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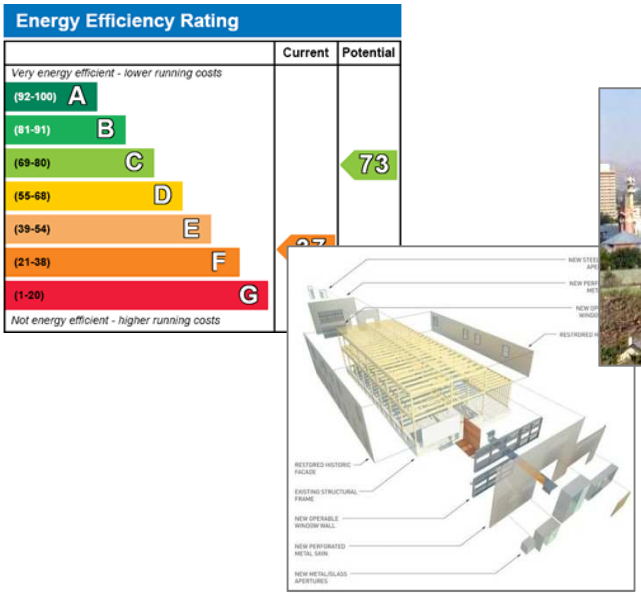

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Table of Content

Table of Figures

Table of Tables

Glossary

EC	-	Energy Conservations
EE	-	Energy Efficiency
GDP	-	Gross Domestic Product
GEF	-	Global Environment Facility
HVAC	-	Heating, Ventilation and Cooling
MME	-	Ministry of Mines and Energy
MWT	-	Ministry of Works and Transport
NEEP	-	Namibia Energy Efficiency Programme
NHAG	-	Namibia Housing action Group
NHE	-	Namibia Housing Enterprise
NPC	-	National Planning Commission
NSI	-	Namibia Standards Institute
RE	-	Renewable Energy
REEECAP	-	Renewable Energy and Energy Efficiency Capacity Building Programme
REEEI	-	Renewable Energy and Energy Efficiency Institute
SADC	-	Southern African Development Community
SAPP	-	Southern African Power Pool
SWH	-	Solar Water Heater
UNDP	-	United Nations Development Programme

Acknowledgment

This report would not have been possible without the excellent cooperation received from the various respondents, and the authors of this report expresses their sincere thanks to each and every one for their precious time – the residential respondents, real estate agents, retailers, architects, manufacturers, the [single] banking institution, the various NGOs and other organisations and especially noting the efforts of the Namibia Manufacturers Association as intermediary.

1. Executive summary

1.1. Background

Namibia and other Southern African countries face potentially damaging power shortages in the early 21st century. Namibia is a large energy importer of its electricity needs from the Southern African Power Pool (SAPP). There has been a remarkable increase in energy demand in Namibia characterized mostly by the booming in the [uranium] mining and construction industries.

The reasonable conclusion can be drawn that a country such as Namibia may arrive at a situation where extensive power outages are commonplace. Unpredictable service interruptions would have far reaching effects on GDP through lost production, reduced productivity and abnormal wear-and-tear on electrical equipment.

The purpose of the **Annual National Survey on Energy Efficiency in Buildings** is to provide a measure for evaluating the effectiveness of initiatives that focus on transforming energy consumption practices of the broader Namibian populace specifically in the setting of new and existing residential and non-residential buildings. More specifically, the survey is useful for measuring the outcome and effectiveness of *targeted interventions*, for further strategic planning.

The current situation in Namibia calls for a clear understanding and assessment of the following (as per project Terms of Reference):

- Energy demand, consumption and expenditure of different building categories i.e residential and non-residential;
- The level of awareness and adoption of EE practices and technologies in the building categories;
- The level of market penetration of EE technologies and practices in buildings;
- The level of awareness and use of building rating tools and standards; and
- Potential barriers to EE penetration and possible means to address the barriers,

which are the focus of this report (via the survey conducted).

1.2. Problem and objective statement

It is generally accepted that modern societies can only exist and function in their current fashion due to abundant access to various forms of energy. Savings in energy consumption through more efficient energy use can contribute to economic growth and industrial development, and so to higher levels of energy supply security. Ambitious energy-conservation efforts are therefore a central element in any serious long term energy strategy.

However, the baseline scenario in Namibia's building sector before the design of the NEEP project was characterized by a number of unaddressed gaps in legislation and the market as far as energy efficiency / conservation is concerned.

The two main objectives of this project were:

Firstly, conducting a national survey in Namibia to assess the following key points (in the built environment)

- Energy demand, consumption and expenditure in different building categories;
- The level of awareness and adoption of EE practices and technologies;
- The level of market penetration of EE technologies and practices;

- The level of awareness and use of building rating tools and standards; and
- Potential barriers to EE penetration and possible means to address the barriers,

Secondly, to ensure that the outcome and processes of this project are repeatable, for future surveys, to allow accurate comparison between different time periods and further to make recommendations.

1.3. Results

The survey was seen as a success in a number of areas:

- In providing useful results and conclusions regarding the average Namibian's understanding of energy efficiency issues;
- In establishing the parameters for future surveys and quantifying a number of unknowns;
- In establishing effective methodologies for the execution of future surveys through thorough design of the questionnaires as well extensive *'post-mortem'* analysis of the same, subsequent to execution of the survey

It was established that there is a wide-spread understanding of energy terminology. The depth of understanding was however clearly seen to be insufficient and correspondingly the behaviour of the survey groups indicated a tendency of only paying lip service to the real issues.

1.4. Conclusions and recommendations

The results of the survey indicated that there exists a definite gap in real understanding of energy efficiency issues (as opposed to paying lip service only). Awareness was seen to be less of an issue as apparently popular media and popular culture had effectively created familiarity with the topics of renewable energy and energy efficiency. It was however clear that information disseminated had only created awareness, without a corresponding knowledge of the full extent of these topics, as applies to everyday life. Namibian people are generally aware of the need to be energy efficient, and they have some grasp of how to achieve this, but they lack broad knowledge of alternative solutions and specifically how to evaluate alternatives with respect to [actual / total] cost and benefits.

It is the recommendation of this report that targeted interventions be made to specific groups, to provide them with sufficient knowledge on basic concepts to allow effective decision making with regard to energy product purchases and usage.

Proposed [primary] targeted information dissemination groups are as follows:

- Students at secondary school level, possibly as part of the physical sciences curriculum – these young adults are likely to be more receptive to energy-behaviour-changing concepts than adults, and are more readily accessed when collectively addressed in the school context;
- Private sector decision makers (directors of companies, owners, procurement managers, etc.), through central bodies, such as chambers of commerce, mines etc. and common associations;
- Energy product wholesalers and retailers, even though their businesses are demand-driven;
- Public sector. Providing information to Government and other agencies to facilitate the further mandating of concrete objectives and mandatory standards with regard to energy efficiency and alternative energy (equivalent to the cabinet directive for solar water heaters).

The above groups are proposed on the basis of perceived possible effectiveness of the proposed interventions and also as a means to reduce the cost of intervention.

The knowledge that is to be disseminated and skills to be promoted should include:

- The ability to understand the local supply authority tariff structures and rates;
- The knowledge of how much power certain devices typically use to function and to understand what the implications of using such devices are: especially in the local context with the aforementioned supply-security issues;
- The ability to determine, for products ("off-the-shelf") that the consumers intend to purchase, how much power they use, how efficient they are and what alternatives are available;
- The skills to be able to calculate total cost of ownership (life-time costs) of certain devices and to make comparisons of these between different devices and scenarios (i.e. to compare a low capital cost, high consumption technology with a high capital cost low consumption one).

The above list is not exhaustive, but compiled based on what were determined to be the most central issues identified in the survey.

It was seen in this survey that in certain instances, there is a need for even the most basic information, such as what electrical energy and power are, their cost and their value and basic financial planning for households in relation to their electricity consumption. This very basic information will always have to be provided to the population, as younger generations come of age; however there is also need for information beyond such basics. Even though it makes sense to provide exhaustive information [with regard to energy efficiency], since a large portion of the Namibian population would benefit from this, it may yield diminished returns.

1.4.1. Additional recommendations

In terms of barriers analyses, this report has provided a number of proposed solutions and key issues in Section 6. These may not be the lowest hanging fruits due to the entrenched nature of some of the issues.

2. Introduction

2.1. Nomenclature

This report recognizes the difference between "energy efficiency" and "energy conservation" (the former being a subset of the latter). However, the term "energy efficiency" is used here as a generic term to embody the objectives of this report since it appears to be the term in more common use. For the less technically inclined reader the following explanation is provided:

Energy efficiency describes the goal of *reducing* and *optimizing* the amount of energy required to complete a task, for example lighting up a room, cooking food or heating water. Energy for completing these tasks can be provided by electricity, petrol, wood, paraffin, diesel or sun light to name a few and so the goal is to achieve the same outcome or results by using less of these energy sources.

Energy conservation is a broader term: while it may include the concept of using energy more efficiently (to ultimately use less) it also mandates the requirement of only using as much energy as is necessary to accomplish a required outcome and only when necessary. Energy can theoretically be efficiently employed in a wasted effort, but in such a case it is definitely not conserved. For example, conserving energy would require only switching on as many artificial lights as *required* for a task, only in the area in which the task is executed, and only while the task is being executed. At the same time these lights would have to be of a variety that uses the least amount of power to generate a specific amount of light (efficiency).

2.2. Background

With the background of a rapidly expanding consumer base and stagnant production capacity in the SAPP, Namibia and other Southern African countries face potentially damaging power shortages in the early 21st century. Namibia is a large energy importer and imports up to 56% of its electricity needs from the Southern African Power Pool (SAPP). There has been quite a remarkable increase in energy demand in Namibia characterized mostly by the booming in the [uranium] mining and construction industries.

Figure 1. Uranium and other mines in Namibia contribute greatly to national power demands

The conservative, yet reasonable conclusion can be drawn that a country such as Namibia may arrive at a situation where extensive power outages are commonplace events. Unpredictable service interruptions would have far reaching effects on GDP through lost production, reduced productivity and abnormal wear-and-tear on electrical equipment. It is therefore imperative, and at the time of the report urgent, that apart from additional supply capacity being created, the existing capacity be optimally distributed and used.

This can be achieved through two routes: load shedding (supply-side [en]forced savings) or energy conservation (demand-side management for savings); with the implementation of energy conservation being the only viable long term solution, for the local economy and the environment.

Additionally, the aim of optimizing energy utilization through conservation is in line with the goals of Namibia's National Development Plan 3 (NDP3). Specifically the "Sub-Key Result Area: Sustainable Utilisation of Natural Resources" (no. 5a) in the NDP3 under the energy subsector calls for "…(vi) promoting the efficient use of energy by introducing special technology programmes and public awareness campaigns…"

2.3. Project introduction and justification

The purpose of the **Annual National Survey on Energy Efficiency in Buildings** is to provide a measure for evaluating the effectiveness of initiatives that focus on transforming energy consumption practices of the broader Namibian populace specifically in the setting of new and existing residential and non-residential buildings. More specifically, the survey is useful for measuring the outcome and effectiveness of *targeted interventions*, for further strategic planning.

The information gathered in terms of the energy demand, consumption and expenditure patterns (in the different building sector categories), would assist the NEEP project in determining the level of market penetration of energy efficiency (EE) technologies and practices and allow for planning of:

- The requirements of education or awareness-raising programs for the general populace or specific demographic groups;
- Campaigns for awareness-raising amongst decision makers (indirectly);
- Future frameworks for legislation amendments to enforce EE practices or technologies;
- Future frameworks for the incentivisation (or subsidization) of EE practices, technologies or alternatives.

2.4. Problem statement

It is generally accepted that modern societies can only exist and function in their current fashion due to abundant access to various forms of energy.

Savings in energy consumption through more efficient energy use can contribute to economic growth and industrial development, and so to higher levels of energy supply security. Such savings if capitalized upon could lead to the effective addressing of global environmental [pollution] problems. Ambitious energy-conservation efforts are therefore a central element in any serious long term energy strategy.

However, the baseline scenario in Namibia's building sector before the design of the NEEP project was characterized as follows:

2.4.1. National building codes do not incorporate standards and recommendations on Energy Efficiency (EE) and Renewable Energy (RE) for the following aspects:

- The building envelope (referring to insulation, sealing, etc.)
- Lighting (such as the use of natural lighting, alternative technologies or management / automation systems)
- Heating, Ventilation and Air Conditioning (HVAC) systems
- Water heating systems (with reference to solar water heating: the Namibian Government has mandated the use of SWHs in public institution buildings, setting a clear example)
- Indoor air quality (specifically beyond safety requirement, i.e. performance standards)

2.4.2. No recommendations having been made to date on energy-efficient equipment and materials that have been tested and labelled in accordance to internationally recognized standards (whether tested locally or not).

2.4.3. Building owners having no access to dedicated financial instruments to introduce energy-efficient technologies in their buildings because of reluctance or unfamiliarity of financial institutions with these technologies.

2.4.4. Building owners having limited access to technical resources to conduct energy audits in their buildings and evaluate the potential measures that could be implemented to realize energy savings with possible cost savings.

2.4.5. Limited availability of energy auditors sufficiently qualified to undertake energy audits in buildings.

2.4.6. No publicized, comprehensive energy audits having been conducted in Namibia building sector.

2.4.7. Principal players (e.g. manufacturers, suppliers, retailers, specifiers and developers) on the market were apparently not actively promoting EE.

- According to the EE Baseline Survey conducted under REEECAP (2008), 17% of local architects surveyed were not aware of EE issues in buildings whilst 67% were aware but not implementing EE measures.

2.4.8. No significant programmes or legislation having been in place offering incentives towards the promotion of EE alternative technologies, whether by direct subsidization, tax incentives or other means.

The foregoing points indicate considerable gaps in any possible, serious, long term energy strategy, since no favourable environment for EE could exist in the light of these issues. The NEEP project is therefore of prime relevance and great importance.

2.5. Objectives

The current situation in Namibia calls for a clear understanding and assessment of the following (as per project Terms of Reference):

- Energy demand, consumption and expenditure of different building categories i.e residential and non-residential;
- The level of awareness and adoption of EE practices and technologies in the building categories;
- The level of market penetration of EE technologies and practices in buildings;
- The level of awareness and use of building rating tools and standards; and
- Potential barriers to EE penetration and possible means to address the barriers,

which are the focus of this report.

The secondary objective of this report is to yield results via the implemented methodology that are repeatable, for future surveys, to allow accurate comparison between different time periods and further to make recommendations from lessons learnt in the execution of this survey.

2.6. Project stakeholders

2.6.1. National implementing partners

- United Nations Development Programme
- Ministry of Mines and Energy
- Renewable Energy and Energy Efficiency Institute

2.6.2. Other stakeholders

Entities from each of the following sectors were deemed to be stakeholders for this project:

- Building industry specifiers (architects, engineers)
- Large power users (manufacturers etc.)
- Building services suppliers (construction, building & equipment retailers / suppliers, property managers, real estate agents)
- Property developers
- Financial institutions
- Retailers (of energy devices)
- Civil society

These stakeholders were also included in the respondents' target groups, fur surveying.

3. Methodology

3.1. Survey groups

As a matter of confidentiality, references to specific entities and persons are omitted in this report, unless otherwise agreed to with each entity. The REEEI will confidentially retain all personal particulars for reference purposes and also to assist future surveys.

The following important demographic groups relevant to the built environment, for the purposes of this survey, were identified as:

– Residential users – which form the core group for this survey
This respondent group constitutes the "general population", the largest non-mining and non-industrial consumer portion of the national electricity usage, and due to the magnitude of its consumption, this group is a significant part of the national power consumption base;

Additional and incidental to the core demographic group, the following respondents were also identified:

– Retailers
The entities who provide energy products and materials (i.e. which are used to consume energy), generally offer both efficient, alternative products and conventional, non-efficient products - often in competition;

– Specifiers (such as architects or engineers) / building operators
Those responsible for guiding building owners on their purchasing decisions and who also have a key role to play in informing or educating others (owners, tenants etc.);

– Property developers
These entities play very significant roles in the Namibian economy, providing a large portion of new housing and / or offices: in the absence of legislated minimum requirements, they determine the level of incorporated energy efficiency;

– Large(r) power users
The mines and large manufacturers constitute some of the largest consumers in Namibia, and certainly are the largest per-capita consumers – however, at the scales of consumption that

apply to these entities, they generally strive to be as efficient as possible to minimise their significant overhead energy costs;

3.2. Survey strategy

It was decided that the most sensible approach to reaching the core respondent group would be by mode of face-to-face interviews. This strategy was required in the local context were some of the demographic subgroups, particularly those of lower income, would not be easily reachable by any other means (such as via online surveys or self-surveys). However, it was also recognized the higher income groups presented a greater challenge in this case due to their security concerns (i.e. accessibility to their premises).

For the remaining respondent groups it was decided that a mixed approach would be taken of using self-survey techniques, which was generally indicated as preferred mode by these groups (it was more convenient to them), and face-to-face or telephonic interviews.

For a survey of this scale and extent, it was not deemed necessary to conduct any pre-survey work, such as mapping and cartographic work, a pilot test, advertising / awareness raising etc.

The execution of the survey was planned in terms three phases being, pre-survey (inception, client contact and needs assessment), survey (collection of data) and post-survey (enumeration of data, processing and analysis, reporting).

3.3. Survey planning and timeline

Originally it was anticipated that the inception and preparation of the project would take approximately one week.

The statistical method for sample sizes (refer to 3.6) was used to determine the sample size (number of respondents) to achieve specific levels of confidence, to be able to draw conclusions. To achieve 95% confidence, with a 5% interval (given a same-answer response rate of 50%) would require a sample base of **380 respondents** (with and without correction for actual population size, Column A). As a lower limit, 95% confidence can be achieved over an 8% interval if the sample size is reduced to **150 respondents** (Column D). If the correlation on a specific answer is greater than 85%, then with the same sample size, 150, the confidence interval reduces to 5.55% (Column E).

