the family. Technologies and energy sources are simply a means to this end and will only be considered if they can fulfill the primary need, regardless of any other potential benefit. Once this threshold is crossed, the choice of energy is a function of what the consumer can afford to use and of what is available at any point in time. These same factors drive the choice of food: "what I can afford" and "what is available" are rated as twice as important as eating "what I want".

The cost of household energy is a real problem for the primary target market, and anything that can be seen to be genuinely reducing such costs will be regarded favourably. Davis and Ward (1995) demonstrated that although expenditure on household fuel increases with income, these increases are not in line with income. Consequently, the relative percentage of household income spent on fuels is greatest for low income households. The baseline study for the energy efficient housing monitoring project (PDC 2002) collected data from four lower income areas in different provinces. Although no distinction was made between income categories, the average calculated expense for cooking was R 135,88 in summer months and R 219,55 in winter. This is a significant percentage, for example, of the R 910 average monthly household income of the respondents in the Renewable Energy Study (including LSM 2), and of the primary target market (LSM 3-5), with a weighted average (calculated from AMPS) of just over R 1 500 per month.

Secondary to the above is the issue of the time a particular technology takes to cook. Consequently, when consumers describe their selected technologies, typically one will be seen to be "cheaper", and the other "faster". Most importantly, there are substantial health and safety concerns about all forms of household energy, especially LPG gas and paraffin. Consumers use these energy supplies with concern because they perceive no safer, but still affordable, alternatives.

What are particularly significant are the great disparities between the household energy technologies known by consumers, those actually used by them, and those that would be preferred for use. The following Tables summarise these findings for the total sample.

Table 18:
% Energy for cooking

	Awareness		Currently used	Preference
	Total	1st mention		
Electricity	71	23	6	45
Coal	69	29	31	20
Paraffin	65	21	54	14
Wood	60	19	26	15
Gas	36	10	8	5

The contrasts, particularly between paraffin and electricity, are immediately obvious. Paraffin is the fuel most used by the sample, yet only comes third after electricity and coal in terms of both first mention and total spontaneous awareness. More importantly, whereas 54% currently use paraffin for cooking, only 14% aspire to using it - the second lowest after gas. Electricity, by comparison, is the most aspirational form of household energy, but with very few actually using it. Another major observation is the relative unimportance of gas, both in terms of use or preference. A similar picture emerges for heating energy, the major difference compared to cooking being the relative strength of coal:

Table 19:
% Energy for heating

	Awareness		Currently used	Preference
	Total	1st mention		
Electricity	63	19	5	30
Coal	100	43	37	37
Paraffin	39	16	18	10
Wood	50	19	25	14
Gas	7	2	2	2

When one delves deeper into the data, more interesting observations emerge.

The following Tables look, in detail, at fuels currently used for cooking:

Table 20:
% By LSM

	LSM 2	LSM 3	LSM 4	LSM 5
Electricity	2	6	10	30
Coal	25	38	34	37
Paraffin	58	54	47	40
Wood	39	14	21	3
Gas	4	10	11	10

Table 21:
% By age of respondent

	18-24	25-34	35-49	50+
Electricity	8	7	5	4
Coal	22	30	37	39
Paraffin	63	56	48	42
Wood	26	24	25	32
Gas	4	6	12	4

There is a strong correlation between the use of certain fuels and relative affluence or age. Use of electricity is strongly correlated with affluence, (yet, still, only 30% of LSM 5, the most affluent in the sample, are currently using it to cook). Conversely, the use of wood and paraffin correlate with lower levels of affluence. The use of electricity and paraffin are strongly correlated with younger households and coal with older, whereas use of wood does not show any strong age bias.

Table 22:
% By electrified h/hold

	Yes	No
Electricity	15	0
Coal	31	31
Paraffin	46	59
Wood	20	30
Gas	8	7

Table 23:
% By community

	Rural electrified	Rural not electrified	Peri-urban informal
Electricity	15	1	0
Coal	31	30	37
Paraffin	47	59	55
Wood	20	29	32
Gas	7	7	7

The most important point to draw from the above Tables is that even in electrified households, electricity is only the fourth most used form of cooking energy. Furthermore, the presence or absence of electricity has less effect on fuel choice (other than, obviously, electricity) than other demographics, particularly affluence or age. The use of coal or gas does not seem to be influenced by electrification of the household, whereas those with electricity are somewhat less likely to use wood and paraffin (although the latter remains the fuel most used for cooking).

Perceptions of the advantages and disadvantages of the different types of household energy vary. The strongest perceived advantages of electricity are that it is fast to use, multipurpose and, in particular used for lighting. Only 2% of the sample could not attribute it with any specific advantages. By comparison 29% could not attribute electricity with specific disadvantages. This is a very positive perspective. However, of those that could ascribe disadvantages, the two strongest are that it is not safe (specifically, it can shock you) and it is expensive.

Coal is multipurpose - particularly for space heating as well as cooking -affordable and the heat is long lasting. However, it smokes a lot, is dirty and dangerous because the fumes are unhealthy. Eighteen percent could not ascribe particular advantages and 8% disadvantages. This perspective is somewhat less positive than for electricity

Paraffin is seen to be fast, easy to use and affordable, but it smells bad, is dangerous (particularly in terms of burns and starting fires), gives off a lot of smoke and is unhealthy. Twelve percent could not ascribe particularly advantages to paraffin and 13% could not ascribe particular disadvantages. Again, this perspective is less positive than for electricity.

Wood has a fairly positive perception. Its major advantage is cost - it is freely available in the veld or can be purchased relatively economically. As with paraffin and electricity is fast to use, and as with coal it is multipurpose. The negative perceptions are also similar to coal: smoky, dirty and causes burns and fires. Nine percent could ascribe no advantages to wood and, significantly, 32% no disadvantages.

Gas has, by far, the most negative perception. On the positive side it is fast, easy to use and affordable, but nearly a third of the sample could list no advantages. By contrast, only 6% had no negative perceptions. Overwhelmingly, the vast majority of respondents regard gas as unsafe because it explodes.

A particularly important finding from the study is that there is a surprisingly high awareness of, understanding of, and positive attitude towards solar energy as a household energy source even though it is not currently being used as such. In fact, it is seen as one of the potential mainstream choices and not as something "different" or "alternative". There is a strong willingness to consider using such technology subject to the fulfillment of certain requirements.

In the Solar Awareness study (conducted in conjunction with mass product demonstrations) "solar" was understood primarily to mean power or energy from the sun, and secondarily as heat or temperature from the sun. Solar cooking technology was understood to work by reflecting the rays of the sun to the pot. The major benefits were that it was cheap - specifically, no fuel costs and particularly in comparison to electricity where using solar energy could save expenditure on electricity - and that it was safe to use. The biggest negative (for about half the respondents) was the limitation of use to when the sun is shining, followed by the perception of being a relatively slow way to cook. In terms of predisposition to using solar energy for cooking, 91% were "positive" and only 9% were negative.

Similar conclusions are drawn from the in-depth Renewable Energy Study of the primary target market. The major perceived benefit of solar is that it is seen to be affordable (free) fuel and therefore offers the ability to save on other fuel costs. The primary disadvantage is that it works only when sunshine is available. Interestingly, solar was perceived by some of the sample to be a fast way of cooking, and by others as slow. The issue of safety was not a factor, either positively or (perhaps more importantly) negatively. Only 12% could perceive no specific advantages and, again importantly, 40% no specific disadvantages.

Significant conclusions can be drawn from a detailed analysis of a question regarding how much the respondent would like to use particular fuels. This analysis looks at the extremes: those who would "definitely" or "definitely not" like to use the following fuel types (eliminating the respondents who answered "probably"," probably not" and "not sure"), as these are a better indicator of likely behaviour.

Table 24:
% Total sample

	Definitely	Definitely not
Electricity	87	3
Coal	58	23
Paraffin	56	15
Wood	57	14
Gas	25	55
Solar	72	8

It is abundantly clear that electricity is the aspirational choice and that gas is rejected. Perhaps surprisingly, solar is second only to electricity. Importantly, however, different demographics do drive particular preference for particular fuels. Some are influenced by affluence and/ or age of respondents and some not.

Table 25:
% By LSM group

	Definitely				Definitely not			
	LSM 2	LSM 3	LSM 4	LSM 5	LSM 2	LSM 3	LSM 4	LSM 5
Electricity	82	89	92	97	3	3	2	0
Coal	50	62	67	63	29	20	18	7
Paraffin	62	53	51	38	11	17	16	31
Wood	65	54	52	37	9	15	15	37
Gas	23	31	25	23	58	49	53	63
Solar	66	79	79	69	8	10	3	7

Table 26:
% By age group of respondents

	Definitely				Definitely not			
	18-24	25-34	35-49	50+	18-24	25-34	35-49	50+
Electricity	90	87	88	81	3	2	4	2
Coal	56	56	61	61	24	28	16	22
Paraffin	57	56	50	67	19	15	16	8
Wood	56	59	56	58	20	12	18	4
Gas	30	28	25	8	57	51	54	69
Solar	74	68	78	69	10	7	4	17

Preference for electricity is highest in all groups. The preference is strongest among the most affluent and youngest - those best able to afford it, and most flexible about adopting new technologies - but importantly there is no rejection in any group. Electricity's status as the most aspirational form of household energy is reinforced by the fact that its preference runs far stronger than its actual usage.

Coal and wood also show preference levels greater than their actual usage levels although not to the same extent as electricity. Preference for coal is positively correlated with higher levels of affluence and wood with lower levels, which reflects actual consumer usage behaviour. Coal preferences also correlate with increasing age, whereas its actual usage is less so.

Levels of preference for paraffin are in line with actual usage. They are strongest with the least affluent. It is important to note that whereas levels of usage are highest among the youngest, levels of preference are not. Perhaps more significantly, levels of rejection are highest in this group and decline with age. Given the other findings of the study concerning paraffin, this supports the view that use of paraffin is increasingly driven more by necessity than desire.

Gas is rejected by all groups, but shows the strongest preference (albeit a minority preference) among the younger members of the sample.

Finally, solar shows strong levels of preference and little rejection in all groups. There is no strong age or income effect. This refutes the hypothesis that solar energy could be perceived as being "specifically for poor people". It is aspirational for all in our defined target market, second only to electricity.

Table 27:
% By electrified household

	Definitely		Definitely not	
	Yes	No	Yes	No
Electricity	91	84	2	3
Coal	66	51	16	28
Paraffin	51	59	18	13
Wood	49	64	17	11
Gas	24	26	55	56
Solar	71	73	8	7

Again, we see the strong aspirational pull of electricity - it is the most preferred even among those not electrified - and solar slotting in as second preference, without any bias towards or against electrification. Preference for coal is biased towards those who have electricity, whereas usage levels are even across the groups. Preference for and usage of wood is biased towards those without electricity in the home. Paraffin is the most used cooking fuel in all households, albeit with a bias to non-electrified homes, but in relative preference terms comes only fourth highest in both groups. Both groups reject gas.

Table 28:
% By community

	Definitely			Definitely not		
	Rural elect.	Rural non-elec	Peri-urb informal	Rural elect.	Rural non-elec	Peri-urb informal
Electricity	91	84	83	2	2	7
Coal	65	49	64	16	29	24
Paraffin	50	60	57	18	13	14
Wood	47	62	71	18	13	2
Gas	25	27	18	54	54	71
Solar	71	70	83	8	9	0

To a great extent, the data here supports the electrified/ non-electrified segmentation. The important distinctions are the relatively stronger preference for wood and solar, and the much stronger rejection of gas by the peri-urban informal sample compared to the also non-electrified rural sample.