Estimated Namibia population (July 2011 est.) as obtained from the World Fact Book: 2,147,585

Table 1. Statistical calculation for confidence and sample size

	A	B	C	D	E
ss	**380**	**264**	**194**	**149**	**149**
z	1.95	1.95	1.95	1.95	1.9
p	50.0%	50.0%	50.0%	50.0%	85.0%
c	5.0%	6.0%	7.0%	8.0%	5.6%
Pop	2,147,585	2,147,585	2,147,585	2,147,585	2,147,585
ss_{new}	**380**	**264**	**194**	**149**	**149**

A period of approximately two weeks for residential and two to three weeks for other respondent groups were allocated to execute the physical surveying.

A further one week was allowed for data enumeration and processing as well as the drafting of the report for stakeholder interaction. Subsequently one to two weeks was allowed for stakeholder feedback and finalization of the report. Within the framework of the eight weeks allowed, this planning would afford a two week contingency.

The actual execution of the project was as follows:

- Project inception was concluded over a two week period; with
- Survey preparation starting concurrently and taking some three weeks (including the submission of a report outline for approval);
- The actual execution, specifically of the residential survey was done over six weeks, though about 75% of all these surveys were completed in the first two to three weeks;
- Other respondent surveys were run concurrently for six weeks, with virtually zero responses initially and only slowly trickling through thereafter;
- The data enumeration, including drafting of detailed draft report required a concurrent three weeks;
- Stakeholder interaction preparation and execution required another two weeks, including pre-approval of presentation information by the client;
- Final total time span: 14 weeks from inception to project presentation. Thereafter another 4 weeks were allowed for stakeholder feedback and incorporation of stakeholder interaction information in final report.

3.4. Questionnaire compilation

With the assessment points as provided in the Terms of Reference, the following survey structure was devised, in close cooperation with the client:

Table 2. Survey matrix for meeting client objectives

Goal	Focus / questions
Energy demand, consumption and expenditure of different building categories i.e residential and non-residential;	Respondent electricity bills, and general usage patterns
The level of awareness and adoption of EE practices and technologies in the building categories;	Respondent awareness of terminology, awareness of alternatives to 'conventional' approaches and awareness of efficiency ratings
The level of market penetration of EE technologies and practices in buildings;	Assess respondent's implementation and use of EE alternative methods and equipment
The level of awareness and use of building rating tools and standards; and	Determine use of tools such as energy audits and awareness / use of available standards in planning
Potential barriers to EE penetration and possible means to address the barriers,	By analysis of the survey data, evaluation of inceidental information and desktop studies, evaluate the issues and compile various proposals

The following key concepts were obtained through research and used as guidelines in the construction of the survey questionnaires:

3.4.1. It was assumed that the survey would involve the negotiation of concepts and terms with respondents who might not know what was meant by a term or a question, but who might have felt pressured by the situation to comply. It was recognized that this could result in conflicting data which is difficult to interpret.

3.4.2. Questionnaires generally comprise a combination of open and closed questions, providing balance between depth and authenticity of information, and fixed-option data which are more easily quantifiable. Each type has advantages:

- for research exploring feelings, attitudes or types of behaviour; and where resources are plentiful, **open-ended questions** are preferable;
- for demographic or performance data, and where time, subject or topic sensitivity, objectivity and ease of scoring and analysis are important, **closed questions** are more practicable;

The second option was chosen as the main (not exclusive) mode of survey compilation. Another benefit of this specific method is that it significantly reduced the survey interview-time which was identified as a key issue amongst respondents. An unexpected drawback found during especially the provision of questionnaires for self-surveys was the physical size of the document (having to contain the written listings of all multiple choice questions) causing psychological resistance amongst respondents.

3.4.3. Within the **closed question** range, there are a number of response options, from the simple Yes / No choices, scale / rating type questions or checklists, offering a range of options for selection.

3.4.4. Factor analysis was also employed in a limited extent – by asking non-energy related questions, it was hoped to establish trends and correlation with regard usage patterns and socio-economic levels.

3.4.5. It was recognized that it is highly important that simple language be used on the documents in order to convey the meaning of all questions and statements clearly. Questions were structured to be easy to read, unambiguous and clearly relevant to the subject under investigation.

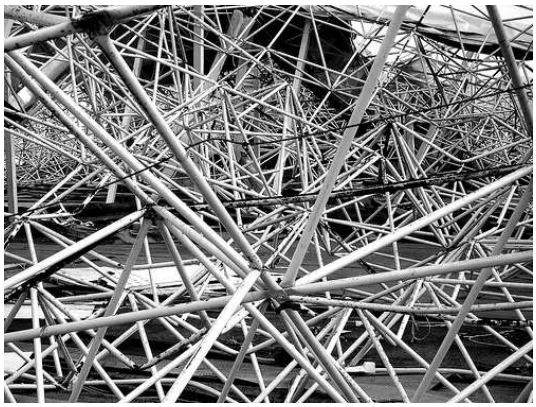


Figure 2. Complexity in the survey questionnaires (and answers) is to be avoided

3.4.6. It was recognized that the questionnaire should create a feeling of importance in the respondent, a feeling that the research is relevant, and that cooperation is vital to facilitate their unreserved cooperation. It was however realized during the survey that the challenge was actually coming to the point of being able to present the questionnaire to respondents.

3.4.7. It was recognized that the questionnaire should not be too long, too complex, or too confusingly varied in format; however it was only fully realized during the execution of the survey what the general 'resistance levels' were.

Please refer to Appendix D for the detailed questionnaires.

3.5. Execution / data collection

It was realized that during the execution of the data collection that the allocated time frame would be too short to gather significant statistical data. It may be of interest to note that the greatest challenges in this regard were presented by the smaller respondent groups such as retailers etc., who exhibited extremely long response times. More information is put forward in the Lessons Learnt section (0) of this report. The project had originally been delayed by administrative matters and the program was adjusted accordingly. However, given the foregoing, an extension of time was requested and granted by the client for an additional two to three weeks to complete the surveys which required more than double the amount of anticipated time to execute.

The survey was executed as detailed in the planning in the previous sections, barring the mentioned delays. The general response amongst the larger, single respondents (companies) was that they all were extremely busy and could not assign or delegate the task of participating in the survey. A portion of the corporate respondents requested more advanced notice, though notice was generally served on the order of one to two weeks.

Tele-surveys were attempted to increase the speed of surveying but abandoned due to refusal of respondents.

Data was collected from entities such as the City of Windhoek, REDs, commercial banks, NHE and others whose operations span over large areas and many persons. In general, this data collection process was much less successful than the general population survey with very low response rates.

Due to the possible presence of sensitive data and due to the volume of data, no raw or enumerated data will be included with this report.

3.6. Data processing

With the time constraints mentioned before, coupled with the compact budget, the survey could not be executed as an exhaustive one (covering all or most of the natural persons in Namibia, or even covering most of the human settlements). The survey was therefore structured for an optimal statistical approach and standard statistical [survey] tools were used to analyse data, determine trends and draw conclusions.

Specifically, the analyses were made using the standard Sample Size formula (refer to Appendix B).

The outcome, including statistical bases for decision making is discussed in more detail below.

3.7. Desktop research

All survey information was enumerated on Microsoft Excel and processed within the same program. Data was correlated and group according to various factors to determine trends and also to apply factor analysis.

All other works referenced in the compilation of this report are disclosed in Section 9; literature studies only formed a very small part of this report.

3.8. Stakeholder interaction

The stakeholder interaction yielded important suggestions on recommended alterations to future surveys as well as recommendations for the way forward. The stakeholder interaction relevant to this report is detailed in Appendix C.

4. Survey results – Residential survey

4.1. Factor analysis

The following statistical information was obtained as part of the survey planning[1]:

Namibia Gini coefficient: 70.7

South Africa Gini coefficient: 65

World average Gini coefficient: 62.1

[*The Gini coefficient is a measure of the inequality of a distribution, a value of 0 expressing total equality and a value of 1 maximal inequality; specifically in this case as it applies to income distributions. It was expected that this very high rate would be apparent in the survey statistics, and it was expected to be coupled to issues such as education and [energy] awareness – or even access to energy.*]

With Namibia's high Gini coefficient taken into account, as well as the great size of the country and low population density, the disparity so created makes it difficult to conduct factor analysis based on certain demographic factors. An example of such a demographic factor is *population density*: urban low-income groups tend to live in high densities, the same as the working / middle class in certain cases; while the rural low-income groups are often greatly dispersed on large pieces of low-value land. Optimally, for this kind of analysis, it is recommended that additional factors, such as income levels also be queried to assist with unambiguous subdivision of the sample.

4.2. Data set size

The final tally of respondents is as follows (total number of surveys submitted to respondents, in brackets, is approximate only; percentage shown indicates successful response rate for group, for respondents who received survey forms):

Residential 195 (204; 95.6%)

Windhoek 120

Oshakati / Ongwediva 38

Keetmanshoop 17

Okahandja 13

Rehoboth 3

Rural / peri-urban 3

Swakopmund 1

Retailers 14 (28; 50%)

Real estate 4 (10; 40%)

Architects 4 (15; 27%)

Manufacturers 3 (10; 30%)

[1] CIA World Fact Book

Financial institutions 1 (7; 14%)

Specifiers / operators / developers 1 (18; 5.5%)

It is stated that the bias for the current residential survey is towards the urban / peri-urban demographic, which was deemed acceptable given the levels of urbanization in Namibia (estimated at 38% in 2010), coupled with the relatively large impact of urban load centres[2]. The low response rates, especially from non-residential respondents is ascribed to a number of factors, such as timing (busy time of the year), coordination (some complaints received from respondents with regard to duplication of effort) and general disinterest (there was a perception that the survey project was unimportant – please refer to this report's suggestion for prior marketing campaigns).

Given the size of the data set, the inferred parameters of the survey are as follows:

Confidence level: **95%**

Confidence interval: **7%** (assuming a same-answer response rate of 50%; which is the worst case)

[2] According to statistics provided by the Namibian REDs / ECB:

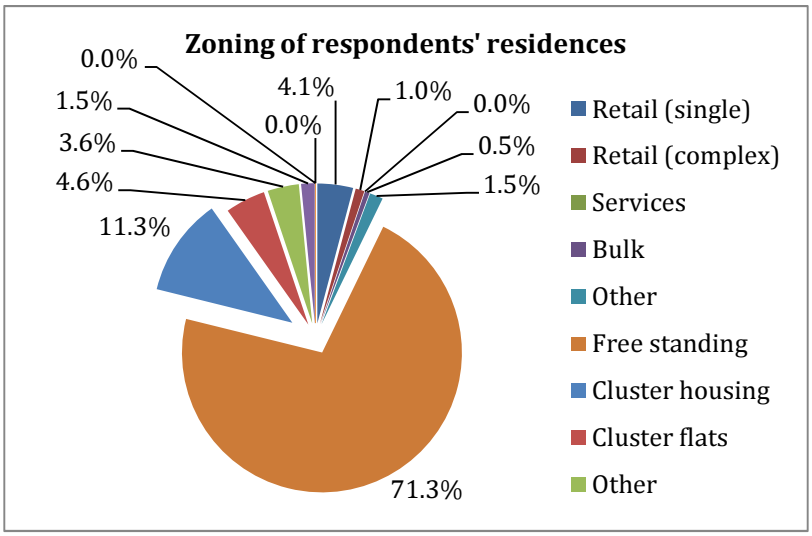
Supply authority	Residential MWh	All MWh	Residential %
Northern RED (NORED)	117,366	245,424	48%
Oshakati Premier Electric (OPE)	16,838	53,512	31%
Central-Northern RED (CENORED)	40,239	148,914	27%
Erongo RED	153,881	392,390	39%
Windhoek	328,892	748,184	44%
Mariental	7,504	23,387	32%
Total	**664,720**	1,611,811	**41%**

The numerical and statistical analyses of the residential surveys yielded the following results.

Please note that the percentages indicated on graphs are with reference to the entire sample – unless stated otherwise for specific cases: where percentages do not tally to the full 100%, the remainder constitute invalid or non-responses. The "RR" term in the question headings indicates the Response Rate for the specific question (i.e. number of answers received as a % of total number of respondents)

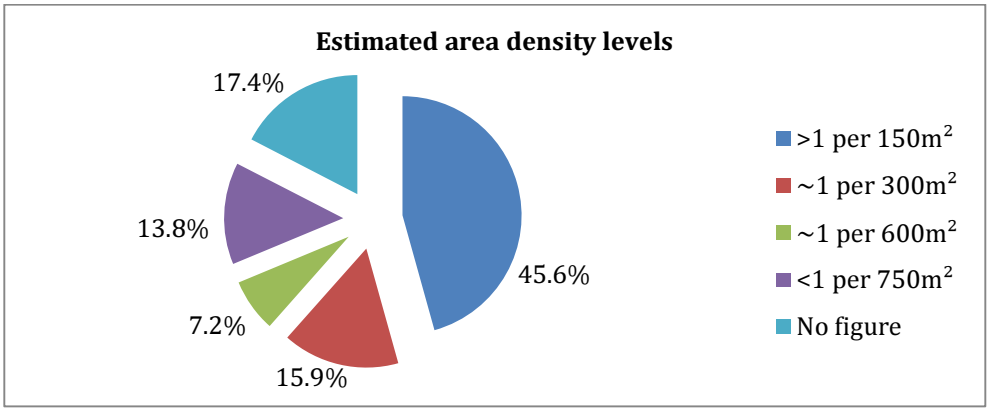
4.3. Basic analysis of residential survey data set, for selected questions

4.3.1. Where do you live? (Percentages shown are relative to ALL property types combined) **RR: 99%**



The results indicating small percentages of respondents residing in areas that are zoned for non-residential purposes is not deemed to be anomalous – there are numerous cases of mixed-use developments and owners living at their place of business. Non-responses are not shown here, being <0.6%. The overriding majority of respondents were resident in free standing properties, in normal residential areas.

4.3.2. Estimated density level of area where respondents reside: **RR: 83%**

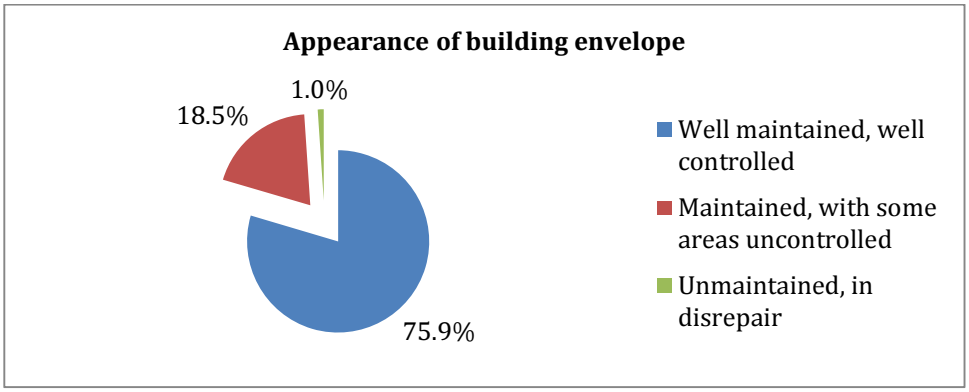


The 17.4% non-response rate attributed to the lack of understanding regarding the meaning of concept of density.

The figures in this graph would suggest a relatively representative distribution in the demographics of the sample: The majority being relatively high density and reducing

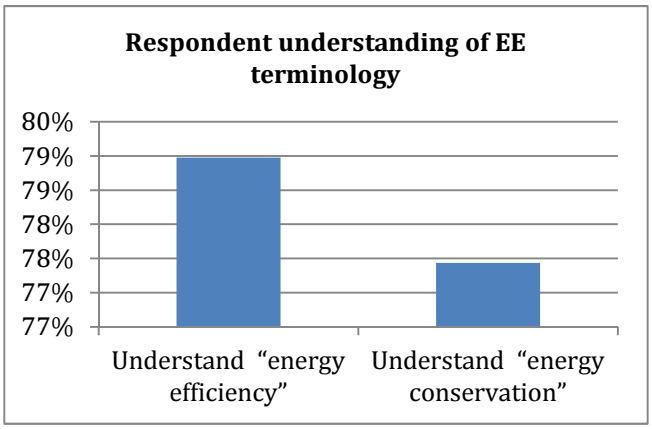
numbers with decreasing density. This argument applies to urban areas, which in this case were the largest sources of respondents. The high non-response rate creates large amount of uncertainty however. A larger bias towards the higher densities would have been desirable.

4.3.3. Appearance of building envelope: RR: 95%



The optimistic results of this question are in doubt and may indicate some oversight on the part of the surveyors and / or overzealousness on the part of the respondents. The question could have been framed with clearer parameters for evaluation. Even though the great majority of surveyed buildings are well maintained the buildings that are deemed to less-well maintained are of such a proportion to warrant further investigation.

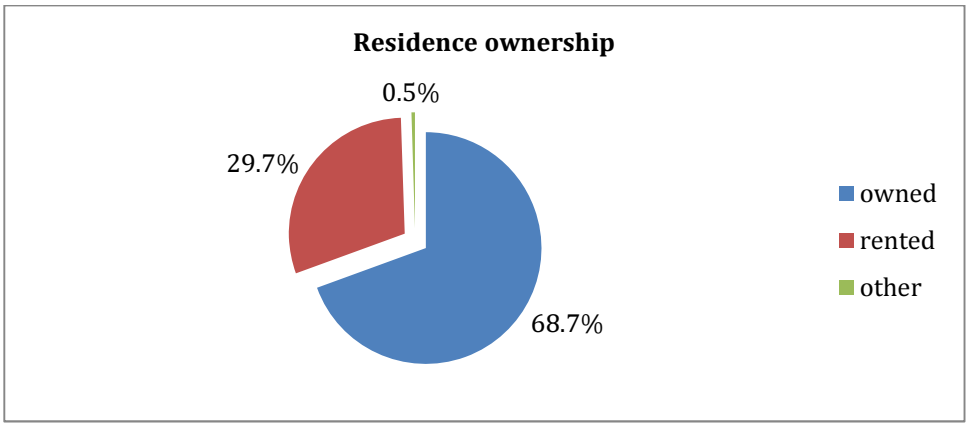
4.3.4. Understanding of energy efficiency and energy conservation: RR: 100%



The results to these questions surprisingly indicate a generally high penetration of these energy concepts in the market. Given the high percentages, a strong recommendation would be to follow this question up with a [set of] discriminatory question(s) to determine whether there might be a conflict in understanding with related concepts such as renewable energy. Additionally, it is recommended that future surveys should offer multiple choice answers to test understanding as opposed to the yes/no answers offered in this survey. Broken down by respondent location, the following was seen:

National averages, with reference to understanding EE and EC:	EE: **79%**, EC: **78%**
In Windhoek the level of understanding was higher than average:	EE: **82%**, EC: **79%**
In Oshakati/Ongwediva the statistic was skewed and lower:	EE: **68%**, EC: **74%**
Okahandja apparently had very high levels of understanding:	EE: **100%**, EC: **100%**
Keetmanshoop had much lower levels of understanding:	EE: **53%**, EC: **47%**

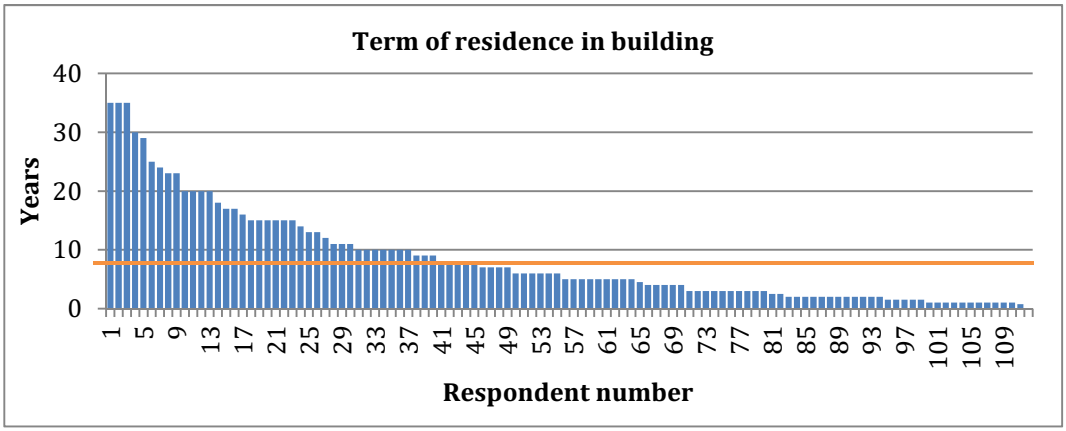
4.3.5. Ownership: RR: 85%



High ownership values bode well for the promotion of energy efficiency since there is vested interest from the beneficiaries. This statistic might become highly skewed in certain urban areas where there are large concentrations of rental units.

4.3.6. Term of residence in building: RR: 63%

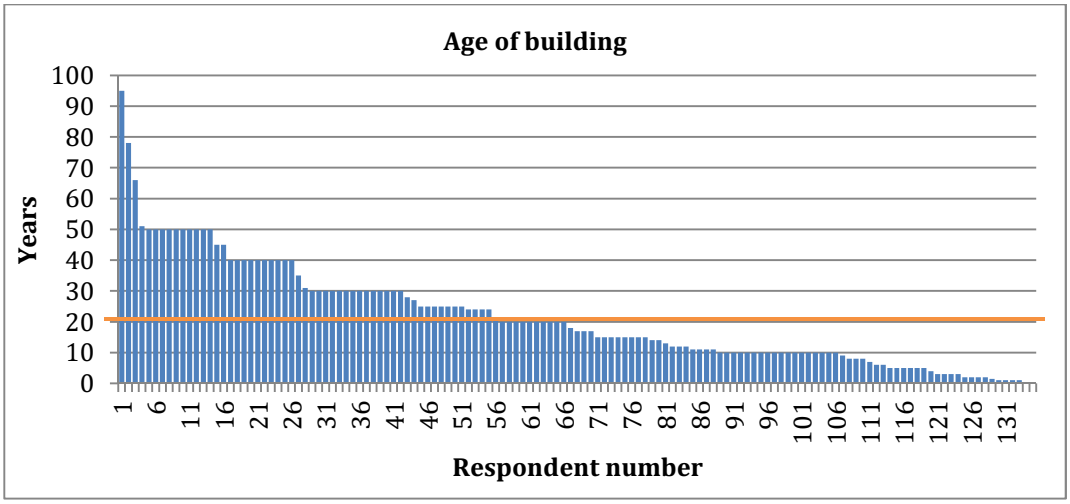
Average value: 8.3 years (median value is 5-6 years); highest value: 35 years, lowest 0.1 years; spoilt & non-response entries: ±40%. These results tend to indicate relatively stable, medium-term occupation rates amongst respondents. In the chart below the survey data is represented by the blue bars (data sorted according to time span, arranged from highest to lowest; average span shown by red line).



Again, the high non-response / spoilage rate makes trending uncertain, but the ordered data set shows the approximately 57% of respondents in the group who answered have remained in the same residence for at least 5 years. This offers a planning horizon in terms of promoting technologies in terms of their pay-back periods. Technologies will be most successfully promoted if their payback periods are on the order of 5 years, apart from any other factors.

4.3.7. How old is the building (that you are living in)? RR: 70%

Average value: 21.6 years (median value is 20 years); highest value: 95 years, lowest 0 years (brand new); spoilt & non-response entries: ±30%. Over 79% of the buildings surveyed (where respondents answered the question) are older than 10 years. In the chart below the survey data is represented by the blue bars (data sorted according to time span, arranged from highest to lowest; average span shown by red line).



The average building is quite old by modern standards, but given local predisposition to the use of bricks and concrete in construction, buildings would expected stand well beyond the 50 year mark. Apart from cases where retrofits were made, it could be assumed that most of these buildings would have scope for improvement in terms of energy efficiency.

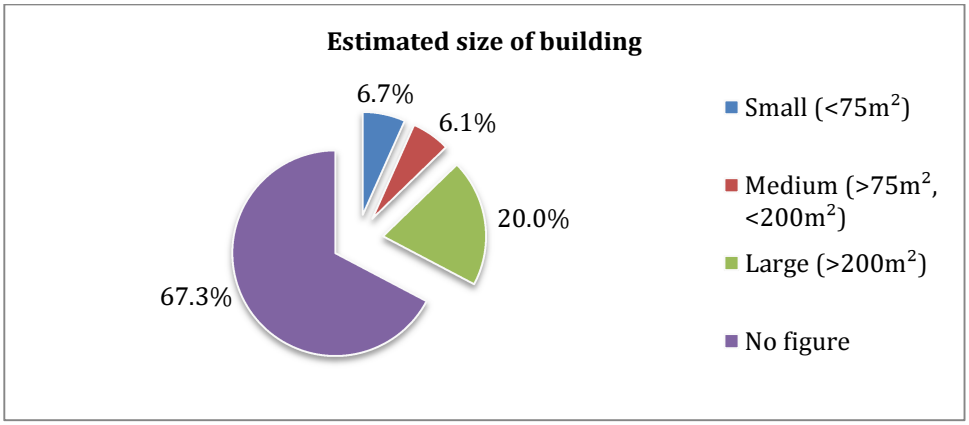
4.3.8. When will you next renovate / expand / move? RR: 15%

The apparent low response rate limited the question's statistical usefulness. It could be assumed that only 15% of respondents are considering any renovation in the following 6 months, and the remaining 85% are not. The averaged date was 2012, with some horizons set as far as 2016; a number were reported to be 'in progress'.

4.3.9. When was the building last renovated? RR: 27%

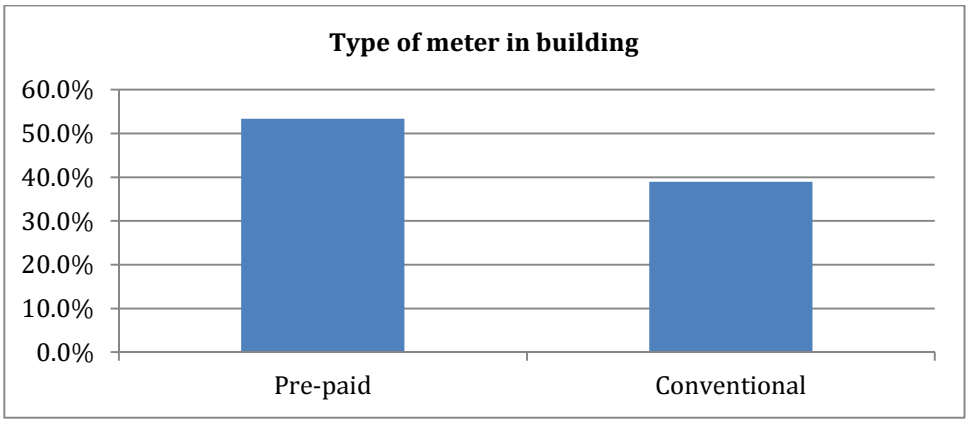
The low response rate limited the question's statistical usefulness. The averaged date over known responses was 2006.

4.3.10. Size of building / unit: RR: 35%



The low response rate made trending (as well as factor analysis with regard to relative income levels as determined from building size) impractical. It may be that the respondents felt that this question was a duplication of the previous building density question. (This question is in fact one of two related to the size of the property / building, however, the other question also only had a ±50% response rate and a number of apparent flaws in the recorded numbers, hence its non-use in this report).

4.3.11. Type of meter in dwelling: **RR: 72%**



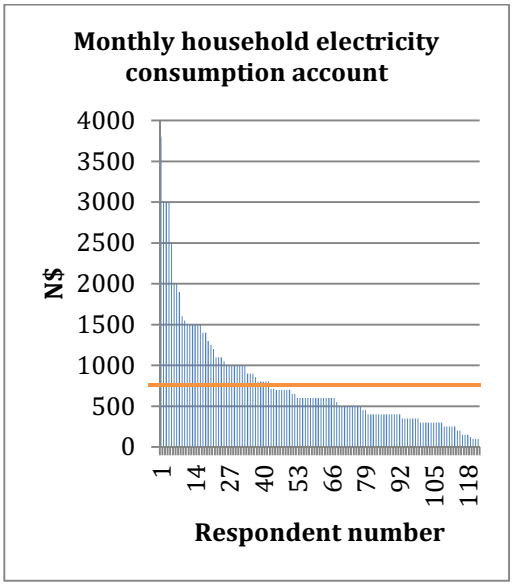
The non-responses possibly indicate the absence / non-use of electricity in the dwellings [for a portion of the non-responses].

4.3.12. Average monthly electricity bill: **RR: 84% average**

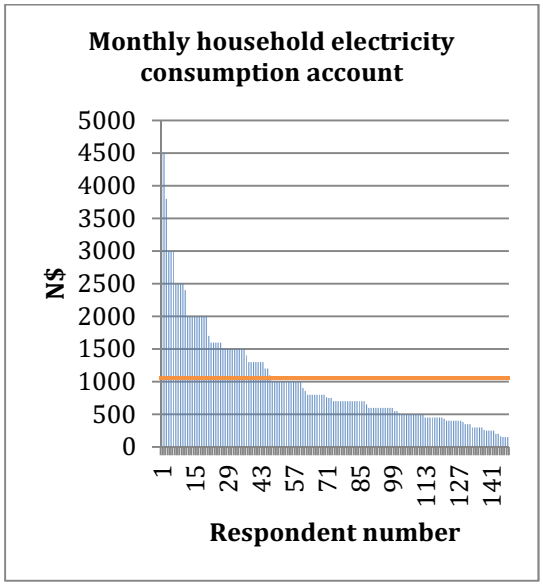
For 8.2% of respondents, their electricity bill is paid by the building owner / landlord.

The average summer and winter electricity bills across all respondents are: N$774 (median is N$600) and N$1013 (median is N$800) respectively. Highest value was N$4,500 (for a NamPower bulk farm connection point) and the lowest value N$100. Spoilt & non-response entries: 25% to 42% - possibly less taking into account that some respondents, though certainly a minority, may not have access to electricity. An additional discrepancy detected post-survey was the strong possibility that certain respondents may have provided the cost of their entire municipal bill (all rates and taxes included) instead of only the electricity bill, as queried.

Summer electricity bills for all respondents



Winter electricity bills for all respondents



In the charts above, the survey data is represented by the blue bars (data sorted according to time span, arranged from highest to lowest; average span shown by red line). The distributions are as expected, though the general expenditures appear to be quite high. The high non-response / spoilage rate (±30% average) on this question makes trending

uncertain. The graphs again seem to mirror the socio-economic demographic in Namibia, with a small number of high expenditure and a large number of lower expenditure, though this may also be artificial, since no efforts were made to balance the respondent demographic makup.

4.3.13. Average monthly spending on other energy sources (in the residence): RR: 25%

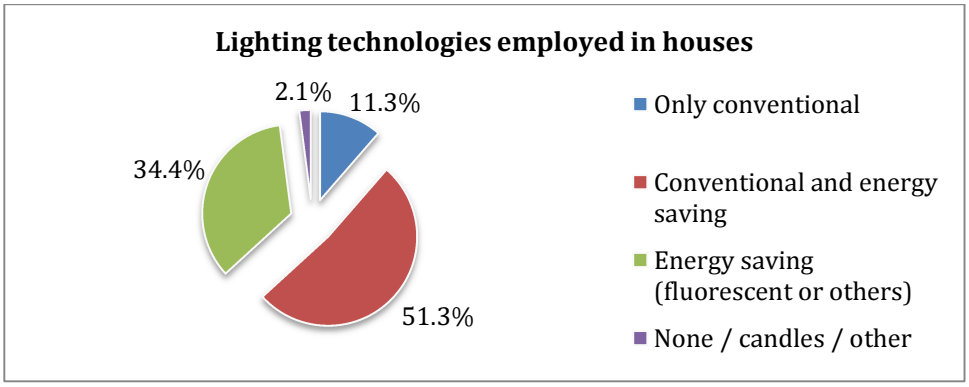
The low response rate is attributed to the expectation that [in the urban Namibia context] a smaller portion of the population will be using alternative energy sources – the low statistic does complicate analysis however. For 4.6% of all respondents, their energy bill for other energy sources is paid by the building owner / landlord. Approximately 10.5% of all respondents reported using alternative energy sources (to electricity). The average summer and winter energy bills across all respondents are: N$196 and N$272 respectively. Highest value was N$1,250 and the lowest value N$50. Non-response entries: 85% - though for this specific question this mostly indicates non-use of alternative energy sources.

10.8% of all respondents (i.e. 72% of those that responded to this question / section) disclosed the nature of their alternative energy sources as: Wood, gas and coal (assumed to be charcoal). One respondent made mention of an electricity generator in use.

4.3.14. Would you be willing to pay higher rent if your energy bill could be lower? RR: 64%

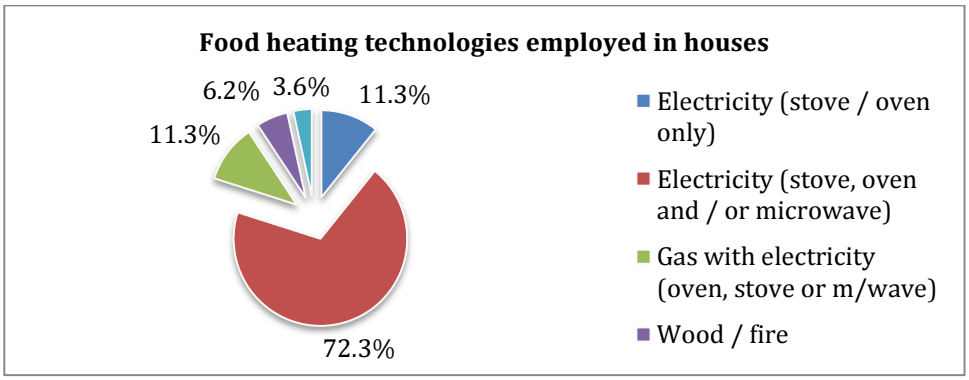
Only 8% of the total number of respondents (or 12% of those who actually answered the question) stated a willingness to pay higher rent for reduced energy costs. This creates a barrier to owner investment.

4.3.15. What kind of light bulbs are used in the dwelling? RR: 98%



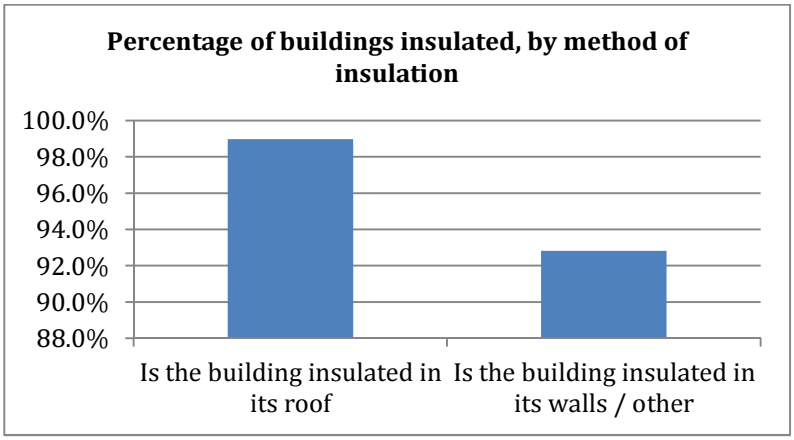
Apparently energy saving lighting technologies have made significant inroads in the local market. General discussions with respondents still indicated some resistance to especially compact fluorescent lamps due to (a) high costs (it was noted by respondents that they were aware of lower-quality, cheap brands on the market) and (b) perceived health risks based on on-going bad publicity regarding their mercury content.

4.3.16. How is food heated? RR: 105%



The responses rate for this question indicated a misunderstanding of the question structure. In future surveys, this question should be restructured to avoid ambiguity. Still, it is strongly evident that the majority of respondents use conventional electrical stove / ovens in conjunction with microwave ovens. Further questions that could be asked, should relate to how these devices are used.