Why is solar so well rated when consumers have no experience of the product? As already discussed, there is an unexpected and relatively high level of awareness and understanding of the concept. The survey itself - conducted independently and without bias towards any particular technology - does not seem to have influenced the outcome: the positive view of solar is not a consequence of the "halo effect" of the product demonstrated to the respondent (recall that one quarter of the sample each worked with a parabolic solar stove, a "T16" box solar stove, a single burner gas stove and a "Vesto" efficient wood burning stove). Regardless of the technology demonstrated, the results are fairly consistent as the following Table demonstrates.

Table 29:
% By type of stove demonstrated

	Definitely				Definitely not			
	Para solar	T16 solar	Gas	Vesto wood	Para solar	T16 solar	Gas	Vesto wood
Electricity	84	87	88	89	3	3	2	3
Coal	54	56	60	61	25	20	26	20
Paraffin	60	53	60	49	15	12	18	16
Wood	56	62	57	53	17	15	8	14
Gas	30	20	24	25	49	61	57	54
Solar	75	68	74	73	5	8	9	9

One important consideration, regardless of the source of energy and any potential savings on energy costs, will be the cost of the cooking appliance itself. The research on the four cookers demonstrates that (within a hypothetical range of prices from R 300 to R 700) although "less expensive" is, obviously, preferable to "more expensive", each individual appliance will be considered on its individual merits. This is reflected by the fact that there is some inverse correlation of "affordability" with price, but "value for money" and, especially, "purchase appeal" are determined by many more variables than ticket price. Simply put: the higher the price, the higher the expectations of the appliance. If the appliance can deliver against these expectations, a higher price is justified.

Table 30:
% By type and price of stove

	Definitely			Definitely not		
	Affordable	Value for money	Purchase appeal	Affordable	Value for money	Purchase appeal
Para solar at R700	50	70	72	21	6	3
T16 solar at R500	50	70	59	22	3	9
Vesto wood at R400	53	61	82	15	12	4
Gas at R300	61	70	37	8	2	28

Full details on all the variables as they relate to the four stoves may be found in the research reports appended to this business case (See Volume II). One last point that must be made however is that price affordability can be managed. The research demonstrates that the lower the price, the greater the ability to pay cash and the higher the price, the greater the expectation of financial terms or other time related purchase mechanisms. Ensuring that such facilities are available, at least through some distribution channels is critical. Finally, the price perception will be positively managed by overtly promoting the relevant fuel cost savings.

✍ Main conclusion

R/A household energy is, unquestionably, commercially viable in the primary target market.

Given the need to reduce fuel consumption costs and improve household safety, the positive perception of solar and the relatively poor perception of gas and, to a lesser extent, paraffin, there are obvious opportunities for solar and other R/A cooking technologies. In the next box, the pattern of response emerging from the primary target markets is summarised.

In summary, drawing from the results of the primary research done for the Solco Project:

- Consumers use more than one household energy technology for cooking. They aspire to electricity, but cannot afford to use it, even if the household is electrified with sufficient capacity to cook. The issue of any fuel cost is paramount. So, what are their alternatives?

- In LSMs 3-5, approximately 10% are using gas, but, in general, these consumers are unhappy with gas for safety reasons. A larger percentage, approximately half in LSMs 3-5, are using paraffin, which while not as negatively perceived as gas, is still problematic for health and safety reasons. It is used primarily because it is relatively inexpensive and safer choices are not available.

- In addition to paraffin, the more affluent and electrified households in these LSM groups are also using coal, and the less affluent and non-electrified households are using wood. *There is a very real opportunity for solar energy to take its place alongside these latter two fuel sources at the expense of gas and paraffin.*

- There is a high awareness of, understanding of, and positive attitude towards solar energy as a household energy source, even though it is not currently being used as such. The strong willingness to consider solar technology (91% of those in the survey sample showed a positive predisposition to solar energy for cooking) rests on the fact that there are not fuel costs and it is safe to use. It is not seen as a "poor person's option". Its dependence on sunshine and its relatively slow cooking speed are, however, seen as negatives.

- There is also an opportunity for more fuel efficient wood and coal burning stoves both to replace current less efficient wood and coal stoves, at the expense of paraffin and gas.

- Any approach to developing renewable household energy should be holistic and incorporate all such technologies. This is because solar can never be the primary household cooking technology in an LSM 3-5 household. Its usage is limited by the availability of sunshine. Consumers will continue to use more than one energy source.

Converting the latent demand to real demand

Obviously, the successful development of the solar category requires that supply considerations be met, including the ongoing provision of a diversified choice of product options and price points, easily available in a variety of accessible distribution channels. These products must also look good and function well - and must be demonstrated so that consumers see how they function. They must be competitively priced relative to the features and benefits offered, and financing should be available to make the higher ticket price options affordable. All of the pre- and post-sales support consumers expect for any appliance must be readily available.

To a certain extent, the appeal of solar in particular - an unfamiliar technology - could be a reaction to the known problems and limitations of the familiar technologies. Given this, there are high, perhaps even unreasonable, expectations for solar and these must be managed properly. There is, indeed, a great risk of disappointment. But, this is a much more acceptable situation for an incipient market and industry than one in which the concept is greeted with disdain or indifference.

The strongest value propositions for the category in this target market are, primarily the fuel cost savings and, secondarily, the safety and health aspects. Individual cookers must additionally position themselves above and beyond these category imperatives and helping to determine these is an important consultancy function for an enabling institution or agency in the process of going forward.

The important point to remember is that the conclusion of the research is that there is strong *latent* demand. Consumers have real needs and are prepared to consider alternatives that provide solutions, including R/A household energy cookers. The issue then becomes converting this latent demand into real demand and this requires that the supply side issues be addressed in a systematic and ongoing way. Without a doubt, it is "supply" and not "demand" that is the single biggest roadblock standing in the way of success.

In the management report for the Renewable Energy Study (entitled, "Consumer lifestyle assessment and reaction to solar cookers and alternative cooking units") prepared by the research company Market Support Associates, the writers maintain that, based on the response of the sample to the two solar stoves tested, "a conservative estimate is that one in three households would buy a solar cooker", presupposing effective distribution and credit facility support. Even strongly discounting this "conservative" estimate, given the progressively successful and ongoing resolution of the issues highlighted, there is no reason to believe that solar cookers could not, at least over time, achieve a similar penetration to gas stoves, about 10% of the target market households. The potential could be far greater.

Furthermore, the efficient wood burning Vesto stove was even more positively received. According to MSA, "this appliance held the strongest appeal of the appliances researched - it is highly desirable and holds the greatest potential". Again, this presupposes effective distribution, credit facility support and a lower retail selling price (already agreed to by the supplier).

A more detailed quantification of the latent demand, and the potential societal benefits if this demand is converted into sales and usage of R/A household energy cooking appliances, will be found in the concluding section of this business case, entitled "The Way Forward" (Section 0).

In summary, then, the conclusions that can be drawn from the primary research in relation to this business case are that:

- R/A household energy is commercially viable in the primary target market.
- The successful development of the category requires that supply considerations be met.
- The positive response to solar options in the study may be partially the result of a lack of familiarity, but the risk of disappointment is less threatening than indifference in an incipient market.
- The primary value proposition for the solar category in the target group is fuel cost savings, followed by safety and health aspects.
- Individual cookers will have to offer something beyond these categories and the enabler has a role to play in advising on this.
- The key issue now becomes converting a latent demand into real demand through meeting supply-side needs.

3 Supply analysis: Meeting the demand in a commercially viable way

This section of the business case looks at the supply-side structure required to meet the potential demand for solar cooking appliances in a commercially viable way. The supply-side includes energy suppliers, appliance manufacturers and the channels by which appliances are made available.

SUPPLY AND DISTRIBUTION PROFILE

- Competitive Structure Analysis
- Routes to Market

3.1 Suppliers and products

Here we look at how cooking energy needs are currently being met (the competition) and at how what the R/A industry has to offer compares.

- **Major energy suppliers currently**

- The current energy players are grouped below according to the fuels they produce and/or sell.

- Eskom produces, sells and distributes electricity. Ninety percent of the electricity is produced by coal which is responsible for huge carbon dioxide emissions. Despite earlier promises, Eskom now acknowledges that it will never be able to supply the whole population with basic electricity services. It's current slogan is *"not electrification but energisation"*. Eskom is looking for viable initiatives that cut electricity demand to address the potential lack of supply capacity as well as peak demand problems.

- Municipalities act as bulk breakers in electricity, serving the residential population in their jurisdiction. They buy electricity and sell it for profit.

- The major petroleum companies are also involved in the production, selling and distribution of paraffin/kerosene. Paraffin is a by-product of the oil industry and the market leader is Engen with its brand *Laurel Paraffin*. No VAT is charged on paraffin although this benefit is not carried over to the consumer. Paraffin is used by 45% of South African households. It is easily accessible at local distribution points, but has a bad safety record and is often the cause of fire, poisoning and deaths.

- The LP Gas Association promotes gas and gas appliances as a healthier, cleaner and more efficient energy form. Members are major oil companies involved in liquid gas production. Liquid gas is also a by-product of the petroleum industry. Afrox which offers *Easigas* cylinders and gas appliance producers like *Cadac* and *Alva* are important here. Distribution beyond fuel stations and small appliance stores is a problem.

- Major coal mining companies include Anglo Coal, Ingwe Coal, Xstrata and Eyesizwe Coal. Over one million households in the Highveld area use coal as a primary energy resource. Some of these companies have a stated commitment to compensating for their "dirty output" which makes them potential partners in private public partnerships involving R/A energy sources. In the townships, coal merchants sometimes sell coal door-to-door.

Besides the dominance of certain individual energy forms (see Appendix 2, Volume I for more information on the different energy forms), the end-user is also influenced by the utilisation of already existing energy carriers through strong branding such as IP (Industrial Paraffin) or simply familiarity. Subsidised products and the low cost of conventional energy such as coal, IP and also, to some extent, electricity in the targeted income bracket determine the affordability of energy carriers. The fuel cost for one meal portion with electricity is 82 cents as compared to 15 cents for paraffin and 30 cents for coal (SA average).

The decision to buy renewable energy (RE) or conventional cooking appliances is not made once and for all. There is no such "one perfect appliance". The accessibility and affordability of the energy carrier determines the decision to buy a related appliance. This also means though that appliances complement each other according to the needs of the cook and that households have more than just one appliance at their use. (See the section on Demand Analysis page 21.)

- **Competitor analysis**

The developed industry for conventional cooking appliances is characterised by:

- A good distribution network
- An infrastructure for servicing and support
- Economies of scale
- Availability of end-user finance
- And a broad range of products.

Products by the established cooking appliance industry for LSM 2-5[8] cover paraffin and gas stoves and electrical hotplates.

[8] LSM 2 was included in the research done for the business case although the main target group is LSMs 3-5.

Box 1:
Current conventional appliances

Hotplates
There are two main, large companies serving the market with hotplates. They are *NuWorld* with the brand *Ideas* and *Amalgamated Appliances* with their brand, among others, of *Pineware*. These hotplates sell for R160 and more. They are distributed through all possible outlets such as supermarkets, general dealers and kitchen stores. Sales figures obtained for the *Ideas* hotplate indicated that 138,890 units sold in the year 2001/2002. They are not very energy efficient. They use a lot of electricity, resulting in high expenditure. The demand side research also clearly indicated that 60% of electrified households (LSM 2-5) don't use electricity for cooking.

Paraffin appliances
The range of paraffin stoves is tremendous: from cheap import wick stoves for R 20, to pressure stoves for up to R 500. One can buy the cheap stoves literally anywhere. The fuel can also be bought cheaply and close to the customer, according to need and money available. However, the cheap stoves are dangerous as they can catch fire and explode easily. They are also unhealthy since they emit much smoke. There are no safety regulations as yet.

In this field, *Amazing Amanzi* (see Volume I, Appendix 3 for more information on AA) is operating in conjuncture with *Eskom Enterprises* (70% of *Amazing Amanzi* belongs to *Eskom Enterprises*). They offer a bundle (2 plate pressure stove, water heater and 5 litre container), which they claim provides safe, smokeless paraffin use. In the S.A. market, over 10 000 units have reportedly been sold; exports to Namibia, Malawi and Botswana are being promoted. Due to the high production costs of R1750 (including VAT), the bundle must be subsidised by R 1 000. The bundle is being distributed through municipalities, housing schemes and farmers' unions. It is also bought by organisations such as the Red Cross for emergency relief. AA is now negotiating with trade unions, especially the National Union of Mineworkers, as a possible distribution network. This product is being pushed by Eskom, in accordance with its objective to diversify energy supply and offer energy solutions to the low income population, be they grid or non-grid, as well as manage the demand side of electricity.

Gas stoves
Gas stoves with two plates are not readily available and not very common in our target group. The cheapest two-plate model by *Cadac* sells at R300, and can be connected to any cylinder. The one plate screw-ons were targeted at the higher income market for outdoor purposes.

Coal stoves
There is a wide range of coal stoves available, both commercial and informal. Many of them are not fuel efficient, pollute the air, negatively affecting health and are dangerous around children. Coal can, however, be bought fairly easily in small quantities in the townships.

✍ "Competitive disadvantages" in the supply of R/A appliances

Where the existing suppliers have a competitive advantage, the opposite situation exists for suppliers of R/A appliances. At present there is no product supply, familiar to the consumer, and characterised by depth and continuity of supply in the R/A energy cooking technology industry. The lack of entrepreneurial drive to supply in this area corresponds with lack of business advice specifically for the sector of R/A energy technology. As a result, the lack of a branded product or a branded distribution network has never been thought through from a commercial perspective.

The appliances have always been distributed as "clean technologies" with the aim of reducing CO_2 emission and air pollution. But, as the demand analysis has shown, the users' priority is cooking in an efficient manner. Other features of a cooking appliance are not considered priorities. The brands *Sunstove* or *Vesto* are sold because they are seen by customers as fuel efficient and time-saving. Their ability to deliver "clean energy" is not a priority for the buyer.

The focus of supply in a commercially viable approach must be on meeting consumer demands and not just on pushing an environmentally superior technology. A multi-pronged approach is needed to meet this challenge:

- Involvement of financial institutions in investing on the supply side or providing finance on the demand side;
- The establishment of distribution networks and support infrastructure;
- The development of a product range of R/A cooking appliances;
- Promotion and awareness; and
- Building the market to create economies of scale.

Subsidies for appliances that use traditional forms of fuel such as paraffin further disadvantage R/A energy cooking appliances. They make appliances that would not otherwise be price competitive affordable, as with the case of *Amazing Amanzi* which is subsidised by Eskom. However, where products rely on subsidies, they are not confronting the challenges and opportunities of commercialisation and this may ultimately be their downfall.

- **Suppliers of current R/A energy cooking appliances**

Renewable energy cooking technology is currently a niche industry, mostly initiated by enthusiasts. They might be engineers and/or inventors, taking pride and satisfaction in developing a unique product, or promoters of clean technologies and social benefits for women and their families. Most of these products are produced in the formal sector and away from the targeted communities.

Box 2:
Energy efficient coal stoves

There are a number of these, marketed under different names. Three currently in use are:

- The *Imbawula* is marketed as a smokeless stove. It is a model that is being produced informally. It has been promoted mainly by NGOs and government departments in the country, over quite a long period, but without any market strategy. The Department of Environmental Health in the City of Johannesburg promotes it.

- The *Vesto Stove* is produced by *New Dawn Engineering*. (see Volume I, Appendix 4 for more information on the Vesto stove). It can cook as well as be upgraded to a heater. It costs R380 and can be used inside and outside. It is small and does not emit smoke. Thus, it is convenient and is not a threat to the health of users. The *Vesto Stove* makes use of fuel types such as wood, twigs, charcoal, dung, and biomass briquettes. It can cook for 1-10 people and saves 40-66% of fuel depending on the management by the user.

- The *Basa Njengo Magogo* is a lighting technique promoted by the DME. This is meant to reduce air pollution and smoke emission by 40%. The technique can be used irrespective of the stove. It is part of a phased approach aimed at reducing coal emissions in households. The technique can be used irrespective of the stove. The DME is envisaging an initial rollout plan from 2004.

Box 3:
Solar cookers

The main appliances of interest here are:

- The *Sunstove* which is a box cooker with a blow-molded polyester casing. Sunstoves are produced by *Sunstove Organisation*, a Sector 21-company devoted to improving the safety and cleanliness of basic elements such as food and water. The stove is light and easy to handle, but slow to heat up. It is suitable for small families and low temperature cooking. It costs R220, and has a long durability. Thus far, about 10 000 Sunstoves have been sold in Southern Africa.

- *Koch* produces a *parabolic solar cooker* (K10 model) and a *solar box stove* (T16 model). Koch is a German manufacturer and therefore import tax has to be taken into account. The K10 costs R680, which is a high initial investment. The advantage of these solar cookers is that they help reduce the carbon dioxide emissions in the air, reducing greenhouse gases. The T16 model costs an estimated R 900. It is a box cooker with internal and external reflector, making it very efficient for cooking and baking. It is able to cook chicken stew for 8-12 people in one hour.

A clear plus for the supply side of RE cooking technology such as solar cookers are that they do not involve fuel costs. A solar cooker sold at a retail price of R 262,50 reaches the break even point between cooker price and monetary fuel savings at 320 meal portions with electricity, 875 meal portions with coal and 1750 meal portions with paraffin.

Box 4:
Cooking through retained heat

There are several versions of this:

- The *Hotbag* produced by *Wendy Chandler*, retains heat for 3-5 hours, and saves 75% of cooking fuel costs. Prices vary from R65-R185 depending on the size and fabric used.
- The *Hotbox* concept, which costs R120, excluding VAT. Research on the efficiency of the *Hotbox* has been done and it proved to be very efficient.
- The *Wonderbox* is produced by Mrs. Marsh in Cape Town and sells for
- R 50. This is a small-scale production run from her home and the actual product looks like the *Hotbox*.

The Wildlife and Environment Society of South Africa (*WESSA)* promotes the idea of the hotbag through its organisation's environment education resources. (See Appendix 5, Volume I for more information on the Hotbag and retained heat cookers)

Production output in the R/A cooking appliance industry is very low. This is in line with the non-existent distribution network, or distribution based only on personal contacts. The products, however, have been developed over a long period of time and are adapted to the local environment. They have been tested for their emission reduction and calculated for their energy cost savings. They provide a base for further development.

Box 5:
Relative strengths and weaknesses of conventional and alternative appliances

Only those cooking appliances that are bought and used by LSMs 2-5 are included here. The strengths and weaknesses relate to the quality of the appliance, the market strengths of the producer and the energy carrier that applies.

Strengths of conventional appliances	**Weaknesses of conventional appliances**
Electrical hotplates	
✍ Electrical hotplates are sold by two big companies serving the SA market and selling about 250 000 electrical hotplates per annum. ✍ Electrical hotplates are sold from R160 and are easily available. ✍ Electrical hotplates are clean and safe.	✍ Electrical hotplates are not energy efficient. ✍ Electrical hotplates use a lot of energy resulting in high cooking energy expenditure. ✍ Electrical hotplates run with electricity that is produced 90% through coal causing high CO_2 emissions.
Paraffin stoves	
✍ Paraffin stoves are manufactured by a wide range of producers with many imports from Southeast Asia. ✍ Paraffin stoves are available everywhere. ✍ Paraffin is available everywhere and in every quantity. ✍ Paraffin stoves can be very cheap. They are available from as little as R20.	✍ Paraffin stoves are often dangerous devices: they fall easily and explode or catch fire. ✍ Paraffin doesn't have any safety regulations for packaging and selling.

Gas stoves	
✍ Gas stoves with 1-2 plates are being sold by two small companies in SA. ✍ Gas are promoted by the DME.	✍ Gas stoves are sold in a few outlets only. ✍ Gas stoves are comparatively highly priced with the 2-plate at R 300 and the 1-plate at R 150. ✍ Gas cylinders are not easily available. ✍ Gas cylinders are difficult to transport.
Coal stoves	
✍ Coal stoves are common and popular appliances. ✍ Coal stoves are made in the informal sector. ✍ Coal stoves are cheap. ✍ Coal is cheap in certain regions. ✍ Coal stoves can cook and heat.	✍ Coal stoves emit a large amount of smoke. ✍ Coal stoves are a health hazard. ✍ Coal stoves are not child safe.
Strength of alternative appliances	**Weaknesses of alternative appliances**
Paraffin stoves	
✍ The Amazing Amanzi stove is being produced by Eskom Enterprises, a powerful player in terms of relationships, money and expertise. ✍ The Amazing Amanzi uses cheap paraffin and will in future operate on gas as well. ✍ The Amazing Amanzi is safe and clean. ✍ The Amazing Amanzi has a modern appearance.	✍ The Amazing Amanzi is expensive at R 1750 incl VAT. ✍ The Amazing Amanzi is being heavily subsidised. ✍ The Amazing Amanzi is not easily available on the open market.
Coal stoves	
✍ Imbawula has been on the market in different guises over many years. ✍ Imbawula is smoke-less. ✍ Imbawula uses cheap coal. ✍ Imbawula can be produced informally.	✍ Imbawula gets subsidised and gets promoted only through development projects. ✍ Imbawula is a “poor man’s product”.
✍ Vesto is produced by experienced staff. ✍ Vesto comes at a medium price for R 480. ✍ Vesto doesn’t smoke at all. ✍ Vesto uses cheap coal or other bio-mass. ✍ Vesto saves 40-66% of energy.	✍ Vesto is not being produced in large quantities yet. ✍ Vesto doesn’t come across as a modern appliance.
Solar cookers	
✍ Sunstove is produced by a South African company with a proven track record. ✍ Sunstove costs only R 179. ✍ Sunstove is light and easy to handle. ✍ Sunstove has a proven long durability.	✍ Sunstove is slow to heat in windy conditions. ✍ Sunstove reaches medium temperatures only.
✍ Koch parabolic is being produced by an experienced manufacturer who has 1000s worldwide. ✍ Koch parabolic is very efficient and fast in cooking for large quantities.	✍ Koch parabolic is an imported product from Germany. ✍ Koch parabolic is priced at R 680 before import tax is added.
Hotbags	
✍ The hotbag, and its variations, can easily be produced locally in a range of sizes and prices. ✍ The hotbag concept is an excellent complement to other forms of energy efficient cooking.	✍ People are reluctant to spend money on something that seems so basic and simple. ✍ The hotbag cannot be used without another appliance to do the initial cooking.

✍ Is there a market in the gap?

R/A energy cooking technology currently occupies a niche in the market. But even within this niche the players and producers have difficulties because the playing field is not level. Investors, enablers and supporters of R/A energy cooking technology have to be careful not to distort the market and impede the proliferation of a variety of products. The interest in one supplier can easily undermine the efforts of other suppliers. Subsidies or investment offered to one product may well amount to manipulation of the market and disregard the commercial principles which we consider to be of utmost importance in promoting R/A energy cooking technology on a mass basis.