4.3.17. Is the building insulated? RR: 97%



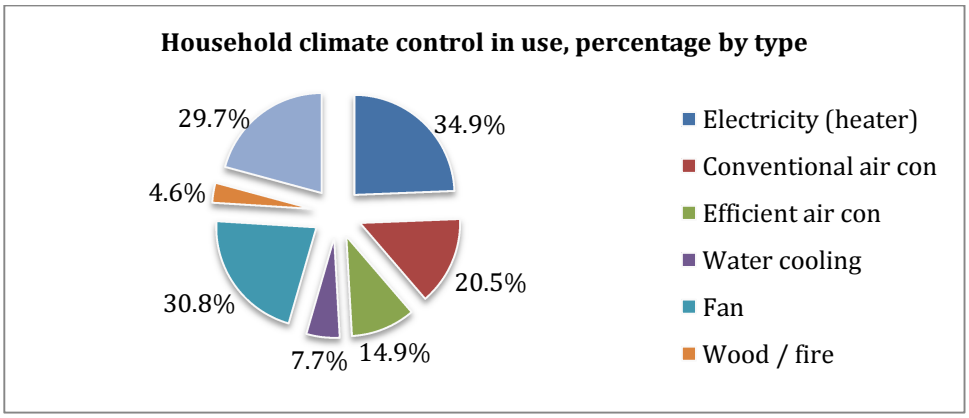
The strongly positive responses for this question are surprising and further investigation is recommended [during future surveys]. It has to be borne in mind that in the local context, the use of [normal, gypsum board] ceilings and block construction (hollow bricks) are deemed to be forms of insulation. Future surveys should disambiguate the question by posing detailed multiple-choice question(s).

4.3.18. How are rooms heated or cooled? RR: 143%

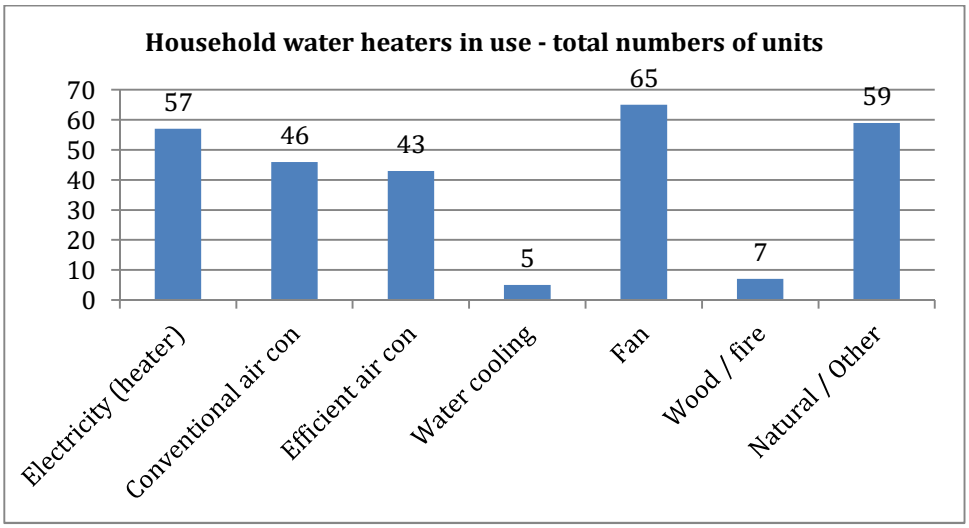
The responses rate for this question (for all subsections) indicated that a number of respondents were making use of multiple technologies in the same residence. The following graph indicates the percentages of respondents (of all respondents) who have *at least one* device installed of the type stated.

The graphs below indicate a prevalence of electrical heaters, most likely due to their low cost. With Namibia's generally warm weather, these devices are however likely only to be used for a limited number of days per year. Fans and natural / other cooling methods are also prevalent. It is interesting to note the high number of air conditioners in use compared to the very low number of water coolers.

The graph below depicts the *percentages of respondents* using each technology:



The graph below depicts the total number of units installed amongst all respondents, by technology:

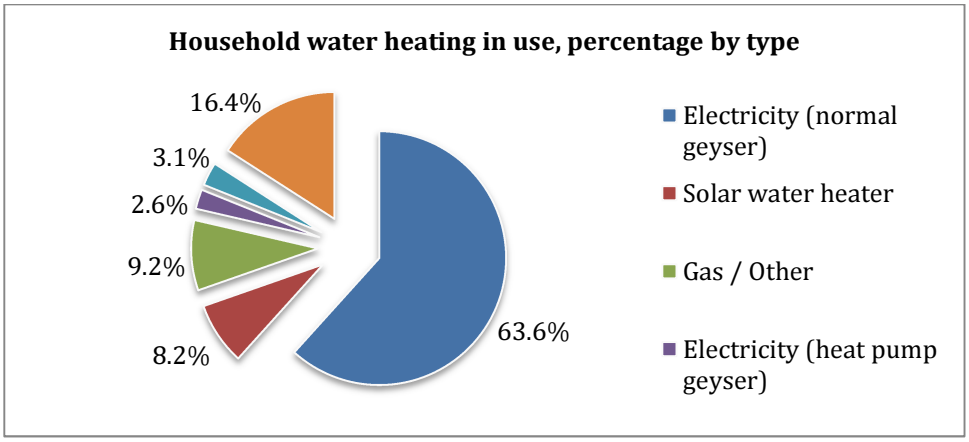


4.3.19. How is the household water heated? **RR: 103%**

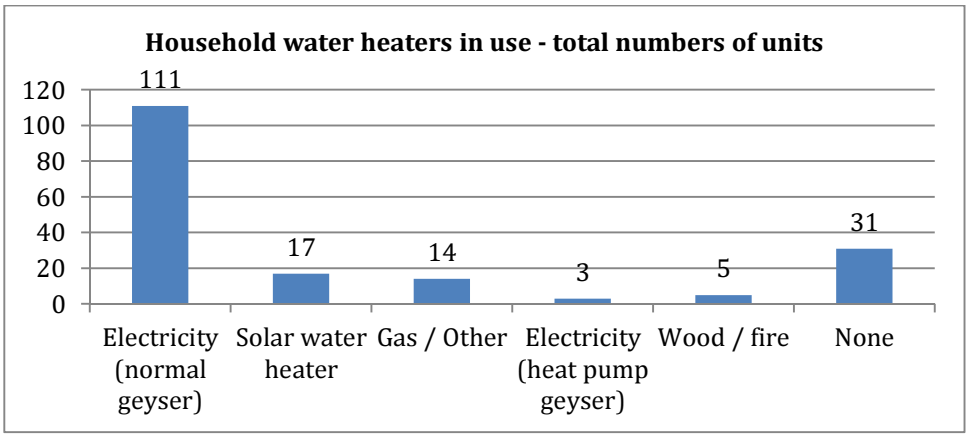
The total responses rate for this question indicated that a number of respondents were making use of multiple water heating *technologies* in the same residence, while it must be noted that 19.4% report not making use of any water heating technology. The following graph indicates the percentages of respondents (of all respondents) who have *at least one* device installed of the type stated.

The indications are that there remains great scope for the retrofitting / replacement of electrical water heaters used by the majority of the population to increase energy efficiency / savings.

The graph below depicts the *percentages of respondents* using each technology:



The graph below depicts the total number of units installed amongst all respondents, by technology:



4.3.20. Are you planning new household equipment purchases? **RR: 95%**

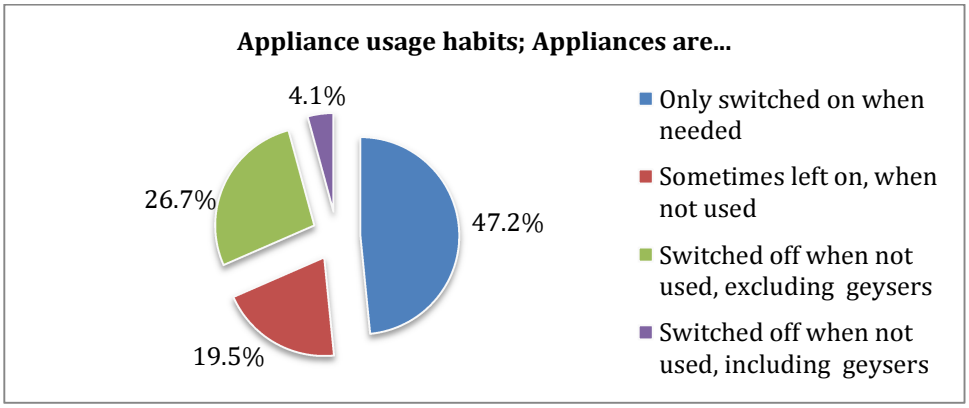
Only 17% of respondents stated that they were in process to purchase new household equipment (within the following six months).

The following were stated as prospective purchase items:

Item	Number of respondents purchasing
Air conditioner	1
Evaporative cooler	2
Gas/Electric stove	**1**
Hot Iron	1
Micro-wave	5
PC	1
PVR decoder	1
Refrigerator	5
Solar water heater	**7**
Stove (electric)	**6**
TV	5
Various appliances	2
Washing Machine	4

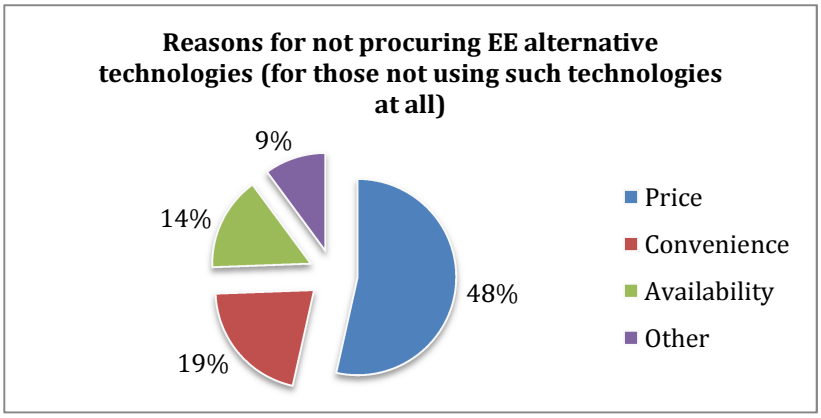
4.3.21. How are appliances used? **RR: 97.4%**

It should be noted that there was an overlap on the first and last two answers creating an ambiguity. Verification of the data set however indicated that respondents only selected single options (correctly, as opposed to selecting two responses).



4.3.22. Where respondents are not using EE technologies at all: Are you aware of energy saving alternative technologies? **RR: 80%**

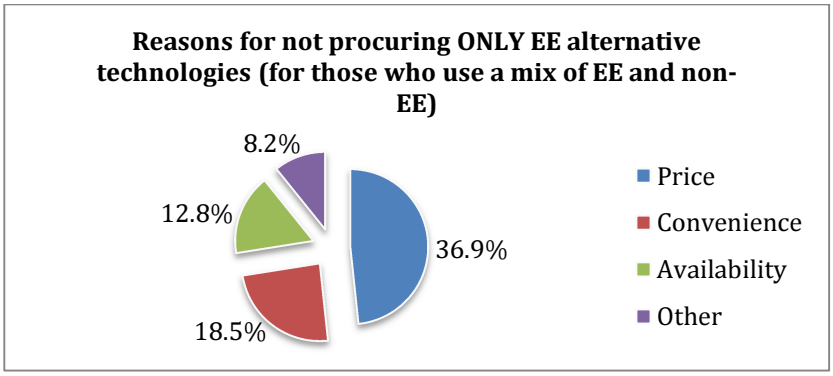
74% of all respondents (only those respondents who were not using any alternative / EE technologies, to the best of their knowledge were required to respond), indicated that they were aware of energy saving alternatives. The following reasons depicted on the graph were given for non-use of EE (note that **expressed percentages are of those responding to this set of questions only**, not the whole sample):



4.3.23. Where a mix of EE and conventional devices are used, reason for not buying / using only efficient alternatives? **RR: 76.4%**

The high response rate on this question indicated an overlap with the question above. It is assumed that the respondents felt obliged [incorrectly] to answer both questions.

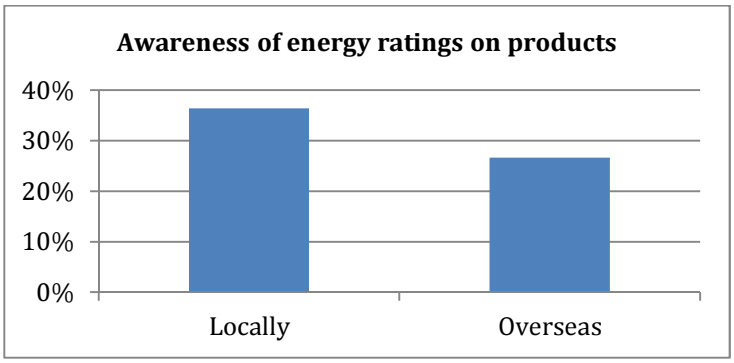
The following reasons depicted on the graph were given for non-exclusive use of EE (note that **expressed percentages are of those responding to this set of questions only**, not the whole sample):



In the foregoing two questions, price is strongly identified as a barrier to ownership / use of EE technologies.

4.3.24. Are you aware of efficiency ratings on products? RR: 97% & 92%

The respondents indicated their awareness of efficiency ratings / labelling on products as follows (respective response rates shown above):



Labelling of energy products in Namibia is not mandatory and, based on the responses received, not common place. The responses received, especially given the low awareness of product ratings in foreign countries (where it generally is a well-publicized issue), seem to indicate some respondent 'compliance' (to match surveyor 'expectations') and so may be compromised. Alternatively, it could simply mean that respondents are familiar with product 'boiler plate' labels indicating product specification. This question could benefit from disambiguation in future surveys.

National averages, with reference to awareness of product labelling: Loc: 36%, O/s: 27%

In Windhoek the level of understanding was higher than average: Loc: 38%, O/s: 33%

In Oshakati/Ongwediva the statistic was skewed: Loc: 50%, O/s: 24%

Okahandja – local awareness levels seem more realistic: Loc: 15%, O/s: 18%

Keetmanshoop had less awareness (figures seem more realistic): Loc: 6%, O/s: 0%

4.3.25. Do you consider energy efficiency of products when making purchases? RR: 93%

This question had a 93.3% response rate. Of the whole sample, 63% indicated that energy efficiency considerations carried some weight during energy product procurement considerations.

National averages, with reference to considering EE when purchasing: EE considered: 63%,

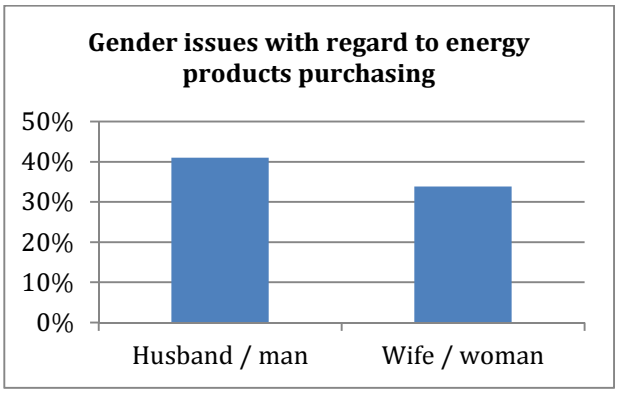
In Windhoek the level consideration was close to the national average: EE considered: 64%

In Oshakati/Ongwediva the statistic was lower: EE considered: 47%

Okahandja apparently had high levels consideration: EE considered: 85%

Keetmanshoop also had high levels consideration: EE considered: 71%

4.3.26. Who is mostly responsible for such purchases? RR: 84%



From incidental conversations during interviews it came to light that the general view was that the husband / man in the household would be responsible for the procurement of [fixed or high consumption] equipment to be fitted in the house. This question could also benefit from some disambiguation in future surveys by discriminating between the different types of energy products procured.

4.3.27. Do you think that you would buy energy efficient products if you had clear information regarding benefits? RR: 99%

92% of the sample indicated a willingness to purchase EE products, given sufficient information.

National averages, with reference to inclination to purchase: 92%

In Windhoek the willingness to change consumption patterns, were: 95%

Oshakati/Ongwediva respondents were less likely to purchase EE products: 79%

Okahandja respondents appeared to be highly compliant: 100%

In Keetmanshoop, respondents were less likely to purchase EE products: 88%

4.3.28. ...Even if those products were more expensive than other products? RR: 97%

71% of the sample indicated a willingness to purchase EE products, if it was more expensive than conventional alternatives. Given the previously recorded indications of price being a prime barrier (for 36-47% of the sample), it may be that the 71% figure could contain some respondent 'compliance'; or it may actually strengthen the case for relevant accurate information dissemination as a barrier remover.

4.3.29. Do you believe that being energy efficiency would lower your energy costs? RR: 98% & 63%

96% of the sample indicated that they understood that being energy efficient would lower their energy costs.

However, only 63% responded to the follow-up question of how much they would expect to save. The average expected savings were indicated to be 25%, for those who estimated a percentage-based saving, or N$227, for those who estimated a cash value, per month (which is between 20 and 35% of respondent average monthly electricity bills).

National averages, with reference to believing the EE can reduce costs and by how much:	EE: 96%, N$: -25%
Windhoek respondents were more conservative regarding savings:	EE: 95%, N$: -21%
In Oshakati/Ongwediva there is a strong and optimistic notion of possible savings in using EE:	EE: 97%, N$: -38%
Okahandja respondents were conservative regarding savings:	EE: 100%, N$: -26%
Keetmanshoop respondents were very conservative regarding savings:	EE: 94%, N$: -15%

4.3.30. How energy efficient do you think your building is (1, least to 5, most)? RR: 93%

Respondents indicated an average efficiency rating of 2.78 out of 5 (5 being most efficient). The trend seems to indicate that Namibians in general believe there is some room for improvement with regard to their dweillings' energy efficiency.

4.3.31. Do you believe that improved energy efficiency would be to your benefit as owner? RR: 98%

98% of the respondents indicated in the affirmative.