The demand side analysis has shown that the consumer chooses between cooking appliances according to the need and current available energy carrier. In everyday life, different appliances are used side-by-side and are not played off against one another. It is in the interest of the demand side and the supply side to extend the number of mature and professional suppliers building a R/A energy cooking industry. On the supply side, diversity needs to be strengthened with regard to the products, the manufacturers and the distribution channels. Any enterprise entering into the mass market will also need to work out some sort of credit policy in order to meet the needs of the primary target group. Once the necessary factors are in place, it should be possible for the R/A energy cooking appliance suppliers to compete with those producing the traditional products.

In summary:

- ✍✍ Cooking appliances are largely categorised according to the fuel they use. There are significant players in the fields of electricity, paraffin, coal, oil and gas. This facilitates ease of access and, in some cases, provides for subsidisation of appliances, making them affordable when they would not otherwise be.
- ✍✍ The R/A cooking appliance industry lags behind the industry for conventional cooking appliances as commercial products because it does not have good distribution networks, infrastructure for servicing and support, economies of scale, availability of end-user finance and a broad range of products.
- ✍✍ There are a limited number of products in the form of energy efficient coal stoves, solar cookers and “hotbag” or “hotbox” type products that cook through retaining heat.
- ✍✍ Most of these are produced by “enthusiasts”, not as commercial ventures.
- ✍✍ They currently occupy a niche market, rather than a mass market.
- ✍✍ Support to these ventures can distort the market and prevent the proliferation of a variety of products, by providing subsidies or non market-based investments.
- ✍✍ On the supply side, diversity needs to be strengthened with regard to the products, the manufacturers and they distribution channels.

3.2 Routes to the market

✍ The link between supply issues and distribution needs

Just as there is no one "ideal" or ultimate R/A household energy cooking technology product, different routes to market - the distribution channels by which suppliers of products ultimately connect with their consumers - will be more or less appropriate in different circumstances and places. The development of any industry can, and must, follow multiple roads going in a similar direction. Some of these roads will become highways and others, dead ends, as the "road users" - the consumers - make their choices about what they want to buy, when, where and how. The enabler cannot be prescriptive about which products to offer, and must similarly refrain from prescribing the routes to market. Rather, the strategy should be to facilitate the creation of a competitive environment in which a sustainable industry and market can develop.

The purpose of this section of the business case is to identify all the potential routes to market in South Africa, to describe them, discuss their relative strengths and weaknesses, and highlight key issues. But, first, a brief discussion of supply structure is necessary. A detailed description of types of products, their advantages and disadvantages, and the strengths and weaknesses of the various suppliers and products has already been presented in this business case. However, for the purposes of this discussion on routes to market, a few key observations need to be reiterated:

- ✍ The category of "suppliers" is not defined or limited by the *source* of supply. It includes all those who manufacture their own products, assemble components sourced externally, or externally source entirely built-up products. These external sources can be either local or import. In a commercial industry, the common denominator that defines a "supplier" is ***the primary responsibility for managing the brand*** in a particular market. This means that the supplier is responsible for taking the key decisions in terms of:
  - ✍ Product range and features;
  - ✍ Wholesale price platform;
  - ✍ Distribution channel strategy;
  - ✍ Brand/product promotional and support strategy.

  One of the key motivations for the establishment of the enabler in this initiative is concern over the ability of current suppliers of R/A household energy cooking technologies to effectively deal with these issues, with consequent implications for routes to market.

- ✍ There is, currently, a paucity of suppliers of R/A household energy cooking technology products. This is reflected both in the quantity and diversity of suppliers. The paucity of suppliers means a paucity of choice for different distribution channels to be able to differentiate themselves competitively.

- With a few exceptions, the existing suppliers are characterised by a relatively low entrepreneurial drive. Often, the motivation driving the supplier is more one of altruism or technological curiosity than commercial opportunity. In certain instances, the move into R/A household cooking technology products has, in part, been out of the "comfort zone" of previous business experience: for example, moving from reacting to large contract tenders in the public sector to proactive selling to retailers and direct to consumers. This lack of commercial sophistication has implications for the development of commercial relationships with distribution channels.

- Generally speaking, none of the existing suppliers currently benefits from economies of scale. They are small, and often marginal, businesses (yet, conversely, most of them are formal businesses and not localised micro enterprises physically operating within the target customer communities). This has ramifications in terms of quantity and continuity of supply, and the relative influence suppliers will have with regard to their channels of distribution.

- From the perspective of the enabler, there is a need to engage with existing suppliers to help them reduce the time, costs and risks or improve the economies of scale associated with their businesses. This can be done by improving their understanding of market-suitable products and removing roadblocks to their successful introduction. In particular, facilitating introduction to appropriate distribution channels is essential.

- But, the scope and vision of the enabler must be far broader than the existing sources of supply. It is essential that the enabler facilitate the entry to the industry of many more, diversified, suppliers. Furthermore, the enabler must prioritise achievement of scale, even to the extent of encouraging and facilitating the development of consolidators/ wholesalers who are able to do on behalf of suppliers collectively what they may not be capable of doing independently.

In summary:

- The problems with supply of R/A energy cooking appliances impact on distribution because there are not enough suppliers, those that exist do not necessarily have an entrepreneurial drive, or commercial experience, and most do not benefit from economies of scale. These factors impact on quantity and continuity of supply and hence on distribution.

- The enabler in this initiative will need to assist existing suppliers to develop commercial know-how, but also to facilitate the entry to the industry of many more diversified suppliers.

- The enabler will also have to prioritise achievement of scale, even to the extent of facilitating the development of wholesalers who are able to do on behalf of suppliers collectively what they may not be capable of doing independently.

- **Distribution channel options**

There are four main distribution channel options (with a number of choices within each of these options). These are:

- Direct response marketing;
- Retail distribution;
- Personal selling; and
- Institutional channels.

(See Appendix 6, Volume I for more information on the distribution channels)

Direct response marketing

This route to market is built on establishing a two-way relationship between a consumer and a supplier (or other marketer) through communications media, and without "face-to-face" physical contact.

There are two forms of direct response marketing. "Outbound" is where the supplier pre-identifies and selects potential customers by name/address, usually from a database with known characteristics. The supplier then provides these targeted customers (typically by post or telephone, and increasingly by email) with a personalised offer, and details on how and where to respond.

"Inbound" direct response marketing is where the supplier relies on interested customers to initiate any direct contact with the supplier. Typically, the supplier solicits inbound response by placing an advertisement with an offer and response details in a mass medium with an appropriate reader/viewer/ listener profile.

Because of the emphasis on pre-qualifying potential customers and the personalisation of the offers and the communications, generally speaking, the response to outbound programmes is higher than for inbound programmes, but so are the costs. Inbound direct response marketing is the route to market employed by Sunstove, currently the largest supplier of solar cookers in South Africa. To the best of our knowledge, no supplier in the R/A household energy cooking industry is currently conducting outbound direct response marketing activities.

The advantages of direct response marketing, inbound or outbound, as a route to market are the following:

- There is no intermediary between the supplier and the consumer other than a communications and product distribution infrastructure such as telephone and postal services. This can facilitate market entry into areas lacking, say, appropriate local retail distribution, and without the supplier having to invest in local infrastructure.

- Direct response marketing permits a high level of flexibility in testing different offers, incentives and target markets.

- The absence of "middlemen" can create a positive perception of cost/price advantage for the supplier (the reality is, of course, dependent on the actual cost of distribution, which, in the posting of individual items can be high).

The disadvantages of direct response marketing as a route to market include:

- The lack of physical contact with the consumer means that the consumer cannot directly "experience" the product. Products that are well known or easy to explain, therefore, have an advantage in this channel over those that are not.

- The lack of a physical presence, such as a retailer, in the community can also create consumer concern over surety of delivery, and post-sales service and support. Responsibility for this will rest squarely with the supplier, who must provide a reasonable methodology such as an effective call centre.

- The limitations of communications and media vehicles for our defined target market must be considered. Despite the growth of cellphone penetration in recent years, particularly in LSM 5, most LSM 3-5 households are still without any phone, cell or landline. Approximately a quarter of LSM 3 and 4 households reside in informal or shack dwellings, making postal and physical product delivery problematic. And the relatively high rate of physical relocation to new addresses, particularly from rural to urban environments, in this demographic segment makes for difficulty in keeping databases clean and current. For these reasons, according to AMPS (2000A): only 12%, 16% and 21% of LSM 3, 4 and 5 households, respectively, report ever receiving any direct marketing materials in the household, and just 1%, 3% and 6% report receiving calls from telemarketers.

Relative to the top end of the market, there are fewer quality databases commercially available to aspiring outbound direct response marketers. The most successful marketers in this niche have taken the time and money needed to develop and maintain their own. This requires a concerted, formalised and ongoing programme of activity, and not simply *ad-hoc* or occasional promotion.

From the perspective of media options for inbound direct marketing, choices are also limited. Radio is the most ubiquitous medium, but is generally unsuitable for direct response marketing because it is not visual. Television adds the visual element and, according to AMPS (2000A), is available in the homes of 71%, 88% and 95% of LSM 3-5 households, respectively. Furthermore, viewership is strongly concentrated on the SABC 1 and 2 channels, making it easy to target this demographic. Consequently, 29%, 37% and 43%, respectively, report having seen direct response television advertisements. The primary limitation of these television channels is that they are national in coverage, include far more than the targeted demographic and, therefore, are relatively expensive for advertisers. Consequently, it is only the largest direct response marketers who have the ways and means to utilise television.

Typically, more localised or focused inbound direct response marketers will rely on print (for example, local newspapers and specialist interest magazines), and increasingly the Internet. However, internet penetration is virtually non-existent in this demographic group and, despite increasing literacy, readership of publications is very low as aliteracy is high. Relative to other markets, the use of unpersonalised materials distributed through "knock and drops" targeted to households in particular neighborhoods, and to individuals at high traffic locations such as taxi ranks, is much more common.

Retail distribution

Formal retail distribution is, by far, the most pervasive route to market for products aimed at our primary target market (there is also a large informal retail distribution network operating here).

Chain groups account for most retail sales of large appliances in South Africa, but independents are still important, collectively if not individually. Chains benefit from economies of scale in buying, pricing, advertising and promotion, and the ability to negotiate leases for preferential positions in shopping malls and high streets. From the perspective of consumers in our primary target market, the well-known chain brands are trustworthy, highly visible because of their aggressive advertising, and importantly, are more likely to offer consumers credit, particularly HP finance. In fact, many of the leading furniture and appliance chains define themselves to their investors as financiers first and foremost, with the product sold simply being a means to the end of securing the finance contract. For these chains, customer loyalty - measured in terms of extending additional finance over time - is paramount, and considerable marketing activity is directed to "working" the finance database.

Other advantages of doing business with the chains include the potential to sell large volumes through a centralised point of contact (i.e. a single buyer for a large number of stores) and, often, delivery to a centralised point of distribution (many of the big chains have regional distribution centres that operate on a hub and spoke basis with their stores). This obviates against the supplier having the costly logistical hassle of physically distributing small quantities of merchandise directly to large numbers of stores spread out across South Africa.

The disadvantages of doing business with the chain retailers are the obverse of their advantages. Because of their size and buying clout, they can dominate small suppliers. A common ploy of certain chains is to control such a large percentage of a supplier's volume that, effectively, they control the supplier and dictate prices and terms to their own benefit, but to the detriment of the supplier. However, ultimately, the chain retailers are driven by the commercial motive of sustainable profit, and suppliers who enter into these relationships with their eyes open can develop "win-win" relationships with such retailers.

Generally speaking, although a chain may test merchandise in a small selection of stores before committing to a larger order, their interest lies primarily in merchandise with national, large volume potential. Such merchandise can merit advertising and in-store promotional support. For these reasons, the chain retailers will not be interested in doing business with suppliers who will not be able to gear up quickly to supply the stores with sufficient volume.

Additionally, they will be highly conservative about listing new concepts such as R/A household energy cooking technologies. Suppliers should approach the chains well prepared for such negotiations. This includes sufficient protection for their "intellectual capital" and trademarks. It is not unknown for South African chain retailers to take a local concept and then have it "knocked off" in volume and at a much lower cost in the Far East.

The most important principle is that one "sells into the retailer on one's ability to sell out". All proof of demand, including market research, the results of pilot studies and performance of the product in other channels of distribution should be marshaled to the advantage of the supplier. External advertising and promotional activity conducted by the supplier which raise awareness of the product and the brand also facilitate a listing with a chain. Additional support, such as inclusion of the product in the chain's own advertising and promotional activity, can usually be negotiated at a price, and may be a stipulated condition for a listing.

While every attempt should be made to convince certain chains to be pioneers in this area, it is to be expected that the bulk of chain retailers will only get onto the R/A household energy cooking technology bandwagon once it has been proven elsewhere.

Perhaps the most important strategic decision that suppliers must take in developing the retail chains as a route to market, concerns the sharing of commercial risk. Chains will be most willing to do business with suppliers who effectively guarantee their profit up-front. Next, in order of priority will be suppliers who provide their merchandise on a sale or return basis. Obviously, such arrangements shift the risk from the retailer to the supplier, but are often worth considering as a marketing investment in the establishment of the new product or brand. Suppliers should carefully choose their retail partners for such deals in order to maximise the benefit at the minimum cost.

By contrast, the "power imbalance" will not be as great with independent retailers. Generally speaking, these retailers can be in closer touch with the needs and wants of the local communities they serve and can offer, as owner/ managers, a higher level of personal selling and service than do the employees of the national chains. Typically, they rely on this, as they do not have the budgets to compete with the chains in media advertising.

Consequently, in communities where demand for R/A household energy cooking technology products can be clearly established, the local independent retailers may be more willing than the national chains to list and support such products. Suppliers should emphasise to such retailers the advantages of having a product that, in fact, differentiates them from the chains. Independent retailers may also be more amenable to, and supportive of, local promotions, in-store demonstrations and other such activities.

The disadvantage of the independent retailers is the difficulty suppliers have in identifying and accessing them, and then managing the consequent large number of independent relationships.

Smaller retailers are also likely to be greater business risks for suppliers, and so any strategy that targets independents should avoid putting "too many eggs in one basket" and spread the risk across a number of stores.

In terms of the types of retailers (both chain and independent) most likely to be interested in stocking R/A household energy cooking products, the categories to consider include furniture retailers (who, typically, also stock a range of large appliances), building supplies retailers, mass discounters and certain specialty categories (including outdoor/camping and energy shops).

In our defined primary target market (LSM 3-5), the retailer with the greatest penetration, by far, is Shoprite. But, this chain (a supermarket) would probably be inappropriate for our product category as it:

- does not sell "big ticket" items (it does, however, stock small appliances);
- offers no personal selling or support (it does sell promotional space such as gondola ends, but the supplier must provide the support); and, most importantly,
- does not offer credit.

The most appropriate retailers for successfully reaching the primary target market are the furniture chains (particularly those offering HP financing), and the building supplies retailers. According to AMPS (2000A), the furniture chains that focus predominantly on the target LSMs 3-5 include: Barnetts, Ellerines, Fairdeal/Savells, Price n' Pride, Protea Furnishers and Score. These should be the priority. Secondary are those chains, positioned somewhat higher, but getting a reasonable minority percentage of business from the target LSMs. These include: Beares, Bradlows, Furniture City, Lewis, Lubners, Morkels and OK Furnishers.

Building supplies retailers aimed at the defined target market are, primarily, independents (including the rural cooperative stores), but chains such as Cashbuild should be considered. Mass discounters such as Dion, Game, Pick n' Pay Hypermarkets, Checkers Hyper and Makro could be appropriate environments for the products, but appeal primarily to consumers of the higher LSMs, as do the outdoor/ and camping specialty stores (such as Cape Union Mart). These may be appropriate for certain niche products, but would not be the priority in building routes to market.

Personal selling

Given both the novelty of the category and products, and the degree to which demonstration supports and facilitates the sale of such products, personal selling is an ideal route to market. Townships and rural communities have a long tradition of, and familiarity with, the traveling merchant or "smous", and, increasingly, the more sophisticated and modern version - the multilevel selling networks.

The advantages of personal selling include:

- The dedication of the salesperson to the product (in a typical retail store, a salesperson will be responsible for a wide range of unrelated products and cannot be knowledgeable about all of them);
- The ability to go to the customer (rather than simply wait for the customer to come to ou); and
- The ability to give the customer the dedicated time and attention required.

Typically, the sales people are of the community, comfortable with the culture and language, and often will know their customers on a personal level. They are also knowledgeable about, and connected into, social institutions (such as churches, clubs and stokvels) that create group selling and promotional opportunities.

The disadvantages of personal selling, from the perspective of the supplier, are:

- The necessity to coordinate many players, often small and not commercially sophisticated: from the identification, training, management and control of salespeople, through the logistics of product supply and storage, to the collection of money, the co-ordination of promotional activities, etc.
- Also, generally speaking, direct selling programmes typically do not offer the level of customer support potential buyers desire, including finance, post-sales service, usage support, etc.

These logistical difficulties and historic gaps in the offer can be viewed either as problems, or as opportunities for entrepreneurs. In establishing a new market and industry, the latter perspective must prevail, and initiatives such as the pilot project with EMS must be pursued with vigour. (See Appendix 7, Volume I for more information on EMS).

Institutional channels

Institutions, including government (national, provincial and municipal) and non-governmental organisations (local and international) are important routes to market. A comprehensive list of the various relevant institutions, their mission, activities and interests is included in an appendix to this business case. (See Appendix 8, Volume I) The purpose of this section is to discuss the relative merits of this distribution channel.

The major advantage of institutional selling is the ability to move relatively large volumes of cookers through a single channel at one time. This will be important in helping suppliers achieve economies of scale. Furthermore, the concentration of institutional activity in defined areas (for example, a large housing project in one municipality) can assist in achieving a visible critical mass of consumers owning a particular technology. This is important reinforcement in sustaining a behaviour change in favour of ongoing usage of the technology. People are more likely to accept, and even desire, products conspicuous in the households of friends and neighbours. The sharing of usage experiences further drives usage of the products.

It must always be remembered, however, that institutions will be driven primarily by a social or environmental agenda (energy efficiency, poverty alleviation and reduction, environmental protection, etc.). In the process, the individual needs, concerns and entrenched behaviour of consumers can be overlooked, with the result that products are placed in households but there is no conversion to, or sustained usage of them. Consequently, an important role for the enabler in working with institutions is to ensure that their decision- making in regard to R/A household energy cooking technology is informed from the perspective of consumer demand. This will include ensuring that all the elements of a commercially-oriented consumer marketing programme are replicated: from the initial consumer education and demand creation, to the ongoing consumer and product support.

It is also important that products provided to consumers through institutional channels are perceived to have been provided at market-related prices. This is necessary so that recipients perceive both value and aspirational status - there is a proven resistance among even the less affluent South African consumers to products that are specifically "for the poor". Furthermore, providing products below perceived market value through institutional channels can undermine the parallel development of commercial channels as products are "dumped" below cost, distorting the market.

Box 6:
Swot analysis of routes to market

Direct Response Marketing – Outbound (e.g. mailing lists) and Inbound (e.g. advertising in media)	
Strengths	**Weaknesses**
✍ No intermediary, no middleman – direct telephone or post or e-mail – gets to remote areas fairly cheaply. ✍ Flexibility. ✍ TV (inbound) gets to most of the target group.	✍ Customer cannot see or experience actual product. ✍ No physical presence – creates fears around follow-up. ✍ Not all in target group is easy to access through telephones etc. They move around. ✍ Not that many target specific data bases (outbound). ✍ Radio (inbound) is not appropriate for visualising products. TV is expensive to use. ✍ Aliteracy (inbound) is high.
Opportunities	**Threats**
✍ Possibility of establishing a professional call-in service. ✍ Market entry into areas without appropriate local retail distribution.	✍ Actual cost of distribution is high. ✍ Danger of delivery, set-up, maintenance problems without support.
Retail Distribution – Chain groups	
Strengths	**Weaknesses**
✍ Economies of scale. ✍ Preferential positions in shopping areas – highly visible. ✍ Aggressive advertising – highly visible. ✍ HP finance. ✍ Sell large volumes. ✍ Have a regional distribution network.	✍ Main interest in merchandise with national, large volume potential. ✍ Conservative about products. ✍ Want supplier to take the risks – but this can be worthwhile as a marketing investment.
Opportunities	**Threats**
✍ Possible to develop win-win situations if suppliers are careful. ✍ If they buy-in, they will increase visibility and harness customer loyalty.	✍ Can dominate small suppliers. ✍ Can "steal" ideas. ✍ Hidden costs. ✍ Suppliers must be able to gear up to big volumes

✍ Potential to sell an idea if supplier can prove there is a demand. ✍ If commercial viability proven, will want to get on bandwagon.	quickly – can be difficult for small suppliers.
Retail distribution – independent retailers	
Strengths	**Weaknesses**
✍ Less of a power imbalance compared with chains. ✍ In closer touch with needs of local communities. ✍ Higher degree of personal selling than chains.	✍ Can't compete with chains on advertising, visibility generally. ✍ Difficult for suppliers to identify and access them. ✍ Difficult for suppliers to manage large numbers of independent relationships.
Opportunities	**Threats**
✍ May be more willing to list and support R/A products than big chains – suppliers can use "difference" as a selling point. ✍ May be willing to do local promotions, in-store demonstrations.	✍ Greater business risk for suppliers – avoid putting too many eggs in one basket.
Personal selling (one on one)	
Strengths	**Weaknesses**
✍ Good option for new products and technologies – based on demonstration. ✍ Familiar route to target group. ✍ Salesperson likely to know community well. ✍ Salesperson has a direct stake and is dedicated to the product and can be committed to the customer. ✍ Salesperson can be proactive – go to the customer.	✍ Supplier has to co-ordinate many salespeople – train, supply, collect money etc. ✍ Unlikely to offer finance, post-sale service, usage support etc.
Opportunities	**Threats**
✍ Big opportunities for innovative solutions to challenges, particularly for companies with existing distribution networks in the target group. (See EMS in the business profiles.)	✍ Logistical breakdowns may impact negatively on customer perception of the product.
Institutional channels (e.g. government agencies and NGOs)	
Strengths	**Weaknesses**
✍ Ability to move relatively large volumes of cookers through a single channel at one time – economies of scale for suppliers. ✍ Concentration in one area (e.g. a housing project) can achieve a visible critical mass of consumers using the same technology – increases acceptance.	✍ Institutions tend to have social or environmental agendas rather than commercial agendas.
Opportunities	**Threats**
✍ For the enabler to ensure that decision-making by institutions around R/A household energy technology is informed from the perspective of consumer demand.	✍ Institutions may not have an understanding of consumers that will ensure follow-up, concern for individual needs etc and hence sustained usage. ✍ If products are seen as being "for the poor", it could have a negative affect and lead to consumer resistance. ✍ Providing products below perceived market value can undermine the parallel development of commercial channels – distorting the market.

In summary:

- There are four main distribution channels that can be used by R/A household energy cooking technology product suppliers. They are direct response marketing, retail distribution, personal selling and institutional channels.

- Each of the four has advantages and disadvantages. Within the context of establishing a new market and industry, it is useful to see many of the disadvantages as challenges or opportunities.