National averages, with reference to respondents' belief in EE:	98%
Windhoek respondents' view is close to the national average:	96%
In Oshakati/Ongwediva, respondents were highly confident in EE benefits:	100%
Okahandja respondents were also highly confident in EE benefits:	100%
Keetmanshoop respondents were also highly confident in EE benefits:	100%

5. Survey results – Non-residential sectors

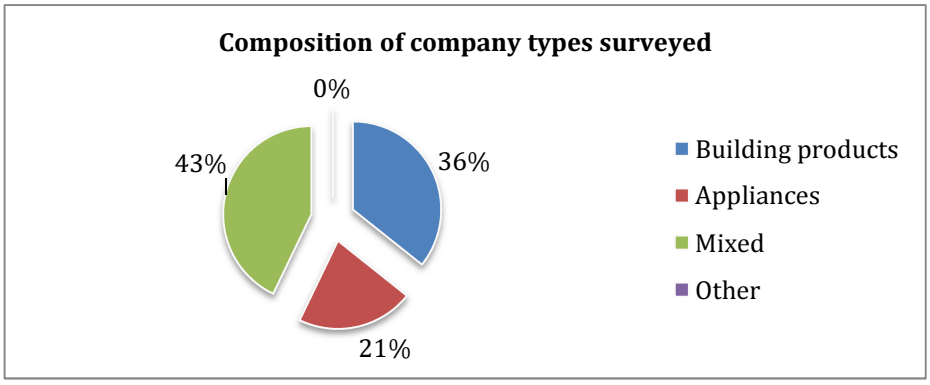
5.1. Statistical validity

Due to the small sizes of the sample groups, it would be futile to generate statistics as were done for the foregoing residential surveys. The statistics, due to the size of the groups, would be non-representative and include large margins for error and uncertainty. This section will alternatively summarize the results in terms of drawing general conclusions for benchmarking of the various industries.

Please note that the percentages indicated on graphs are with reference to the entire sample – unless stated otherwise for specific cases; where percentages do not tally to the full 100%, the remainder constitute invalid or non-responses. The "RR" term indicates the Response Rate for the specific question (i.e. number of answers received as a % of total number of respondents)

5.2. Retailers (14)

Composition of businesses interviewed:



5.2.1. Respondent building data

Most of the companies were located as single-building entities (43%), tenants in multi-unit buildings (29%) in commercial areas or in light industrial areas (21%).

The average building size was 3900m^2 (RR: 50%) which is quite large.

79% of respondents felt that their building envelopes were well maintained and controlled, while 7% felt there was some room for improvement. 79% of respondents were renting their premises and 21% indicated ownership.

In terms of building age and maintenance, respondents indicated the average building age as 13.6 years (RR: 86%), average occupancy of building 12.2 years (RR: 43%), expected renovation / relocation to occur within 3.7 years (RR: 36%) and the last time that renovations were effected as 3.7 years ago (RR: 43%).

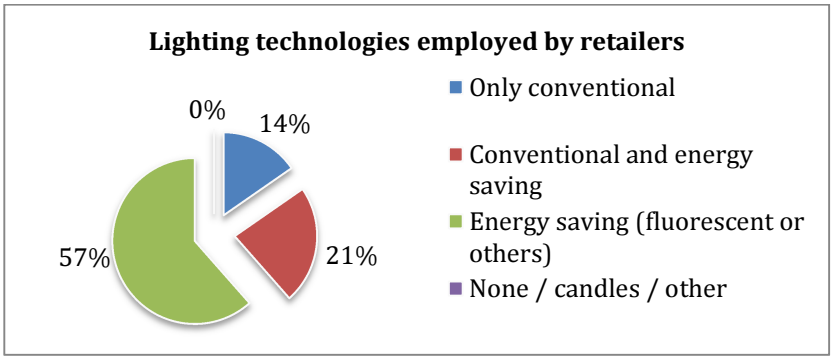
43% of respondents indicated that their buildings' walls were equipped with some form of insulation while 50% responded that their roofs were insulated.

5.2.2. Respondent electrical usage data

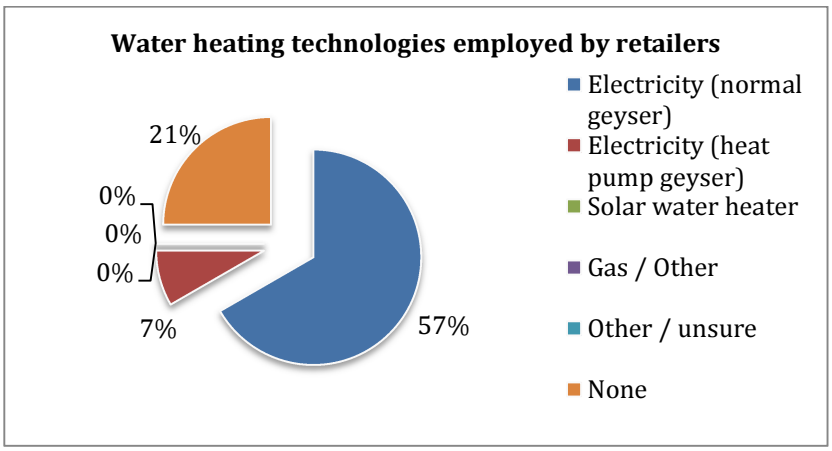
The statistic indicated that respondents were mostly (36%) being metered as part of a distributed metering system (i.e. in a multi-unit complex), due to a low response rate (RR: 57%) for the questions related to their metering installations. Other responses included central conventional meters (14%) and centralised mixed metering (7%; i.e. in a multi-unit building).

Average summer and winter electricity bills were indicated as being N$10,400 and N$10,100 respectively (RR: 50%).

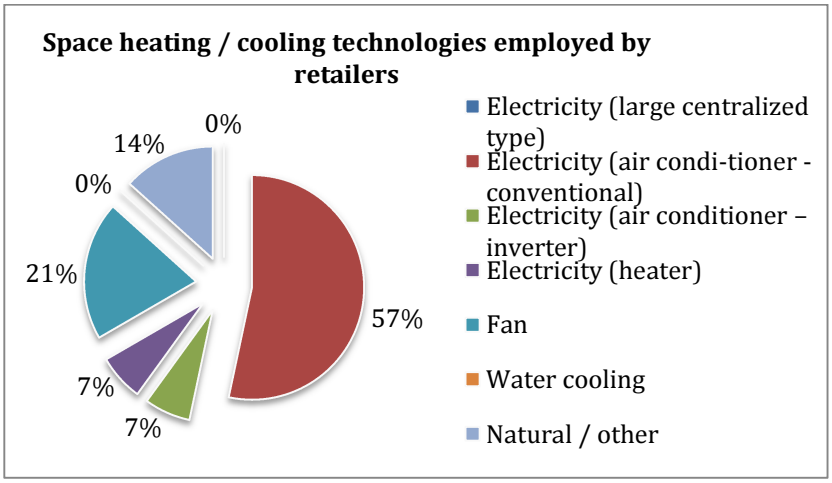
Four respondents (29%) indicated their understanding of the local authority's tariff structure with reference to their electricity bills, while five (36%) did not. (Seven were being supplied by the City of Windhoek, two by Oshakati Premier Electric and two by NamPower.)



(RR: 93%; For lighting technologies employed, as per graph above)



(RR: 86%; For water heating technologies employed, as per graph above)



(RR: 107%; For space heating & cooling technologies employed, as per graph above, indicating that certain respondents made use of multiple technologies)

Following are some pertinent questions and responses with regard to the respondents' internal energy consumption practices (RR: 100% for all questions):

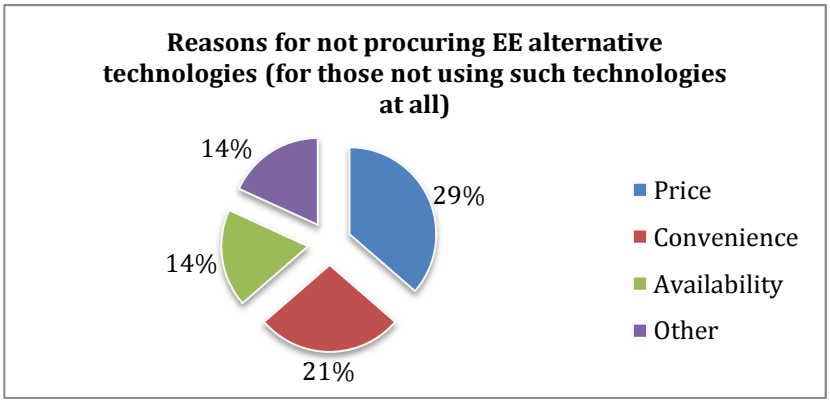
Is there a policy regulating how [efficiently] occupants use energy in the building? Yes: 43%

Is there an automatic building management system controlling the use of energy? Yes: 21%

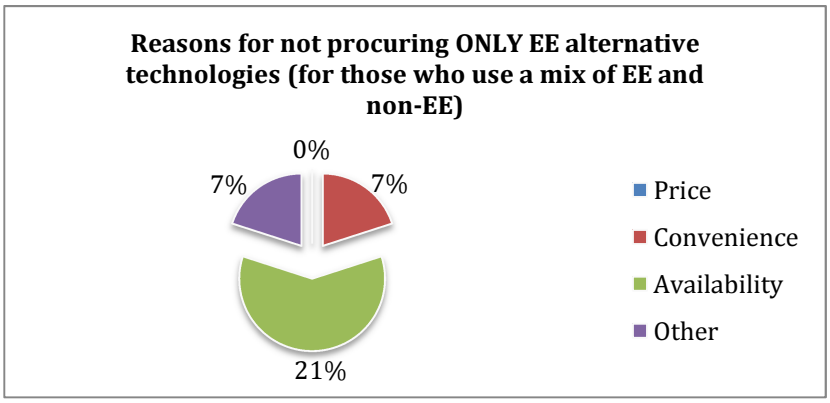
Is the building equipped with devices that consume a lot of energy (such as many computers, large industrial equipment etc.) Yes: 36%

If yes, have the efficiency of these been considered before purchase? Yes: 29%

Are you planning to acquire / specify high-consumption, equipment in the near future? Yes: 0%

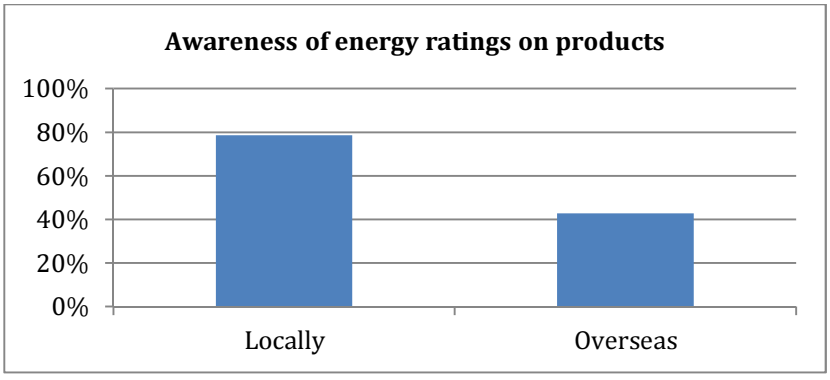


(RR: 79%; as per graph above)



(RR: 36%; as per graph above, indicating some overlap with the previous question, i.e. a very small percentage of respondents incorrectly answered both questions)

5.2.3. Respondent sales / awareness data



(RR: 100%; regarding awareness of energy ratings on products, as per graph above)

The statistics regarding energy efficiency ratings on products again seem to indicate an awareness of 'boiler plate' labelling of products (i.e. indication of their operation parameters as opposed to a specific rating based on efficiency) as was seen in the residential survey.

Following are some questions and responses with regard to the respondents' client interaction / sales policies (RR: 100% for all questions):

Would your clients be willing to pay higher sales price on products if their energy bill could be lower?	Yes: 50%
Do you advise your clients on alternative products or methods that can save energy?	Yes: 71%
Have you been advised by your service suppliers on products or methods that can save energy?	Yes: 57%
Do you feel that your organization possess sufficient capacity to accurately evaluate the benefits and costs of energy efficiency techniques and technologies?	Yes: 43%
Are you familiar with Total-Cost-of-Ownership and Lifecycle Costing concepts with respect to energy efficient products?	Yes: 21%
Do you think that you would buy / specify energy efficient products if you had clear information regarding benefits?	Yes: 86%
…even if those products were more expensive than other products?	Yes: 71%
Do you believe that being energy efficiency could lower energy costs of your clients	Yes: 71%
By how much, at most (% or N$)	Avg.: 28%
Does the company [respondent] have a policy in place regarding the energy efficiency of the products that they retail (e.g. is there a specific percentage of products?)?	Yes: 29%

The responses in general seem positive and encouraging. However, the topic(s) of the questions are hardly new and should be more entrenched with this group of respondents, given their critical nature in the EE supply chain. It is categorically stated that this respondent group could benefit significantly from some form of educational intervention.

Regarding specific, averaged sales data:

If different products performing the same functions are stocked, with some being more efficient than others, what is the ratio between the two, Efficient : Non-efficient products?	1.16 : 1
Overall, in terms of total stock value, for all stock; what is the ratio between Efficient : Non-efficient products?	1.21 : 1
Can you provide an approximate indication of sales volumes; for the ratio between Efficient : Non-efficient products?	1 : 1
Would you say that you have a broad understand and knowledge of most energy efficient / alternative (i.e. non-conventional) products on the market?	Yes: 57%

The figures above again seem encouraging, but the statistics do not match the anecdotal information collected during the surveys, whereby the general complaint from respondents were that EE technologies were still deemed to be expensive and in low demand due to this.

5.3. Real estate (4)

The real estate respondents were queried with regard to the trends in the housing [rental / procurement] market, specifically with reference to "green" building technologies, i.e. sustainable and efficient buildings.

With reference to the questions of whether there were any enquiries from the market (to the real estate agents) regarding buildings being equipped with energy efficiency technologies (such as solar water heating) and being "green" (sustainable / efficient), the indications were that such queries made up less than 10% of all queries on properties. One respondent indicated that enquiries on energy efficiency technologies included with the properties made up 50-75% of all enquiries.

When asked whether the respondents had noticed any changes in the supply availability of buildings equipped with energy efficiency devices or "green" buildings on the real estate market, the general indications were that there might be some small increases in the availability of properties that incorporate EE technologies, but that the supply of "green" buildings was unchanged (assumed to be very low).

Respondents were queried with regard to their turnover / sales volumes and the averaged values were mixed with some respondents indicated volumes in 5-10 properties per month (sold and leased) while others were handling hundreds of properties per month (at these volumes, the respondents were generally managing the rental of such properties).

Respondents' indications with regard to their expectancy of their clients' willingness to pay higher sales prices in exchange for reduced energy costs were mixed: there was some consensus that clients do want the technology, but would not necessarily be willing to pay the price premium generally attached to such properties. The general consensus was that respondents' clients would *not* be willing to pay higher rentals for reduced energy bills.

Regarding respondent awareness it was established that in general, the respondents are aware of energy efficiency and conservation issues, they are aware, to some extent, of energy efficiency rating systems and feel confident to advise their clients regarding energy efficiency devices installed on buildings. The respondents in general are not confident with compiling life-cycle costing and total-cost-of-ownership calculation but all feel confident that EE and "green" building technologies will be of benefit to their clients and should provide energy savings in the range of 20-50%. Also, respondents expressed uncertainty with regard to their ability to exhaustively evaluate "green" buildings for merit (and commensurately advise their clients).

Anecdotal information gathered, indicates that some respondents are of the opinion that the roofing designs of buildings in the Namibia are sub-optimal and could be improved to impact internal space heating / cooling.

5.4. Architects (4)

The architectural respondents generally scored themselves high in terms of knowledge of EE products and techniques (scores ranging from 6 to 9 out of a best possible 10). All indicated awareness and understanding of the energy awareness and energy conservation concepts. All respondents indicated that they discuss EE issues with their clients and encourage their clients to

contemplate these issues. All indicated that the majority of their clients (60-75%) generally have at least a passing interest in energy efficiency issues / considerations.

Asked whether the respondents could provide their clients with hard- or softcopy information detailing what energy efficiency is, why it is important and what the latest developments in the world are, the response was 50:50 (yes / no). Regarding their access to unbiased (i.e. non-product-related) information on energy efficiency technologies and techniques, the response again was a 50:50 split. All respondents indicated that they did not possess sufficient information to provide their clients with cost-benefit ratios and repayment periods of the cost differences between more efficient and older technologies.

All respondents indicated that they attempt to incorporate best-practice thermal designs in their buildings, within the limitations of their clients' allowances.

The sentiment amongst respondents, unanimously, is that current regulations and codes (an practices) are in opposition to the goals of achieving energy efficiency.

In terms of trends, all respondents were positive with regard to an improvement in institutional support (government or otherwise) of energy efficiency in the building sector / built environment in the last five years as well as an improvement in the awareness of energy efficiency issues amongst their clients.

5.5. Manufacturers (3)

5.5.1. Respondent awareness

Manufacturing respondents generally indicated high awareness and understanding of energy efficiency and energy conservation [issues]. One respondent indicated the use of innovative EE guidelines (such as energy re-use / secondary use, optimum building insulation and lighting optimisation).

The majority of respondents indicated a lack of information / awareness of [best practice] EE in building design and operation techniques and technologies.

5.5.2. Respondent building data

Respondents indicated generally well maintained building envelopes, with most owning their properties and having being resident for 8-18 years. The buildings were in the age range of 8-25 years and slated for renovation work in the following 2-4 years.

5.5.3. Respondent electrical usage data

The consumption figures for the respondents were in the range of N$1,000 to N$90,000 per month, with winter consumption figures generally 15-30% higher than summer consumption figures. Supply authorities listed included CenNoRED and City of Windhoek, with the respondents indicating clear understanding of their tariff structures across the board. One respondent indicated the use of non-electricity energy sources to the value of N$35,000-40,000 per month (again with winter consumption being higher).

The majority of respondents made use of *only* energy efficient lighting (all made use of at least some efficient lighting).

One respondent indicated no insulation being used in either the wall or the ceilings of their buildings, while the others indicated the presence of both.

All respondents made use of at least one conventional electrical geyser. All respondents made use of air conditioning in their buildings (one using a centralised type) and most also used fans for ventilation / cooling.

None of the respondents indicated the use or enforcement of EE polices. Most indicated the use of high consumption equipment that were procured subsequent to the consideration of energy use and efficient alternatives. Price is generally indicated as a barrier to the procurement of EE alternative equipment.

Respondents indicated a willingness to make capital expenditures to decrease their energy bills. Respondents indicated their requirements for capex repayment periods as 12, 24 and 36-60 months. The respondents were not asked to indicate their minimum expected IRR.

Respondents are not generally aware of product or building efficiency labelling locally or overseas, mirroring the actual situation. One respondent indicated awareness of foreign labelling systems.

The respondents generally expect that EE technologies can reduce their consumption figures, in the range of 5-50%. Respondents generally indicated a lack of proper tools to execute life-cycle costing and total-cost-of-ownership calculations and felt that they did not poses sufficient information or knowledge to accurately evaluate the benefits of EE. Most indicated however that they had been advised, to some extent by their suppliers, with regard to EE. All indicated that EE was a consideration when making purchases. All indicated a willingness to procure EE technologies and green buildings over conventional technologies, but the there was less consensus in this regard if a price-premium for the improved technology / building was included in the consideration.

All respondents indicated that they felt that the use / incorporation of EE in their buildings would be of benefit to them. They also generally indicated an awareness of energy audits, but none had conducted any audits.

5.6. Financial institutions (1)

Only one commercial bank responded positively to a request for information. All indications from this commercial bank, however, are that energy efficiency has not been prioritised or even designated in terms of financial product development. The institution indicated no policies for the financing of such technologies was in place or under consideration. Also the institution itself only considered energy efficiency within highly conventional parameters, such as the use of efficient fluorescent lighting and power factor correction on mains supplies. These measures are encouraging, more than anything because they indicate some measure of longer-term thinking amongst these institutions.

5.7. Specifiers / operators / developers (1)

5.7.1. Respondent awareness

Respondent indicated high awareness and understanding of energy efficiency and energy conservation [issues]. They also indicated the encouraging of service suppliers to provide [buildings] in line with current best practices. The respondent had no official EE policies in place.

The majority of respondents indicated a lack of information / awareness of [best practice] EE in building design and operation techniques and technologies.

5.7.2. Respondent building data

The respondent indicated generally well maintained building envelopes (for three buildings reported), with all properties being rented out and in the age range of 6-12 years. No indications were given with respect to historic / future renovations.

5.7.3. Respondent electrical usage data

The consumption figures for the respondent were not disclosed (being paid by tenants). Supply authorities listed included NoRED, ErongoRED and City of Windhoek, with the respondent indicating clear understanding of their tariff structures across the board.

The respondent's buildings did not make use of any water heating technologies. All buildings made use of air conditioning.

The respondent indicated a willingness to make capital expenditures to decrease their energy bills. They also indicated their requirements for capex repayment periods as 24 months. The respondent was not asked to indicate their minimum expected IRR.

The respondent is not generally aware of product or building efficiency labelling locally or overseas, mirroring the actual situation.

The respondent indicated an awareness of EE alternatives to conventional technologies and that these differences were considered when procuring.

The respondent also generally expects that EE technologies can reduce their consumption figures, in the range of 30%. They indicated a willingness to procure EE technologies and green buildings over conventional technologies, even if a price-premium for the improved technology / building was included in the consideration. They indicated an awareness of energy audits, but had not conducted any.

5.8. Public institutions & non-governmental organisations

An interview conducted with the National Housing Action Group / Shack-Dwellers Association indicated that their and similar organisations' core approach is with regard to affordability – as tends to be a norm in the local market given the large number of people of below-average means (with reference to the Gini coefficient). General awareness of energy issues does appear to be a barrier. Access to electricity was indicated, almost on-par with water availability, as a must-have basic service. Installation of electricity supply was at times even arranged prior to informal settlement in certain areas. Despite the demand, the understanding of the nuances of electricity and especially the regional supply problems are definitely lacking. The respondents indicated that, to the dismay of organisations such as NHAG, beneficiaries of formalised settlement often spend more than their available disposable income on electricity services for the benefits derived therefrom.

The Namibian Standards Institute, indicated that they work closely with local stakeholders, such as the Renewable Energy and Energy Efficiency Institute in the discussion and review of standards and standards-related issues. At the point of compilation of this report, no formal standards were in place with regard to efficient building practices. More so, the NSI indicated that most standards were for the most part of a voluntary nature, as required by local entities, and that additional legislation would be required to have possible future green building / efficient standards as mandatory standards. This may be due in part to these standards not relating to [immediate] human safety and welfare, which would necessitate their existence.

The National Housing Enterprise of Namibia, indicated that they have a strong drive to incorporate energy efficiency in their housing designs / projects, as part of their objective of providing quality housing to all Namibians and especially lower income groups. However, pricing of EE technologies is a key barrier for this organisation who has a mandate to provide housing at the lowest possible cost. They attempt to incorporate absolute minimum requirements such as thick walling and roof insulation, as well as efficient lighting, but the inclusion of high cost items such as wall insulation and solar water heaters are often deem economically unfeasible. Another barrier was indicated as being building regulations (and the requirements of financing institutions) which require the use of certain [conventional and possibly inefficient] materials for building construction.

Local authorities indicated their adherence to the SABS / SANS standards for the most part as well as local bylaws and local norms, with regarding building standards. Building design (specifically in meeting 'green requirements' and including efficiency aspects) was not highlighted as an issue apart from the high cost in providing points of connection to energy / water intensive business and buildings. Further, general indications were that the local authorities [had] manpower challenges that created problems in meeting the demands of building inspection for safety and compliance only – having to inspect quality of construction and the finer aspects of alternative construction technologies would certainly compound the problem.

5.9. Summary

Despite a general resistance to cooperation in the execution of the survey amongst the various respondents, the survey was seen as a success in a number of areas:

- In providing useful results and conclusions regarding the average Namibian's understanding of energy efficiency issues;
- In establishing the parameters for future surveys via the designed survey structure and the lessons learnt from the execution of the survey, and quantifying a number of unknowns (again by the execution of the survey, through information collected as well as lessons learnt);
- In establishing effective methodologies for the execution of future surveys through thorough design of the questionnaires as well extensive *'post-mortem'* analysis of the same, subsequent to execution of the survey.

It was established by the survey results that there is a wide-spread understanding of energy terminology as commonly used in media. The depth of understanding amongst the general population was however clearly seen to be insufficient and correspondingly the behaviour of the survey groups indicated a tendency of only paying lip service to the real issues. Correspondingly, it is the opinion of the researchers that through some mechanism of self-persuasion a large portion of the respondents were convinced that their *awareness* of energy efficiency and limited implementation [of energy conservation] was adequate enough in serving the common good.

Money was a key topic and the general perception was that though being energy efficient is a sure way to save money in the long run, the immediate, perceived costs of achieving this were too high.

6. Barriers analysis

There exist several barriers and potential barriers to energy efficiency penetration. These exist in varying forms and at various levels. Many authors on energy efficiency have categorised these barriers under different categories and the following are provided as being common themes, based on the results of the surveys and further research.

6.1. Lack of knowledge and understanding of Energy Efficiency

The Bible says in Hosea 4 vs. 6," My people perish because of lack of knowledge".

Energy efficiency opportunities are frequently overlooked due to the simple fact that industry and other consumers are unaware that they exist. The majority of energy consumers currently have imperfect information regarding the range and performance of energy efficient products. This fact inevitably results in poor decision-making when purchasing goods or specifying equipment.

6.1.1. Possible solutions:

- To enhance awareness in such matters and to bring knowledge and understanding into the various sectors through education;
- Launching of awareness campaigns, demonstration programmes, audits and education;
- Publicising corporate commitment programmes, and public building sector energy efficiency implementation initiatives;
- Enhancing decision-makers' awareness of issues such as running costs, environmental costs, etc. This can be achieved via the official adoption of appropriate **mandatory** standards and by the use of instruments such as appliance labelling.

6.2. Policy / Regulatory Barriers

There are barriers created by the position of Government itself, specifically by energy efficiency having been given a relatively low priority when compared with other pressing national issues such as access to basic services and education. Experience in the region has shown that the introduction, and successful use, of renewable energy technologies and energy efficiency measures are highly dependent on existing policy frameworks.

Government policies are a crucial factor in terms of their ability to create an enabling environment for energy efficiency implementation, to mobilise resources and to disseminate results, as well as encouraging private sector investment. There is generally a lack of policy commitment from the policy makers and limited policy support for renewable energy and energy efficiency is further demonstrated by the low budgetary allocations.

6.2.1. Possible solutions:

- To have clear and detailed policies in place in order to promote the energy efficiency cause;
- Incentives should be created which encourage the public and companies to engage EE measures.
- Standards should be put in place in line with the world- and or regional best practices;

The final two points above are analogous to the "carrot and stick" metaphor whereby compliance is elicited through both enticement as well as punitive measures.

6.3. Investment and Financing Barriers

Energy efficiency makes sound economic sense, especially on a national scale. Although the unit price of energy may be low for the time being, the overall cost to the energy-intensive industries is high. If energy efficiency is approached correctly, payback on investment is frequently less than three years.

- Banking institutions

  Energy efficiency systems are generally perceived as having unsuitable return on investment and high initial costs. Hence one of the main obstacles to implementing energy efficiency programmes is often not the technical feasibility of these initiatives but the absence of low cost, long term financing. Banking institutions lack understanding and appreciation of EE systems and so do not provide dedicated instruments for the financing of these or alternatively have strict conditions that hamper access to financing.

- Alternative financial instruments

  Another barrier to the promotion energy efficiency is the lack of awareness of existing local and international financing options. For instance, there is limited knowledge and expertise on how utility financing could be used to underwrite renewable energy and energy efficiency investments. Some utility officials may be worried that investment in energy efficiency can lead to lower revenues, but it is a matter of demonstrating that the initial investment in energy efficiency can yield significant benefits for the utility by reducing high cost peak loads and improve the profile of the power demand curve that the utility has to meet or supply.

  There appears to be limited ability to access to internationally available "sustainable energy financing", e.g. from the Global Environment Facility (GEF)and various other financing schemes such as Activities Implemented Jointly (AIJ), the Clean Development Mechanism (CDM), the Prototype Carbon Fund and Community Development Carbon Fund. This may in part be due to the very small size of the Namibian population.

- Lack of investment confidence

  Achieving optimum energy performance sometimes involves the installation of costly plant and equipment, and investors may be reluctant to tie-up financial resources in long-term projects. There exists uncertainty, both nationally and internationally, due to the currency fluctuations and regional political instability (though less applicable to Namibia).

6.3.1. Possible solutions:

- Education and awareness programmes are some of the first steps towards overcoming these barriers.
- In terms of addressing investment confidence, investors should be encouraged / required to cost all externalities when considering energy efficiency investment opportunities, to ensure that a fair basis of comparison is created. Appropriate risk-weightings should be attributed to fossil fuel prices when considering plant lifetime running costs.
- The notion of introducing Government / utility-funded incentives on energy efficient appliances and equipment should be considered.

6.4. Institutional barriers and resistance to change

Institutional barriers often stem from a fear that 'outsiders' will identify previously overlooked opportunities, thereby uncovering apparent incompetence within organisations. There is also a

frequently encountered misconception, particularly within industry, that energy efficiency will disrupt production processes, jeopardise quality, and threaten personnel safety.

6.4.1. Possible solutions / mitigation factors:

- It is important to understand that to a large extent these are emotional barriers. An approach is required, therefore, that is not only professional and technically competent, but also sensitive to such issues.

6.5. Research, Technological and Skills Barriers.

In most sub-Saharan African countries, there is inadequate information on the potential of energy efficient systems and the possible savings from energy efficiency initiatives. In addition, there is limited availability of comprehensive and well-documented data sets on the dissemination of energy efficient systems in the region and their potential benefits in the economic development of the region, such as job creation and poverty alleviation. The region's poor baseline information on energy efficient systems is exacerbated by inadequate documentation and library services. Information on past experiences that would help avoid duplication and the recurrence of past errors has been dumped instead of being transferred to libraries and the public domain. The few industrial energy efficiency programmes that have been implemented in the region are also not well documented.

At a macro-economic level, the potential positive impact of energy efficient systems on the national balance of payments through the reduction in the import of fossil fuels is poorly documented. Consequently, energy efficient systems have not been given due attention in national economic policy, planning and budgetary allocations. In addition, power master plans in most African countries largely focus on conventional energy sources with limited reference to energy efficiency.

The importance of technical know-how in the increased utilization of renewable and energy efficiency measures has been recognized in the region, but there remains a continuing shortage of qualified personnel.

Governments and ministries in Africa suffer from a shortage of qualified renewable energy personnel. This deficit is largely responsible for the generally underdeveloped research and technological capability and the poor management of renewable energy and energy efficiency programmes. Although Government, donors and NGOs have, in the past, invested in building renewable energy skills and expertise, the trained personnel often move into other sectors. This is primarily due to the embryonic nature of the renewable energy and energy efficiency industry and the limited business development training provided to trainees.

6.5.1. Possible solutions / mitigation factors:

- Technical knowledge (through increased training and continuing education) is needed to build a critical mass of policy analysts, economic managers and engineers who will be able to manage all aspects of efficient systems development.
- Increased business development training to be provided to personnel specifically trained in EE and RE.

7. Conclusions and recommendations related to the survey

7.1. Conclusions

It is strongly recommended, if the reader has not already done so, to scrutinize the Survey Results (Sections 4 & 5) for important results and conclusions drawn on specific survey issues.

The results of the survey indicated that there exists a definite gap in the real and grounded understanding of energy efficiency issues. Awareness was seen to be less of an issue as apparently popular media and popular culture had effectively created familiarity with the topics of renewable energy and energy efficiency. It was however clear that information disseminated had only created awareness, without providing a corresponding knowledge of the full extent of these topics, as applies to everyday life.

People are generally aware of the need to be energy efficient, and they have some grasp of how to achieve this, but they lack broad knowledge of alternative solutions and specifically how to evaluate alternatives with respect to [actual / total] cost and benefits. There is still a pressing need throughout Namibia for proper energy education. There is also a lack of adequate product information that can explain to people in lay terms what impact the products they wish to buy have, on the environment and their wallets. There appears to be a need and a market for appliance / product labelling in terms of energy efficiency.

It is noted that there should also be easy access to tools that can provide justification of higher purchase costs (where they exist), in comparison to inefficient alternatives, on the basis of real-world examples for long term savings and other benefits – most sensibly provided via product literature.

In terms of making further recommendations for action, the current report assumes limited resources (financial and otherwise) on the part of the implementing project (NEEP) and therefore seeks to make recommendations that seem the most feasible, requiring only modest financing.

7.2. Recommendations

It is the recommendation of this report that targeted interventions be made to specific groups, to provide them with sufficient knowledge on basic concepts, to allow effective decision making with regard to energy product purchases and usage.

7.2.1. Suggested core target group for intervention

Proposed primary targeted information dissemination groups (for the information bulleted below) are as follows:

- **Students at secondary school level**, possibly as part of the physical sciences curriculum: these young adults are likely to be more receptive to energy-behaviour-changing concepts than adults, and are more readily accessed when collectively addressed in the school context. Students at tertiary institutions could also be targeted but they represent a smaller portion of the population.
- **Private sector decision makers** (directors of companies, owners, procurement managers, etc.), through central bodies, such as chambers of commerce, mines etc. and common associations. **Manufacturers** are key players and **energy products retailers** are equally seen as being important in this regard. The mines are very large players in the energy sector, but due to the large scales of consumption, have vested interest in minimizing their electricity use and generally are as efficient as financially possible. Mines are therefore not suggested as prime targets.

- **Energy product wholesalers and retailers**, even though their businesses are demand-driven; since these entities effectively facilitate the infiltration of [newer] technologies in the country.
- **Public sector**. Providing information to Government and other agencies to facilitate the further mandating of concrete objectives and mandated standards with regard to energy efficiency and alternative energy (such as the cabinet directive for solar water heaters). A general trend in conversations with respondents indicate a desire to see (a) Government taking a leading role in these issue, (b) publicly implementing the techniques and technologies as "leadership by example" and (c) facilitating the penetration of new technologies by providing incentives as tax breaks or subsidies and by 'prohibiting' inefficient, cheaper technologies

The above groups are proposed on the basis of perceived possible effectiveness of the proposed interventions and also as a means to reduce the cost of intervention.

The knowledge and skills to be provided to these groups should include:

- The ability to **understand the local supply authority tariff structures** and rates – providing skills to rate payers to obtain the relevant information from their utilities and to understand and be able to interpret the numbers (this item is most relevant to the students target group);
- The **knowledge of how much energy certain household or business activities typically use** (in each target group's context), and to understand what the implications of using efficient devices are: especially in the local context with the regional supply-security issues. The average monthly electricity bills drawn from the statistics can serve as a yardstick in educating stakeholders but also acts as a guideline when evaluating proposed interventions – so that solar water heaters, for example, are promoted ahead of lower consumption devices, such as televisions;
- The **ability to determine how much power products use**, for products that the consumers intend to purchase ("off-the-shelf"), how efficient they are and what alternatives are available as well as being able to gather the information from product labels;
- The **skills to calculate total cost of ownership** (life-time costs) of certain energy devices and to make comparisons of these between different devices and scenarios (i.e. to compare a low capital cost, high consumption technology with a high capital cost low consumption one). An important statistic drawn from the survey is the 5-year 'limit' on repayment of technologies installed in buildings as 'fixed appliances', given the average term of residence.

The above list is not provided as exhaustive, but compiled based on what were determined to be the most central issues identified in the survey.

It could also make sense to provide exhaustive / basic information during dissemination, with regard to energy and energy efficiency, since a large portion of the Namibian population would benefit from this, but it may yield diminished returns and is therefore not recommended.

7.2.2. Broad intervention (higher cost option with diminishing returns; secondary targets)

It was seen in this survey that there is a definite need for the most basic information, such as what electrical energy and power are, their cost and their value and even basic financial planning skills for households in relation to their electricity consumption. This very basic information will have to regularly be disseminated among the population, as younger generations come of age and gain purchasing power.

Currently, the groups most likely to benefit from this type of information would be the rural and peri-urban (and possibly also urban) low income groups, who have access to electricity.

The statistical analysis of collected information clearly indicated that smaller towns in Namibia could benefit from targeted interventions [more than the larger centres], since they apparently have less access to information or exposure to current trends than the larger towns.