- Direct response marketing can be divided into "outbound" (as in direct mailing, telephone contacts) and inbound (as in advertising where the interested customer makes contact with the supplier). Advantages include access to inaccessible areas, without much by way of retailing outlets, flexibility in testing offers, incentives etc, the absence of "middlemen". Disadvantages include lack of physical contact with consumers, lack of on-the-spot reassurance and follow-up service, the difficulties of contact intrinsic in the profile of LSM3-5 (few telephones, shifting addresses and so on). Successful marketers making use of outbound direct response marketing invest time and money in developing and maintaining their own databases. For inbound, in LSMs 3-5, local print media, using "knock and drops" or taxi ranks, work best.

- Formal retail distribution is the most pervasive route for marketing in the primary target market. Chain groups have many obvious advantages including location, economies of scale, mass advertising, high visibility, customer trust and loyalty, HP options, and regional supply networks. The best chains for this initiative are furniture retailers and building supply retailers. On the disadvantage side, because of their size and buying clout, the chains can dominate small suppliers, insisting on terms to their benefit and to the detriment of the supplier. However, suppliers with their wits about them can develop "win-win" relationships with such retailers. The more a supplier can demonstrate demand, the more likely the retailer is to want to negotiate. The enabler can be useful in this regard.

- The power imbalance will be less with independent retailers, and there are other advantages to this route, including familiarity with local communities, personal selling and service, support for local promotions and in-store demonstrations. Disadvantages include the difficulties of identifying and accessing independent retailers, and then maintaining relationships, and the greater risk involved.

- Personal selling is an ideal route to the market in this field. Advantages include dedication of the salesperson, the ability to go out to the customer, his/her familiarity with the customers and institutions in the area, and the personalised attention. Disadvantages include the problems of co-ordination with so many distributors, post-sale services and demand side financing. However, there are innovative ways of overcoming these.

- Institutional channels are those such as municipalities, refugee organisations, non-governmental organisations and so on. The advantages here include being able to move relatively large quantities through a single channel at a time, and critical mass visibility and experience-sharing in one location. In using this route, it is important that the products are not seen as "specifically for the poor" which would undermine their desirability, and that the institutional approach does not undermine the parallel development of commercial channels by distorting prices through subsidies.

4 Facilitators

There are a number of enabling mechanisms that could support the development of a healthy R/A energy cooking appliance industry. The existence of such mechanisms will allow the enabler to draw on support for the work it does in terms of bona fide supply side finance support, creating environmental visibility, leveraging useful public private partnerships, generally mentoring the growth of a new industry and mobilising support in the environment.

FACILITATING MECHANISMS - EXTERNAL

- Capacity Development
- Project Resource Leveraging
- Demand Financing
- Partnerships
- Customer Education
- Regulation

4.1 Supply side finance: funding support available

Research shows that there are many programmes in South Africa aimed at supporting and promoting environment-friendly projects and/or small and medium enterprises (SMEs).

The finance institutions that might support supply side stakeholders in the R/A energy cooking appliance industry can be grouped according to their mission and interests as follows:

- National, bilateral and multilateral institutions
- Promoters of SMEs
- Corporate Foundations
- Funds for Renewable Energy

- **National, Bilateral and Multilateral Institutions**

Institutions relevant for R/A cooking technology are either those that have an interest in market-oriented approaches to make energy accessible for the poor, or those with an interest in reducing greenhouse gas emission. These institutions are likely to be open and receptive to helping in the establishment of a R/A cooking appliance industry. Their form of support is open for negotiation.

German institutions like BMZ, KfW and GTZ have already shown their commitment in this area. Multilateral institutions, such as the European Union and the World Bank, have large funds and various instruments through which to support the reduction of greenhouse gases, enhanced energy access for the poor and the establishment of diversified energy supply structures.. The support is available in the form of grants or loans. Initial positive results and the cooperation of the relevant stakeholders will increase opportunities to tap into these funds.

There are other national donor institutions such as USAID, the environmental division of the Ministry of Foreign Affairs of the Netherlands, Department for International Development (DfID) and DANIDA (Danish government funding) who are very active in South Africa. USAID and the Canadian International Development Agency (CIDA), for example, have funds to increase energy access for the poor. They are currently looking for demand driven approaches. DfID, the French Overseas Development Agency (ODA) and the Japanese International Co-operation Agency (JICA) are of interest as they support among other focus areas, the promotion of SMEs. Where there is a link to clean technologies, the interest generated among these institutions could be high. DANIDA has a close cooperation with the South African Government on Renewable Energy (RE) and is working directly within the DME to build capacity and initiate long-term planning on RE. Beyond that, DANIDA also supports initiatives in RE promoted by civil society and local authorities. .

The Development Bank of South Africa (DBSA) and the Industrial Development corporation (IDC) are South African development banks with an explicit interest in supporting infrastructure development such as that for diversified energy supply and the promotion of SMEs. The IDC even has funds for research and pilots in industrial and technological innovations for SMEs.

These institutions focus on projects.

- **Promoters of SMEs**

As noted above, donor institutions also support SMEs through their funds. In this category, the players focus specifically on the promotion of SMEs and Black Entrepreneurship. The funding is often linked with technical and economic advice. Environmental concerns do not play a major role in these considerations. Generally they invest in business ideas and in broker investments through retail banks. Sometimes, with organisations such as the IDC, they give for particular innovative development. On the whole, the key elements of the co-operation are consultation and support services. In most cases the SMEs have to be able to match grants by up to 50%.

The funds made available by the National Research Foundation and the Sector Partnership Fund of the Department of Trade and Industry (DTI) are of particular interest and relevance to our case. They encourage co-operation between a small number of SMEs and/or other interested parties such as NGOs or research institutions. The Khula Technology Transfer Guarantee Fund, the Technology for Women in Business Fund, and the Small Enterprise Scheme handled by the International Finance Corporation (IFC) for the World Bank, are funds aimed at facilitating technological innovations and transfer of expertise to SMEs. IFC is especially interested in supporting “green technologies”.

In October 2003 a new stock exchange primarily for SMEs is expected to open (AltX).

These players are concerned about viability and sound business cases.

✍ Corporate Foundations

There are a number of corporate foundations interested in funding social or "green" projects. So, for example, Shell Foundation is currently funding SMEs offering energy services in the Eastern Cape, in co-operation with RAPS Finance, E+Co (see below) and KfW (German Development Bank). Of special interest here are the Coal Mining Companies of which Ingwe Coal and Anglo Coal have specific social investment policies. The coal efficient stove "Vesto" could tap into these funds with regard to social and environmental benefits to the community. There is potential here for a public private partnership.

With a bit of creativity there are many more corporate social funds to tap into, but these would generally be localised and activity bound.

These players are looking for innovative projects that fit their needs.

✍ Funds for Renewable Energy Businesses

Empowerment Through Energy Fund (ETEF)
ETEF is a 51 million South Africa rand based fund that aims to support the provision of energy services to households via small and medium sized enterprises. A collaboration between leading local and global business organisations, the fund aims to invest growth capital, skills and knowledge in viable SME's in the South African modern energy sector. ETEF provides an appropriate mix of services and capital to enterprises, thereby enhancing the delivery of modern energy services by the private sector in a sustainable manner. In addition the fund has a strong empowerment focus by providing assistance to those SME's that fully embrace the country's Black Economic Empowerment guidelines. Every SME assisted by ETEF must have at least a 25% BEE shareholding. The main focus are on enterprises offering modern energy products and services who require financial assistance in the region of R100 000 and R3m. RAPS Finance has been appointed as the managers of the ETEF. Contact info@raps.co.za web: www.raps.co.za

E+Co
E+Co was created in 1994 as a US based non-profit organization to provide enterprise development services and start up finance ($25,000 to $250,000) to economically, socially and environmentally sustainable energy enterprises in developing countries. These services and catalytic funds enable entrepreneurs to take their early stage ideas and experiences and prepare them for later stage investors, implementation and growth. With a presence in Latin America, Africa and Asia, E+Co has undertaken a total of 100+ investments amounting to $10 million of which 35 are in Africa as of December 2003. The investments undertaken in Africa are of a more developmental start up phase of the business growth cycle and are often of the high risk, lower return nature. Contact eco@energyhouse.com web: www.energyhouse.com

Solar Development Group
Solar Development Group (SDG) provides business development support and investment to companies with high growth and profit potential that provide photovoltaic (PV) and other energy sources to off grid rural areas in developing countries. Solar Development Group consists of two divisions the Solar Development Foundation (SDF) and Solar Development Capital (SDC). SDF provides loans and or grants for business development activities and seed capital ranging between USD 5,000 to USD 100,000. Their intent is to help companies prepare for substantial growth and help attract necessary growth capital. As a second stage funder SDC invests in PV businesses in developing countries and endeavors to achieve capital appreciation for its shareholders and to create model businesses able to attract outside financing for future expansion. Debt or equity assistance is provided by SDC to companies involved in distribution, consumer financing, leasing, manufacturing, or other aspects related to accelerated PV use in rural areas.
web: www.solardevelopment.org

These players are equally concerned about energy and business.

✍ Conclusion

There are a number of financial institutions that cover two of our three bottom lines: either the economic and the social, or the economic and the environmental. Those that cover the full spectrum of the triple bottom line are either the corporate social funds or the donor institutions.

Presented with a competent case, and with some basis for trust, many of the donor institutions might well be pleased to invest their funds in a viable and effective programme. It is, however, important to keep in mind that the majority of the economic investments, whether socially or environmentally oriented, focus on Black Empowerment and SMEs.

We can expect interest to rise as more results from the feasibility studies come in, interest from the demand side becomes visible, and the manufacturers express interest in going to scale. The institutions appraised have a major and genuine interest in the development of a commercially viable local industry. This is particularly so when positive side effects on low-income levels in the form of increased energy access, and positive effects on the environment can be demonstrated.

(More details can be found in Appendix 8, Volume I)

4.2 Supply side finance: Clean Development Mechanism route

During 2003, the Climate Protection Programme of GTZ commissioned a study on the potential for attracting finance through the Clean Development Mechanism (CDM). It was done by Steve Thorne and Stefan Raubenheimer of Energy Transformations and looked specifically at solar cookers and carbon mitigation possibilities. It was a desk study based on secondary data which attempted to evaluate the potential for CDM finance for a solar cooker industry in South Africa. (The full report is attached in Appendix 9, Volume I) Here we summarise some of the main points.

The Framework Convention on Climate Change, established at the Rio Earth Summit in 1992 and ratified by Parties in 1995, was intended to establish a framework though which to stabilise the earth's atmosphere in order not to be dangerous to life on the planet. The Kyoto Protocol set out to operationalise this framework by setting obligatory emissions reduction targets for industrialised countries. The year 1990 was taken as the base. The Clean Development Mechanism (CDM) is a project-based mechanism under the Kyoto Protocol that allows countries with GHG (greenhouse gas) emissions commitments under the protocol to achieve a portion of their target (less than half) off shore in developing countries. Simply put, where non-industrialised countries have Certified Emissions Reductions (each equivalent to one tonne of CO_2) they can sell them to industrialised countries for use in reaching their targets for reduced GHG emissions. This is allowed in the context of an understanding of global sustainable development.

The first step for a development project or business (project developer) wanting to take advantage of this option is the Project Design Document (PDD). This predicts the performance of the project, is validated by a form of "emissions auditor", and approved by the Designated National Authority (the DNA), a host government institution, as contributing to the sustainable development of the host country. In South Africa, the government has just appointed the Department of Minerals and Energy to act as the institutional home for the DNA. It will still take time to finalise the regulations. The PDD is then registered by an international Executive Board of the CDM, answerable to the protocol signatories. The DNA determines the ownership of the CERs in order to allow a project developer to gain the financial input from "carbon finance" ownership transfer from the state to the developer. The calculations done in the GTZ study made the assumption that, in South Africa, the DNA would cede such rights and would not take a share of the CER proceeds.