7.2.3. Additional recommendations

In terms of barriers analyses, this report has provided a number of proposed solutions and key issues in Section 6. These may not be the lowest hanging fruits due to the entrenched nature of some of them. Nonetheless they are summarised as follows:

- **Publicising corporate commitment programmes**, and public building sector energy efficiency implementation initiatives (this specific item is a low hanging fruit and should be pursued at all costs, since it was identified during the survey a source of great contention among some respondents);
- Awareness to be enhanced in EE matters and knowledge and understanding provided to the various sectors through **education**;
- Energy awareness **campaigns** should be launched, demonstration programmes, audits and education be conducted;
- Enhancing **decision-makers' awareness** of issues such as running costs, environmental costs, etc. This can be achieved via the official adoption of appropriate **mandatory** standards (which are in line with the world- and or regional best practices) and by the use of instruments such as appliance labelling;
- **Clear and detailed policies** should be put in place in order to promote the energy efficiency cause;
- The notion of introducing **Government / utility-funded incentives** on energy efficient appliances and equipment should be considered, which encourage the public and companies to engage EE measures.
- In terms of addressing investment confidence, investors should be encouraged / required to **cost all externalities when considering energy efficiency investment opportunities**, to ensure that a fair basis of comparison is created. Appropriate risk-weightings should be attributed to fossil fuel prices when considering plant lifetime running costs;
- It is important to understand **emotional barriers** with regard to resistance to change among larger institutions. An approach is required, that is not only professional and technically competent, but also sensitive to such issues.

- **Technical knowledge** (through increased training and continuing education) is needed to build a critical mass of policy analysts, economic managers and engineers who will be able to manage all aspects of efficient systems development.
- Increased **business development training** to be provided to personnel specifically trained and employed in EE and RE.

8. Project lessons learnt

A number of fundamental, practical lessons were learnt in the course of execution of this survey, which are presented here in support of similar future endeavours.

8.1. Survey preparation

8.1.1. Pre-survey preparation

- Even with the low key nature of this project (as compared to an NPC National Census, for example), it was realized that greater effort could have been applied in preparations for the survey process. The costs would have to be investigated, but it is strongly recommended in future that a multimedia campaign, of modest scale, be launched prior to the survey to create awareness amongst the populace of the survey itself and its importance.
- Large single respondents (such as corporations) should in future be contacted as early as possible, even before launching media campaigns and should be vigilantly pursued in their completion of the surveys. The key is not to create resistance with these organizations through ['abrasive'] follow-up methodologies, however a 'softer' approach (where respondents are not pursued with such great vigour) does not yield sufficient returns on time invested.
- It may also be of benefit to future survey projects that they are elevated to a more public position, suitably advertised and endorsed by Government officials, to add credibility to the overall need of such surveys with the public.

The questionnaires as they are presented in this report are recognized as not being optimal. It is recommended that in future they be restructured as follows:

8.1.2. General

- In terms of executing factor analyses on the data collected, additional questions should be asked and existing questions restructured to allow correlation of data to specific groupings or other statistics (such for income, gender, age, location and education levels; *inter alia*).

8.1.3. Residential

- The questions asked could be amended / changed if future surveyors see a need for this or recognize failings in the current structure. Some notes were made in the survey analysis section were possible ambiguities were noted. One of the strongest suggestions would be to reconfigure the questions for multiple choice answers.
- **Multiple-choice questions** also would be an excellent tool (if correctly structures) to increase data accuracy, if the questions are structured to "test" the knowledge and cross-correlate the truthfulness of respondents.
- There was apparently little resistance with regard to the number of questions, so these would not need to be reduced, especially since a number of these questions required single word answers. More focus should be placed on multiple-choice-type questions, which would also increase survey speed / efficiency.

- It was realized subsequently that the language in the survey could be even more simplified and some ambiguity in the wording of a small number of questions was recognized.

8.1.4. Retail, manufacturers, operators, developers etc.

- The questionnaires should be streamlined. If possible, the number of questions (apart from requesting respondent information) should be limited to 20 (for example).
- A clearer strategy should be formulated on these entities for future surveys, and how they should form part of those surveys, due to the specific peculiarities of each group / subgroup: they effectively require a separate survey process, using a different approach to residential surveys, and the results of their surveys cannot be compared 1:1 with those of the residential survey, adding to the divergence.

8.1.5. Alternative methodologies

- In future, multi-mode surveys could be executed to optimize time expenditure and speed up the survey process: With a more information-enabled Namibia, online automated surveys could be utilized to survey a significant (approximately 5.9% / 130,000 internet users[3]) portion of the population. This may however be a limited demographic group and would in any case require sufficient pre-survey awareness raising via conventional media for any measure of success.
- It is estimated that about 120,000 people in Namibia are registered with the social network "Facebook"[4] which also allows unique opportunities for conducting surveys, without the need for extensive marketing prior.
- Another option would be leverage the employment of groups of people in larger companies to obtain data through one point of contact. In this way, the company's employees could be engaged during their breaks, thus avoiding loss of productivity, for the residential surveys. Management could likewise be engaged for the completion of residential and non-residential surveys. This would require extensive cooperation from the targeted companies, which is generally unlikely given the experience on this survey, unless the process is approached strategically and with patience and perseverance.
- Another option would be to incentivise the survey, by offering nominal remuneration to respondents for successfully completing (entirely) survey forms. This route could potentially limit the number of forms that could be obtained, based on the survey budget. The price level is certain to differ between demographic groups and so some time would have to be spent in deciding a cost-effective value; compared to the cost per respondent for doing a door-to-door survey. This option could be combined with the previously mentioned option, for example by offering a cooperating company's employees an amount sufficient to purchase a small lunch in exchange for completing survey forms at the beginning of lunch time.
- Tele-surveys remain a least-recommended option, unless outsourced to a specialist provider. Even so, this mode may create some negative market sentiment for future surveys.

[3] *Internet world stats*
[4] *Internet world stats*

8.2. Human issues

8.2.1. General resistance to surveys

A great deal of resistance was met with several institutions regarding this survey, not specifically as being an energy sector survey, but simply as being an intrusion on their normal business activities. No specific solution is offered here, but it is hoped that with sufficient pre-survey awareness raising, this issue could be minimized.

8.2.2. Possible coordination issues

Certain specific organizations were relatively hostile, with specific reference to the subject matter of the survey (EE). Apparently, in their opinions, there had been a lack of coordination with previous, similar projects in which case they felt the current survey would be a waste of their time or resources. Again, the most simple solution might simply have been an information campaign.

It was also realized that the current survey had been conducted at approximately the same time as the official Namibia National Census. Sufficient coordination could not be achieved to execute the current survey in close cooperation with the National Census. It is suspected that a number of opportunities to obtain results were lost due to mistrust amongst the populace about the current survey possibly representing a "scam", to exploit the National Census.

8.3. Data processing

It is highly recommended that future surveys be conducted using specifically developed computerized data base technology (rights / use of which to be retained by the client), for storing and tracking information as well as presenting and analysing the same. It is understood that such technologies are often custom-made solutions with high capital costs involved. It should be noted that such expenditures are long term investments, though, if the annual national survey is indeed to be a recurring event, allowing interesting and dynamic data processing to occur across different periods.

9. Sources

9.1. Figures

Figure 1 - **García, Alberto Otero** (2009/08/07). *Kakadu National Park uranium mining Controlled Area*. Flickr. Reproduction under creative commons license.

Figure 2 – **Nardone, Domenico** (2005/08/05). *Complexity [1]*. Flickr. Reproduction under creative commons license.

9.2. Texts, documents & books

Youngman, M. (1978) *Designing Questionnaires*

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9.3. Websites

The Central Intelligency Agency World Fact Book. (2011) https://www.cia.gov/library/publications/the-world-factbook/geos/wa.html

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Creative research systems. (2011) http://www.surveysystem.com/

10. Appendices

Appendix A – Proposed Survey Participants

The following list identifies the various survey participants (for brevity, residential respondents are omitted).

Appendix B – Statistical methods

B.1. Statistical applicability calculation

Specifically, the analyses were made using the standard Sample Size formula:

$ss = \frac{Z^2 * (p) * (1-p)}{c^2}$, including the finite population correction: $ss_{new} = \frac{ss}{1+\frac{ss-1}{Pop}}$

(Z = confidence, p = percentage for picking a choice, c = confidence interval, Pop = actual population size)

B.2. Statistical background

The confidence interval (also called margin of error, c) is the plus-or-minus figure usually reported in newspaper or television opinion poll results. For example, using a confidence interval of 4 where 47% of the respondents pick an answer, then the entire relevant population between 43% (47-4) and 51% (47+4) would have likely picked the same answer.

The confidence level is expressed as a percentage and represents how often the true percentage of the population who would pick an answer lies within the confidence interval. The 95% confidence level means 95% certainty; the 99% confidence level means 99% certainty. Most researchers use the 95% confidence level.

When combining the confidence level and the confidence interval, one could say with 95% sureness that the true percentage of the population is between 43% and 51%. The wider the accepted confidence interval, the more certain that the whole population's answers would be within that range.

B.2.1. Factors that Affect Confidence Intervals

There are three factors that determine the size of the confidence interval for a given confidence level:

- Sample size
- Percentage
- Population size

B.2.1.1. Sample Size

The larger the sample size, the greater the greater the certainty and thus the smaller the confidence interval. However, the relationship is not linear (i.e., doubling the sample size does not halve the confidence interval).

B.2.1.2. Percentage

The accuracy also depends on the percentage of the respondents that picked a particular answer. If 99% of respondents said "Yes" and 1% said "No," the chances of error are remote, irrespective of sample size. However, if the percentages are 51% and 49% the chances of error are much greater.

When determining the sample size needed for a given level of accuracy the worst case percentage (50%) is often used as baseline. This percentage is also used in the case of determining a general level of accuracy for a sample.

B.2.1.3. Population Size

The mathematics of probability proves the size of the population is irrelevant unless the size of the sample exceeds a few percent of the total population under examination.

The confidence interval calculations assume a genuine random sample of the relevant population, which was the aim of this survey.

Appendix C – Stakeholder interaction sub-report

Following is the slideshow presentation used for the stakeholder interaction.

Annual National Survey on Energy Efficiency in Buildings

For the REEEI Institute in collaboration with GEF, Ministry of Mines and Energy & UNDP

By Lithon Project Consultants (Pty) Ltd, 21 October 2011

- F Mushangwe, B.Tech (Mech)(UZ), MBA (UZ)
- D Nel, Pr.Eng B.Eng (EE)(Stel.) MSAIEE MEPA

Introduction

Purpose:

The **Annual National Survey on Energy Efficiency in Buildings** provides a measure for evaluating the effectiveness of initiatives that focus on transforming energy consumption practices of the broader Namibian populace, specifically in the setting the built environment.

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ANNUAL NATIONAL SURVEY ON ENERGY EFFICIENCY IN BUILDINGS

For the REEEI Institute in collaboration with GEF, Ministry of Mines and Energy & UNDP

Introduction and Project Background

Introduction (cont.)

The survey allows for **planning** of:

- The **requirements** of education or awareness-raising **programs** for the general populace;
- Campaigns for awareness-raising amongst **decision makers**;
- Future **frameworks for legislation amendments** to enforce EE practices or technologies;
- Future **frameworks** for the **incentivisation** (or subsidization) of EE practices, technologies or alternatives.

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Aims of project

To gain understanding of and assess the following :

- Energy demand, consumption and expenditure;
- The level of awareness and adoption of EE practices;
- The level of market penetration of EE technologies and practices in buildings;
- The level of awareness and use of building rating tools and standards; and
- Potential barriers to EE penetration and possible means to address the barriers.

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Survey respondent selection

The following groups relevant to the built environment were identified:

Core group: **Residential users**

Additional and incidental to the core demographic group, the following respondents were also identified:

Retailers, who provide energy products;

Specifiers;

Property developers;

Large(r) power users;

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For the REEEI Institute in collaboration with GEF, Ministry of Mines and Energy & UNDP

Methodology

A description of the survey design and execution

Survey strategy

Main mode: **face-to-face interviews**;

Alternative: mixed approach of using **self-surveys** or **telephonic** interviews.

Due to small scale and extent, **no pre-survey work** was executed, such as mapping and cartographic work, a pilot test, advertising / awareness raising etc.

Three phases were planned: **pre-survey** (inception, client contact and needs assessment), **survey** (collection of data) and **post-survey** (enumeration of data, processing and analysis, reporting).

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Matrix for meeting client requirements

Goal	Focus / questions
Energy demand, consumption and expenditure of different building categories i.e residential and non-residential;	Respondent electricity bills, and general usage patterns
The level of awareness and adoption of EE practices and technologies in the building categories;	Respondent awareness of terminology, awareness of alternatives to 'conventional' approaches and awareness of efficiency ratings
The level of market penetration of EE technologies and practices in buildings;	Assess respondent's implementation and use of EE alternative methods and equipment
The level of awareness and use of building rating tools and standards; and	Determine use of tools such as energy audits and awareness / use of available standards in planning
Potential barriers to EE penetration and possible means to address the barriers,	By analysis of the survey data, evaluation of incidental information and desktop studies, evaluate the issues and compile various proposals

ANNUAL NATIONAL SURVEY ON ENERGY EFFICIENCY IN BUILDINGS

For the REEEI Institute in collaboration with GEF, Ministry of Mines and Energy & UNDP

Survey Analysis

A discussion of survey results and knowledge inferred for further action

Breakdown of respondents

Residential – 195 (204; 95.6%)

Windhoek (120), Oshakati / Ongwediva (38), Keetmanshoop (17), Okahandja (13), Rehoboth (3), Swakopmund (1), Rural / peri-urban (3)

Retailers – 14 (28; 50%)

Real estate – 4 (10; 40%)

Manufacturers & other large power users – 3 (10; 30%)

Architects – 4 (15; 27%)

Specifiers / operators / developers – 3 (18; 17%)

Financial institutions – 1 (7; 14%)

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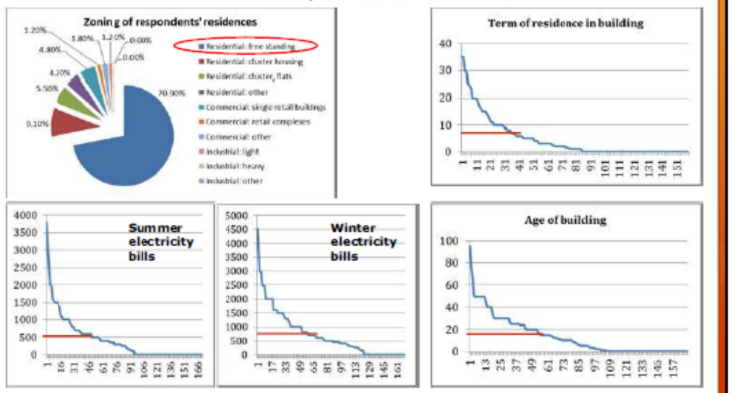
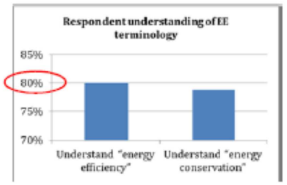
Respondents' living statistics

PLEASE NOTE: Disclosed percentages are with reference to the TOTAL SAMPLE, not referred to the respondents to the specific question

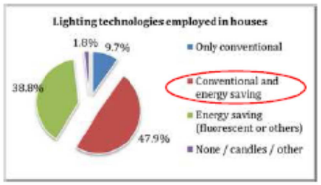
Confidence level: 95%; Confidence interval: 7%

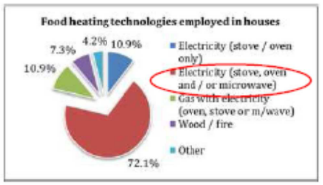


Understanding Energy Efficiency

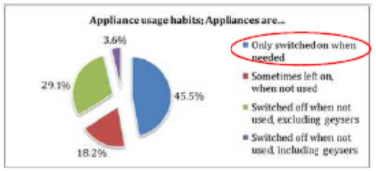


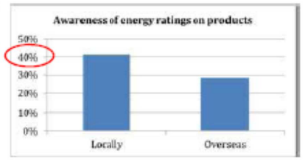
- 67% indicated tenant status, of whom 11% indicated a willingness to pay higher rent for a lower electricity bill
- 11% of respondents report using energy sources other than electricity

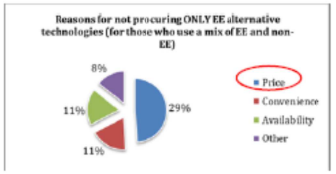


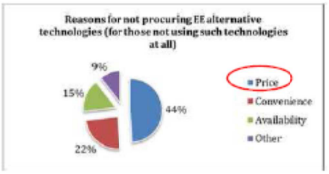


Understanding Energy Efficiency (cont.)

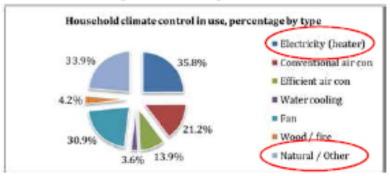


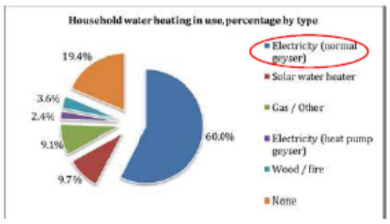






Understanding Energy Efficiency (cont.)





Item	Number of respondents purchasing
Air conditioner	1
Evaporative cooler	1
Gas/Electric stove	1
Hot Iron	1
Micro-wave	5
PC	1
PVR decoder	1
Refrigerator	4
Solar water heater	5
Stove (electric)	5
TV	5
Various appliances	2
Washing Machine	4

- How efficient is your residence?
  Average score of 2.81 out 5 (best)

Consumer behaviour

Of the whole sample, 62% indicated that energy efficiency considerations considered during energy product procurement

92% indicated a willingness to purchase EE products, given sufficient information

73% indicated a willingness to purchase EE products, if it was more expensive than alternatives. Note previously recording of price being a prime barrier!

96% of the sample indicating that they understood that being energy efficient would lower their energy costs (by a sampled estimate of 30%)

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Other respondents, summary

General analysis of commercial and institutional respondents was marred by low response rates.