In the implementation phase of the CDM Project, the actual emissions are measured and verified, and, at certain set points of the implementation life cycle of the Project, these verified emission reductions are certified and the CERs are issued. For small scale projects (which is where solar cookers would fall) there is some simplification of the process. The monitoring is undertaken by the project participant (or its agent) and verified by a Designated Operational Entity (DOE). The intention of the monitoring in a solar cooker project will be to establish the amount and type of fuel displaced by the solar cooker. In the case of solar cookers, monitoring could be kept relatively simple.

It was within this framework that the study reported on here was conducted for GTZ. The consultants doing the study were concerned to predict the performance of a solar cooker project in terms of reducing emissions, and to establish a figure for the amount of income that could be generated through selling CERs thus earned. Using an internationally accepted theoretical model, they concluded that the use of solar cookers will reduce emissions of greenhouse gases in most cases. The exception is when wood (or other biomass) is being 100% sustainably cropped (or is considered as renewable). The study based its findings on 244 meal portions per person per year cooked on a solar cooker, five people per solar cooker, and 1.21 MJ per meal portion, with solar energy replacing a range of commonly used fuels. On this basis there would be reduction in the relevant six Kyoto Protocol greenhouse gases at between 0.25 and 1.27 tonnes CO_2 equivalent per year. The study uses a projection of 250 000 solar cookers sold exponentially in the South African market over five years. This figure is deduced from the demand analysis described in the business case. Transaction costs, levies and taxes need to be taken into account. The study concludes, however, that there could be an undiscounted "carbon" income of between US$ 2.21 million and US$ 47.8 million (undiscounted, before tax) per annum (based on a CER Certificate market price of between US$ 3.5 and US$ 18, the fuel being replaced) for a solar cooker industry in South Africa over a period of 16 years. The once-off and ongoing (taxes and levies) transaction costs are broadly between US$ 72 000 and US$ 355 000 for small scale and complex "regular" CDM project activities respectively. The consultants involved in the study believe that they have been conservative in their assessments.

The study envisages a business model in which one business holds all rights of ownership to CERs produced through the sale and operation of the solar cooker units. This company returns a portion of the income stream in the form of a price rebate and a performance-related reward to purchasers of the units. Before transaction costs are subtracted using the same CER price range, each system could provide between US$ 8.8 (electricity baseline) and US$ 229 (unsustainably cropped woodfuel baseline) in income (undiscounted) over a 10 year crediting period. The exchange transaction between the project developer and the industrialised country partner can take two forms: through a joint venture where an interested partner could invest in the project developer and get CERs at a reduced rate, or through purchase where the industrialised partner simply buys the CERs outright for value.

The consultants concluded that locally manufactured and distributed solar cookers could advance sustainable development. They also said that, used in the lower LSM groups, they could assist in energy poverty alleviation, improving respiratory health, and in saving on available cash and time (used in wood collection). They believe that a successful CDM project activity could be developed.). They recommend that the development of a Project Design Document (PDD) and the registration of a CDM project activity be undertaken before the commencement of such a business. They suggest that such a CDM project activity should attempt to qualify for Gold Standard labelling as this would provide a stringent and transparent process and could deliver a CER price premium.

For the purposes of the business case presented in this document, the potential to raise significant supply-side finance for an emerging solar appliance industry through the CDM route needs to be noted.

4.3 Networking: Co-operation partners in "Local Agenda 21"

Following the call of the Rio document "Agenda 21", a number of players in South Africa are focusing on the "Local Agenda 21". The aim of the "Local Agenda 21" is to develop communities and cities in a sustainable way, allowing the population to achieve economic growth, the fulfillment of basic needs and a clean environment.

The players can be grouped in three different categories, with much networking going on between them:

- the NGOs or Section 21 organisations;
- the municipalities; and
- the governmental line departments.

The NGOs or Section 21-organisations

There are numerous NGOs in South Africa working in the field of sustainable development. Here we concentrate only on those in close cooperation with local authorities and active in energy efficient (EE) or RE measures.
The International Council for Local Environment Initiatives (ICLEI) and the World Conservation Union (IUCN) are international NGOs with affiliates in South Africa focusing on the reduction of greenhouse gases and climate change. ICLEI promotes the network of "Cities for Climate Change" and offers capacity building trainings for municipal staff and councillors, mostly in managing the software to calculate financial savings from energy reduction. It concentrates on energy efficiency in municipal operations such as energy efficient streetlights, and is funded by USAID.

Two very active not-for-profit organisations are Sustainable Energy Africa (SEA) and the SouthSouthNorth Trust (SSN). SEA is involved in many sustainable energy projects to increase the access of the poor to energy. It has worked for the solar programme in the Eastern Cape, for Bonesa, and for Eskom Enterprises. It is involved in the planning of the International City Energy Strategies Conference (November 2003). Through the Sustainable Living Centre, they promote and sell "eco-products" and energy efficient appliances such as the hotbox. Through SEED, they focus on capacitating and enhancing the co-operation between NGOs and local authorities to reconcile sustainable development objectives with efficient service delivery. They have established a close group of members belonging to different agencies. There are linkages to national departments and associations trying to back up the activities at local level. They are funded by DANIDA.

The SouthSouthNorth Trust working explicitly on climate change and the initiation of CDM projects. This includes capacity building and advice to the public sector and other interested parties on CDM and its potential. They are involved in a much publicised energy efficient housing scheme in Khayelitsha, together with the City Council of Cape Town, and funded by the Netherlands. They would be willing to advise the Solco Project and its offshoots on CDM.

In Johannesburg there are two other initiatives involved in sustainable living and development. They are the Greenhouse Project and EcoCity. Both work in close co-operation with the City Council of Johannesburg on energy efficient and socially acceptable housing schemes. They also promote other environment-friendly activities. The social development of the poor through, for example job-creation is an integral part of their perspective.

✍ Municipalities

The municipal authorities are organised through SALGA (the South African Local Government Organisation), which has a huge agenda. Sustainable development and EE are not high on the priority list, but are becoming more visible. Currently SALGA is in the early stage of developing a Municipal Energy Strategy trying to incorporate Sustainable Energy Use and participatory approaches (See Appendix 10, Volume I for a Draft Concept Document that was written for municipalities on Renewable Energy Cooking Technologies for Low Income households).

The City of Cape Town and the City of Johannesburg are two examples of active municipalities. Tshwane (Pretoria), Durban and a number of smaller municipalities are also taking on the issues, although the latter struggle with new initiatives, making clear conceptualisation and thorough strategic planning in the early stages essential.

The big metros have a number of staff members involved in some way or the other in Local Agenda 21 activities. One or two will be involved in the SEED programme; others work on one-off projects, often without knowledge of other city activities. Johannesburg, for example, promotes the Imbawula, is involved in the promotion of EE in municipal operations, and plans energy efficient and eco friendly housing schemes. In Cape Town, a department is developing an energy efficient "do-it-yourself-kit" to improve insulation in informal housing and to create jobs. Single projects such as these do get funding from donor agencies or, in some instances, from the National Department of Housing.

✍ Government line departments

The focus of a project at the local level will determine the possibility for co-operation with a national line department such as Housing, with the Ministry of Minerals and Energy or with the Department of Trade and Industry.

The National Department of Housing is currently formulating its policy on energy efficiency in houses. The focus of the policy, which will also look at reducing regulatory standards, will be on "no-cost" (directing the houses to the sun), and on low-cost (ceilings in RDP-schemes). A pilot phase is being initiated with regard to ceilings insulation as a measure to reduce CO_2 emissions and indoor air pollution. Funds have been requested from GEF, DANIDA and the World Bank. After the pilot, and if the Treasury allots more funds, a national roll-out is envisaged.

There is a major need for consolidation and co-ordination. In the meantime, however, information flow and networking serve an important function.

The DME is too small to get involved on all matters of Local Agenda 21 and housing schemes, but it is on the Forum for Housing which is discussing standards, legislation and focal target groups.

✍ Conclusion

Much is going on. Most initiatives are still in their embryonic stages or form part of pilot phases. Energy efficiency in housing is becoming a focus but is often limited to EE and activities that do not involve too many social actors, such as using energy efficient light bulbs. Household energy as a holistic approach to cooking, lighting, water heating and space heating is not yet regarded as a major issue. The Solco initiative complements the existing ideas and measures. The Local Agenda 21 players have shown interest in the Solco initiative.

The Solco initiative is emerging at a time when the public sector is at the stage of developing and writing policy. Through personal meetings and the backing of CEF, one could push household energy or cooking energy concerns more with, for example, the National Department of Housing and the South African Local Government Association (SALGA). The results of the Solco pilot phases should be publicised widely to ensure maximum buy-in from this sector.

In summary:

- ✍✍ There are a number of enabling and supporting mechanisms that could facilitate the development of a healthy R/A energy cooking appliance industry in South Africa.
- ✍✍ In terms of supply-side finance, there are different funding avenues that could be explored to support the process. These include national, bilateral and multilateral funding institutions, promoters of SMEs, corporate foundations and funds specifically available for renewable energy business initiatives.
- ✍✍ Another potential supply-side financing option might be to exploit the possibilities of CDM finance. The study done recently for GTZ in this regard was encouraging. Its predictions about the performance of a solar cooking project in terms of reducing emissions were positive, as were its assertions that locally manufactured and distributed solar cookers could advance sustainable development and provide the basis for a CDM project that could generate finance to support the development of an R/A cooking appliance industry.
- ✍✍ There is already a network of organisations in South Africa explicitly concerned with alternative energy issues. They are focusing on “Local Agenda 21” which derives from a broader international Agenda 21. Their aim is to develop communities and cities in a sustainable way. These organisations include NGOs and Section 21 companies, municipalities and government line departments. While most of the work is still in the embryonic stage, the Solco initiative is emerging at a time when there are opportunities for synergy and co-operation between initiatives that complement one another in this field.

5 The way forward

To reiterate: the vision of the Solco Project is to achieve a significant penetration by renewable and alternative (R/A) household energy technologies, particularly for cooking, into South African households. The critically important byproduct of such penetration would be tangible success in helping overcome a variety of economic, social, health, environmental and other problems experienced by South Africans, particularly among the poorer and more marginalised sectors of society.

The best – and, we believe only - way to realise this vision is through the establishment of a commercially viable and sustainable R/A household energy market and industry. The mission of the Solco Project is the establishment of a body that will pool the resources of the key international development organisations (GTZ, UNDP and GEF) within the working environment of a relevant local institution to bring about this end. A positive response in this regard has recently been received from CEF, the essential South African partner. CEF has been kept "in the loop" through the project phase which has led to the conceptualisation and writing of this business case.

The most important conclusion to be drawn from the business case presented in this document is that R/A household energy cooking technology is, unquestionably, commercially viable in the South African market. There is a demonstrable "value motive" for consumers and consequent latent demand upon which a market can be established and an industry built. The roadblocks that stand in the way of success are primarily on the supply (or industry), side, and these have been discussed in some detail. Given the willingness of entrepreneurs and others to invest resources and time, the roadblocks can be addressed and removed. The fundamental issue going forward is, therefore, ensuring that this investment happens. Investments will only be made, especially in "green fields" or speculative start-up projects and industries, if they satisfy the "profit motive" by offering the potential of a reasonable return relative to the risk.

This business case has endeavoured to show that the commercial viability of such an industry is integral to the achievement of the social and environmental goals around which the Solco Project was conceived. It is through the so-called "triple bottom line" that the full societal benefits of R/A household energy cooking appliances can be realised. The sustainability of an R/A household energy cooking appliance industry depends on its collective achievement of societal benefits without the diminishment of society's human, environmental, social and material capital.

The way forward involves four key tasks:

5.1 Key task #1: Quantifying the size and potential of the opportunity

Sales of R/A household energy cooking appliances are currently negligible in South Africa. There is nothing currently visible "out there" to convince potential investors this industry should be of interest to them. Existing industry players are marginal at best, and not particularly entrepreneurial in terms of driving growth.

The development of the industry requires new blood, passion and money. For this injection to be made, and for investors to make meaningful investments, they need to be persuaded that there is at least the potential of achieving some scale in the foreseeable future. Based on the market research, the Solco Project has concluded that, very conservatively, solar cookers should achieve at least a similar penetration to gas cookers in our primary target market, and the real potential could be far greater. There are 3.6 million households in LSMs 3-5. A 10% penetration, equivalent to gas, is 360 000 units. Additionally, there are the potential sales of other R/A household energy cookers, especially more efficient wood and coal burning stoves. The Vesto, for example, performed particularly well in the research study. There is also the potential for sales in other LSM groups which collectively account for 60% of the South African population. These should be pursued, particular in the niche markets identified in the higher income groups. Not only are these additional sales, they are important in reinforcing the perception that R/A household energy technology is not just for poor people - a perception critical to ongoing success. Finally, the prospects for sales into the rest of Africa and elsewhere in the world also need to be taken into account.

For these reasons, backed by research evidence, we believe that a target of 250 000 total unit sales at an accelerating rate over a period of 5 years is a highly realistic objective for the immediate term. At an average price of, say, R 500 per unit, this equates to an industry generating R125 million in sales revenue over this period and, perhaps, R50 million (or 100 000 units) per annum by the end of the period. While not particularly large by the standards of many industries, this is at least 100 times larger than the best estimates of the current size of the industry in South Africa. And, most critically, it is certainly large enough to attract reasonable interest and investment from entrepreneurs, who will see this as a sufficient base from which to build a more substantial and sustainable industry.

These projections should inform the development of any specific business plans. Entrepreneurs will, obviously, be free to make their own assumptions and projections, but should have the benefit of this perspective as a frame of reference. Furthermore, in the hands of the enabler, these projections will be the filter through which project viability and feasibility will, initially, be evaluated. Over time, and with a greater base of experience, the projections will be adjusted and fine-tuned.

5.2 Key task #2: Quantifying the societal benefits

One of the main tasks of the enabler is to monitor and report, to as great an extent as possible, on the progress of the development of the industry and market in terms of the triple bottom line. These issues have been statistically modeled and are incorporated in a detailed spread sheet that can be regularly updated. For the purposes of this business case, following is a "top line" discussion of the main issues.

R/A household energy cooking technologies can demonstrably play a role in the alleviation of poverty. The baseline study for the energy efficient housing monitoring project (PDC 2002 - discussed previously in this document) calculated that the average energy expense for cooking in 4 lower income areas was R135,88 in summer months and R219,55 in winter. This represents between 15-24% of the R910 average household income in our Renewable Energy Study sample (LSMs 3-5, but also including and skewed towards LSM 2), and between 9-15% of the R1 503 weighted average household income for our primary target market, LSMs 3-5, in the AMPS 2000A database.

There is no energy cost with solar cooking. We must assume, however, that, even where acquired, solar cookers will not displace all current household cooking appliances. Households in our target market currently utilise at least two cooking energy technologies. Given usage limitation to periods of sunshine and the relative lack of cooking speed (especially for the less expensive cookers) - solar cookers are not likely to become the only, or even the primary, cooking appliance in the home. Consequently, it would be unrealistic to assume that households acquiring a solar cooker will eliminate all their cooking energy costs. The research conducted by PDC in the baseline period concluded that, where solar cookers were placed in a household, sustained usage was equivalent to wood stoves and higher than for cookers using other fuels. Their best estimate was that solar cookers would be used for 38% of meal preparation occasions. Even if we conservatively assume a much lower rate of usage, say 20%, this still equates to a substantial savings for lower income households once the purchase price of the appliance has been amortised. And, with consumer financing mechanisms facilitating the purchase, the savings can offset the monthly repayments. The collective fuel cost savings for South African consumers based on an estimate of solar cookers being acquired by 250 000 households and used for 20% of cooking occasions will be approximately R7million- R11million per month in 2002 rands.

Similarly, the Vesto wood burning stove has been demonstrated to be approximately 5 times as efficient as traditional wood burning stoves. The savings here will be both monetary and in time, as the majority of wood used for cooking fuel is collected and not purchased.

South Africa will also realise additional indirect savings. For example, a key issue facing Eskom, the national electricity provider, is its looming capacity constraint. In order to achieve an objective of providing electricity to all South African households, substantial investment in infrastructure and installation would have to be made. These investments would be, to a great extent, made in more rural and less accessible regions, and so would be relatively costly. The investments must be made primarily for the benefit of low income households who could not afford to purchase the quantities of electricity that might justify such an investment. The likely consequence would be the subsidisation of the investment by increasing the relative cost of electricity for current consumers and/or subsidisation by taxpayers. R/A household energy cooking technologies will help mitigate the demand for increased capacity and the consequent financial pressure on Eskom and society at large. These technologies can complement the rollout of a more cost-effective electricity grid that simply meets the basic consumer demand for lighting. Eskom, and electricity, should be viewed as a potential complement and partner for R/A household cooking technology, as well as a competitor.

A positive environmental effect of a potential 250 000 solar cookers being introduced and utilised in this market over the next five years has already been discussed and quantified in some detail in the sub-section of Chapter 4 dealing with the Clean Development Mechanism (CDM). The calculation is that switching to these cookers will result in the reduction of emission of the relevant 6 Kyoto Protocol greenhouse gasses by between 0.25 and 1.27 tonnes CO_2 equivalent per year. The consequent benefits of using these emission reductions as the basis for a CDM financing mechanism for the industry have also been discussed.

It is likely that the Vesto wood burning stove will primarily replace less efficient wood burners. This assumption is based on the research findings that consumers utilising fuels such as electricity, paraffin, gas and, to a somewhat lesser extent, coal are less likely to switch to wood as these other fuels are perceived to be "more modern" than wood. It is those consumers who currently use wood who will most appreciate the relative efficiency benefits of the Vesto. The Vesto is five times more fuel efficient than traditional stoves. The majority of wood used as cooking fuel is collected and not purchased. This means that it is likely not to have been commercially cultivated and replaced. The use of the Vesto stove will, therefore, have a positive effect on the rate of deforestation.

Any movement from traditional wood burners to solar stoves will also be positive, and there will certainly be some. It is our belief, however, that solar stoves will, to the greater extent, replace paraffin burning stoves, as consumers have significant health and safety concerns about paraffin appliances. Paraffin stoves are held to be responsible for a large number of fires - a particular problem in crowded peri-urban informal squatter communities - and for accidental poisonings, especially of young children. The R/A household energy stoves also significantly reduce or completely eliminate the risk of exposure to noxious emissions.

5.3 Key task # 3 "Marketing" the conclusions of this project

Upon the completion and acceptance of this business case, the primary task for the enabler will be to share the findings reported in the case with all relevant current and potential stakeholders. This is essential in order to "kick start" the process of developing a commercially viable R/A household energy industry and market.

Candidates for targeted communications and presentations include, but are not limited to: relevant government officials at all levels (national, provincial and municipal) up to and including the Minister of the Department of Minerals and Energy (and select officials from other departments including Health, Education, Labour, Housing, Environment and Tourism, and Commerce), relevant local and international development organizations, energy suppliers (particularly Eskom), trade groups (especially furniture retailers), and gatherings/ forums of potential entrepreneurs and investors.

The market research conducted in the development of the conclusions on which the case is based should be made widely available and easily accessible. To this end, CEF has already offered to host the research findings on its website.

Importantly, the public at large needs to be exposed to the findings and conclusions. They are of general relevance and interest. But, more importantly, such exposure is an important first step in the on-going marketing of the broad concept of renewable household energy. It will provide a contextual umbrella for the individual marketing activities of suppliers and distribution channels. Exposure (free of charge) should be negotiated with all relevant consumer media: TV, radio, newspapers, magazines and on-line. The enabler may wish to retain the services of a professional public relations consultant with appropriate media relationships and sensitivity to the topic.

5.4 Key task #4- Getting the enabler up and running

For the above three tasks to be undertaken, it is important that the enabler be fully functional and effective as quickly as possible. This means:

- The unit must be physically located on CEF's premises and the working/ administrative ground rules established.
- The additional (planned and budgeted for) human resources must be recruited.
- A methodology must be put in place for identifying and screening potential projects. For the reasons outlined in the business case, priority and preference will be given to projects that address the issue "holistically" in terms of supply and demand management as such initiatives have the greatest chance of success.

- The enabler needs to " fill the pipeline" quickly in order to gain essential experience in discriminating between project proposals:
  - Resources, including external consultants, for assisting in the development of business plans and proposals, and the ongoing transfer of relevant market knowledge and business skills should be retained. A "resource centre" should be established so that interested parties can easily access relevant materials.
  - Standards for the ongoing evaluation of, and reporting on, the performance of projects must be defined. This includes both the performance of individual projects against agreed parameters, and of the industry collectively in terms of the "triple bottom line"

- Selection of the initial projects should, in addition to general criteria, be informed by the need to get some "quick wins" which will have PR value in the further development of interest in the industry

- Ongoing forums should be created and scheduled in order to present to, and discuss with potential entrepreneurs and investors relevant issues (such as the continued presentation of the Solco Project conclusions and research findings, any important new developments, experience in other countries, etc). These forums are also an ideal opportunity for essential networking and the building of strategic alliances among players in the industry. They also provide a stage for presentations to players in the industry by key facilitators such as financiers and relevant development organisations.

- Additionally, priority must be given to presenting the market case (along with potential suppliers) to established retail chains (particularly furniture retailers operating in the primary target market) as success in penetrating this channel of distribution is critical to the growth of the industry.

- A plan for any ongoing mass media support for the development of the market should be created and implemented.

- A plan for additional market research should be created and implemented.

In summary:

- Based on the research done for the preparation of the business case, the Solco Project believes that the best way, and probably the only way, to realise the vision of extensive use of R/A household energy technologies is through the establishment of a commercially viable and sustainable R/A household energy market and industry.
- The longer term critical byproduct of success in this regard would be positive impact on social, economic, health and environmental problems, particularly in the more marginalised sectors of South African society.
- The research shows that an R/A household cooking appliance industry is commercially viable. The obstacles are largely on the supply (or industry) side. The key issue is to ensure that there is investment on the supply-side. This requires that there be a convincing potential for a reasonable return relative to investment risk.
- What is needed is an enabling unit to ensure that the necessary steps are taken. CEF has agreed to provide an institutional home for this unit.

- It is now essential to get the enabler up and running. Thereafter, the key tasks for the enabling unit will be to quantify the size and potential of the opportunity; to quantify the societal benefits that result from the initiative; to popularise the results of the research for this business case as a marketing exercise.
- The Solco Project believes that a target of 250 000 total unit sales at an accelerating rate over a period of five years is a highly realistic objective. This equates to an industry generating about R 125 million in sales revenue in five years. This is large enough to attract investment interest.
- The business case already documents likely societal benefits from increased use of R/A household cooking appliances. These include fuel cost saving, a decrease in biomass depletion, a decrease in harmful emissions, health benefits, and the easing of pressure on the electricity grid. It will be the task of the enabler to monitor and quantify the benefits.
- The findings of the business case research need to be widely communicated to potential investors and consumers. This too will be the task of the enabler.
- Getting the enabler functional and effective is, thus, the most urgent task that now needs to be undertaken.