General conclusions drawn from residential and commercial / institutional entity surveys:

- There is an **apparent** high awareness of energy issues and energy efficiency (but only APPARENTLY!)
- There is a general resistance to invest in energy efficiency alternatives due to perceived high capital costs and longer term pay-back periods
- But also, there is a general resistance to the perceived high prices of electricity

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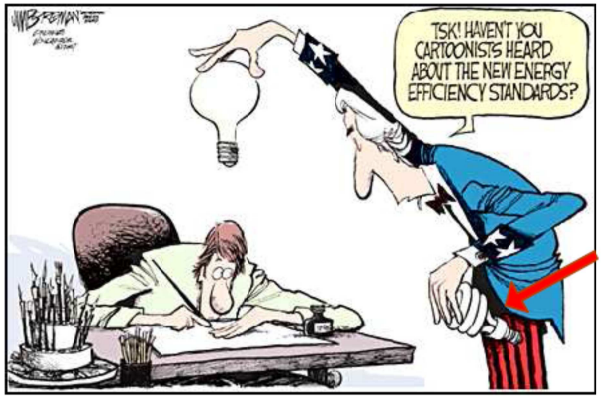

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Other respondents, summary (cont.)

- There may be a lack of useful [product] information indicating ROI and pay-back periods (though there often seems to be mistrust in these figures)
- Very little understanding of cost-benefits and total-cost-of-ownership analyses
- The low income groups indicate inability to afford efficient alternatives and the higher income groups resist more expensive alternatives
- General consensus: Other countries appear to be incentivising EE alternatives; Government should promote EE more concretely

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ANNUAL NATIONAL SURVEY ON ENERGY EFFICIENCY IN BUILDINGS

For the REEEI Institute in collaboration with GEF, Ministry of Mines and Energy & UNDP

Barriers to Energy Efficiency in Namibia

An analysis of barriers to energy efficiency and addressing the same

Lack of knowledge and understanding of Energy Efficiency

B: Energy efficiency opportunities are frequently overlooked due to the simple fact that industry and other consumers are unaware that they exist

S: Demonstration programmes (consumer education)

S: Publicising corporate commitment programmes, and public building sector energy efficiency implementation initiatives (beyond solar water heaters)

S: Promote awareness campaigns

Policy / Regulatory Barriers

B: Is energy efficiency, and renewable energy, our highest priority? Do we have the same sense of urgency as South Africa regarding energy availability?

S: Have clear cut policies in place in order to promote the Energy Efficiency cause.

S: [**Mandatory**] Standards should be put in place in line with the world and or regional best practices

S: To come up with incentives which encourage the public and private companies to engage in EE measures.

Lack of knowledge and understanding of Energy Efficiency (cont.)

S: To enhance awareness in such matters and to bring knowledge and understanding in the various sectors

S: Enhance the decision-makers' awareness of issues such as running costs, environmental costs, etc.; specifically via appropriate standards, awareness and education, and instruments such as appliance labelling

Investment and Financing Barriers

B: Perceptions regarding high initial / capital costs;

B: Long terms of cost recoupment / recapitalisation and possible low ROI;

B: Short-term, bottom-line thinking;

B: Lack of investment confidence;

B: Existing financing institutions: "Not business as usual"

Investment and Financing Barriers (cont.)

S: Innovative local and international financing options (Global Environment Facility and various other financing schemes such as Activities Implemented Jointly, the Clean Development Mechanism the Prototype Carbon Fund and Community Development Carbon Fund)

S: Education and awareness programmes are some of the first steps to take towards overcoming this barrier

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Research, Technological and Skills Barriers

B: There is inadequate information on the potential of energy efficient systems and the possible savings from energy efficiency initiatives

B: Limited availability of comprehensive and well-documented data sets on the dissemination of energy efficient systems in the region and their potential benefits in the economic development of the region, such as job creation and poverty alleviation

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Institutional barriers and resistance to change

Emotional barriers:

B: Fear that outsiders will identify previously overlooked opportunities, thereby uncovering apparent incompetence within organisations

B: Energy efficiency will disrupt production processes, quality may be jeopardised, and that personnel safety may be threatened

S: Professionals and solutions providers need to prepare for these issues and be sensitive to them

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Research, Technological and Skills Barriers (cont.)

B: Industrial energy efficiency programmes might not be well documented or publicised enough

B: At a macro-economic level, the potential positive impact of energy efficient systems on the national balance of payments through the reduction in the import of fossil fuels is poorly documented

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Research, Technological and Skills Barriers (cont.)

B: Power master plans in most African countries largely focus on conventional energy sources with limited reference to energy efficiency

B: No adequate skills in Namibia and around the region, there is a continuing shortage of qualified personnel

S: Technical knowledge is needed to build a critical mass of policy analysts, economic managers and engineers who will be able to manage all aspects of efficient systems development.

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Research, Technological and Skills Barriers (cont.)

S: Trained manpower capable of developing and manufacturing energy efficient systems is a prerequisite for their successful dissemination. Governments and ministries in Africa suffer from a shortage of qualified renewable energy personnel, which should be addressed. This deficit is largely responsible for the generally underdeveloped research and technological capability and the poor management of renewable energy and energy efficiency programmes.

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"He says he'll only talk if you can assure him that those are energy efficient bulbs"

Thank you for your valuable time!

For further information contact the REEEI Institute at the Polytechnic of Namibia

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Responses received from stakeholders at stakeholder interaction / workshop

JB - Johan Bekker
GC - Gerhard Coeln
AM - Andre Muller
EM - EL Mwangosi
KN - Kudakwashe Ndlukula
CR - Conrad Roedern

Feedback:

Item	Comment	Initials
C-1	It was noted that the overriding majority of building designs, specifically in the Windhoek context if nowhere else, were done by apparently poorly- or unqualified persons, not architects. These persons would not necessarily have any of the skills required for efficient building design.	**AM**
C-2	It is noted that architects generally are not playing a leading role in EE and RE and in fact are acting as a barrier to progress, by not wanting to specify "ugly" appliances such as solar water heaters.	**AM**
C-3	As a question based on gender issues in the report, for future surveys: Do men save more, in the family context, than women? Who in the household is responsible for utility payments?	**EM**
C-4	As a question based on gender issues in the report, for future surveys: Who is in charge of the household an responsible for taking decisions related to [energy] expenditures?	**CR**
C-5	It is noted that it may generally be that EE is inconvenient or unsightly to the women in the households who act as 'home makers'. Additionally it may be that where the women treat the houses / homes as an expression of their personality while the men may do the same with automobiles, that neither party wishes to make concessions with regard to expenditures (due to ego) and so no efficiency is achieved.	**CR**
C-6	A suggestion was made that incandescent lamp illumination may not be as inefficient as suggested in the case where it is used as a heating element. However this requires sufficient insulation and generally colder conditions, neither of which is the general rule throughout Namibia.	**GC**
C-7	With reference to the suppliers of electrical equipment, if it really is true that their procurement strategy is driven by consumer demand, then education of the general populace should be executed at school level, where people are unbiased enough to receive the information and by implication able to make informed decisions regarding EE & RE. As these learners become economically active, they will hopefully create the necessary consumer demand to drive EE.	**GC**
C-8	Tsumkwe was suggested as a role model for *enforced* (a) energy conservation and (b) energy efficiency, having only extremely limited energy resources. It was stated that the local citizens did not have any choice with reference to the amount of power they could obtain and would have to sparingly use electricity to be able to be connected to the local grid.	**JB**

C-9	As a future survey issue, it was suggested that parallels be drawn between unemployment and energy use, to explore the social issues related to energy use in Namibia.	**GC**
C-10	As a future survey issue, it was suggested that a question be posed regarding people's interpretation of energy availability as being a right or a privilege. Further, it may be instructional to determine from the utilities what the default rates are like amongst the consumers (based on their possible interpretation of energy being a 'right'). It was mentioned that based on the interaction with NHAG that apparently the default rates on other household obligations was apparently higher than that for electricity rates, since the majority of relevant persons attached a very high value on the availability of electricity (and by implication saw it as a privilege) rather than say housing and water which generally appear to be seen as 'rights'.	**CR**
C-11	It was noted that prepayment electricity meters have excellent utility as educational tools, in that they physically show users the effect of daily electricity use and would also clearly show energy efficiency and conservation effects.	**CR**
C-12	In terms of evaluating financial services providers, it was queried whether the commercial banks and institutions such the Ministry of Mines and Energy and service providers such as Kongalend were approached for information and assessment and whether information on implementation projects were obtained from them (specific reference was made to the solar financing scheme, for amongst others, solar water heaters). It was mentioned that the responses from the financing institutions were exceedingly poor and that service providers such as Kongalend were not included in the survey.	**LA**
C-13	It was suggested that companies should [be forced to] look beyond the bottom line and look towards reporting on the triple bottom line [People / Planet / Profit]. Auditors, through the office of the Auditor-General should enforce this and especially public companies should report on these issues and be measure accordingly. Guidelines for compliance / performance in the non-financial aspects needs to be evaluated.	**GC**
C-14	It was mentioned that in Finland a system such as mentioned above was in place where public companies' annual reporting had to include environmental aspects (even for their international operations).	**KN**
C-15	It was suggested that perhaps the Registrar of companies, Ministry of Trade and Industry, should mandate a specific type of financial reporting, as mentioned above.	**GC**
C-16	It was suggested that a definite risk to the future implementation of EE and RE would be the availability of [artificially] cheap electricity, such as may be produced by the proposed nuclear or coal-fired power plants in Namibia.	**CR**
C-17	It was suggested that life cycle costing, and true costing (including long term environmental issues) should be used in evaluation of any and all energy solutions that Namibia could look at.	**KN**

Appendix D – Questionnaires

Survey questionnaire form: Residential survey

NEEP Annual Survey

SURVEY FORM: Residential users / company employees

Pre-questionnaire checklist (Before entering property / initiating survey)

1.	Date						
2.	Location (town, area, street, no.)						
3.	Size of property (estimate)						
4.	What is the property?	Commercial	Retail (single)	Retail (complex)	Services	Bulk	Other
		Residential	Free standing	Cluster housing	Cluster flats	Other	
		Industrial	Light[5]	Heavy	Other		
5.	Description, if other:						
6.	Estimated density level of area	>1 per 150m^2	~1 per 300m^2	~1 per 600m^2	<1 per 750m^2		
7.	Appearance of building envelope:	Well maintained, well controlled[6]	Maintained, with some areas uncontrolled[7]	Unmaintained, in disrepair[8]			

If respondents refuse to answer specific questions, make a note at the question and move on to the next.

Survey

8. **Introduction** (Read to respondent): This survey, the Annual National Survey on Energy Efficiency in Buildings, is conducted through the Renewable Energy and Energy Efficiency Institute of the Polytechnic of Namibia. Its purpose is to evaluate people's awareness and use of energy saving methods and products. This survey is to be used to plan future initiatives to increase the use of energy saving techniques to benefit Namibia's economy and reduce our reliance on other countries for imported energy. This survey should take between **15 and 25 minutes**. A maximum of **38 questions** will be asked. The respondent may refuse to answer any question that they do not feel comfortable answering.

9.	Do you understand what "energy efficiency" is? Can you give a brief explanation?	**Y / N**
10.	Do you understand what "energy conservation" is? Can you give a brief explanation?	**Y / N**

[5] Mostly storage, some clean / dry industrial activity – such as welding or hand assembly

[6] Building looks clean and maintained: painted, very few cracks, all windows functioning, all exterior equipment in a state of repair

[7] Building looks clean and maintained, but possibly some windows / doors are broken, or fitting very loosely closed or left open, roof damage, large cracks/openings or other abnormalities, but limited in extent.

[8] Building is very 'leaky' – brick building in disrepair, or typical corrugated iron shack dwelling

	If answer to either was 'no' then the follow explanation is given: *Energy efficiency* is the goal to reduce the amount of energy required to do something, for example lighting up a room, cooking food or heating water. Energy can be provided by electricity, but also by petrol like in a car or wood like in a wood stove, paraffin, diesel, sun light to name a few. *Energy conservation* is broader than energy efficiency because it includes the efforts of a person or people to make less use of things that use energy, for example to only switch on one light instead of more lights, and not keeping it on for longer than it is needed. This term it also includes the practice of energy efficiency mentioned before. The benefits of being energy efficient and conserving energy are: • Less money is spent on wasted energy. • The whole country benefits when there is more energy available, because less is wasted. • Household benefits because they can save or spend the money on other things.

11.	Contact person name & surname (survey participant)					
12.	Is the building / unit	**owned**		**rented**	**other**	
13.	Term of residence in building			How old is the building		
14.	When will you next renovate / expand / move			When was the building last renovated		
15.	Size of building / unit					
16.	Type of meter in dwelling	**Pre-paid**		**Conventional (post-paid)**		
17.	Average monthly electricity bill:	**Paid by owner**, or		For summer:	**N$ /month**	
				For Winter:	**N$ /month**	
18.	Average monthly spending on other energy sources (<u>in the house</u>):	**Paid by owner**, or		For summer:	**N$ /month**	
				For Winter:	**N$ /month**	
19.	If respondent **<u>pays own energy bills & rents</u>**:	Would you be willing to pay higher rent if your energy bill could be lower			**Y / N**	
20.	Highest bill in the last year, electricity:	**N$ /month**		Other energy source Type_____	**N$ /month**	
21.	What kind of light bulbs are used in the dwelling	**Only conventional**	**Conventional and energy saving**	**Energy saving (fluorescent or others) only**	**None / candles / other**	
22.	How is food heated	**Electricity (stove /**	**Electricity (stove, oven**	**Gas with electricity**	**Wood / fire**	**Other**

		oven only)	**and / or microwave)**	**(oven, stove or m/wave)**			
23.	Is the building insulated: roof	**Y / N**		Walls / other:		**Y / N**	
24.	How are rooms heated or cooled (state number of devices)	Electricity (heater)			Electricity (air conditioner - conventional)		
		Electricity (air conditioner – inverter type)			Fan		
		Water cooling			Wood / fire		
		Natural / Other					
25.	How is the household water heated (state number of devices)	Electricity (normal geyser)			Electricity (heat pump geyser)		
		Solar water heater			Wood / fire		
		Gas / Other			None		
26.	Are you planning new household equipment purchases	**Y / N**	If yes, what type of equipment				
27.	How are appliances used	**Appliances are only switched on when needed, incl. lights & TV**		**Appliances are sometimes left on, without people in the room**	**All appliances switched off when not used, excluding electrical geysers**	**All appliances switched off when not used, including electrical geysers**	
28.	Where no energy saving devices are used (microwave, energy saving lamps, fan / advanced air conditioner):	Are you aware of energy saving alternatives			**Y / N**		
		Reason for not buying / using efficient alternatives			**Price**	**Availability**	
					Convenience	**Other**	
29.	Where a mix of energy saving and conventional devices are used:	Reason for not buying / using **only** efficient alternatives			**Price**	**Availability**	
					Convenience	**Other**	
30.	Are you aware of efficiency ratings on products: Locally	**Y / N**		Overseas		**Y / N**	

31.	Do you consider energy efficiency of products when making purchases	**Y / N**	Who is mostly responsible for such purchases	**Husband / man** **Wife / woman**
32.	Do you think that you would buy energy efficient products if you had clear information regarding benefits	**Y / N**	Even if those products were more expensive than other products	**Y / N**
33.	Do you believe that being energy efficiency would lower your energy costs	**Y / N**	By how much (% or N$)	
34.	How energy efficient do you think your building is (1 to 5 – 1 very inefficient, 5 very efficient)		Do you believe that improved energy efficiency would be to your benefit as owner	**Y / N**
35.	Additional notes			

Survey questionnaire form: Retailers

NEEP Annual Survey
SURVEY FORM: Energy product retailers

Survey

1. **Introduction** (Read to respondent): The purpose of the Annual National Survey on Energy Efficiency in Buildings is to provide a basis for evaluating a variety of initiatives that focus on transforming building practices and energy efficiency in new and existing residential and non-residential buildings, specifically for targeted intervention. The information, generated from energy demand, consumption and expenditure in the different building sector categories, would assist the NEEP project in determining the level of market penetration of EE technologies and practices in buildings. This survey should take between **10 and 20 minutes**. A maximum of **50 questions** will be asked – it is suggested that someone from the admin department should also attend the survey.
   The respondent may refuse to answer any question that they do not feel comfortable answering.

2.	Date						
3.	Contact person name & surname (survey participant)						
4.	Company name						
5.	Company type	**Building products**	**Appliances**	**Mixed**	**Other**		
6.	Do you understand what "energy efficiency" is? Can you give a brief explanation?						**Y / N**
7.	Do you understand what "energy conservation" is? Can you give a brief explanation?						**Y / N**
	If answer to either was 'no' then the follow explanation is given: *Energy efficiency* is the goal to reduce the amount of energy required to do something, for example lighting up a room, cooking food or heating water. Energy can be provided by electricity, but also by petrol like in a car or wood like in a wood stove, paraffin, diesel, sun light to name a few. *Energy conservation* is broader than energy efficiency because it includes the efforts of a person or people to make less use of things that use energy, for example to only switch on one light instead of more lights, and not keeping it on for longer than it is needed. This term it also includes the practice of energy efficiency mentioned before. The benefits of being energy efficient and conserving energy are: Less money is spent on wasted energy; The whole country benefits when there is more energy available, because less is wasted; Companies benefit since they reduce overheads and improve their image.						
8.	Location of retailer (town, area, street, no.)						
9.	Name of building, if any						
10.	What is the property?	Commercial	**Retail (single)**	**Retail (complex)**	**Services**	**Bulk**	**Other**
		Residential	**Free standing**	**Cluster housing**	**Cluster flats**	**Other**	
		Industrial	**Light**[9]	**Heavy**	**Other**		

[9] Mostly storage, some clean / dry industrial activity – such as welding or hand assembly

11.	Size of building or size of respondent's unit (estimate)	**Building**		**Unit**	
12.	Description, if other:				
13.	Estimated density / bulk level of your area	**>1 per 150m² / >1**	**~1 per 300m² / ~0.8**	**~1 per 600m² / ~0.4**	**<1 per 750m² / ~0.25**
14.	Appearance of your building envelope (the outside of building)	**Well maintained, well controlled[10]**	**Maintained, with areas uncontrolled[11]**	**Unmaintained, in disrepair[12]**	
15.	Is the building / unit	**rented**	**owned**	**other**	
16.	How old is the building?		Term of residence in building?		
17.	When will you next renovate / expand / move?		When was the building last renovated?		
18.	Type of meter(s) in building	**Central (1) max demand**	**Central (1) conventional**	**Central (multiple) mixed (conv. & MD)**	**Distributed (multi.) mixed**
19.	Average monthly electricity bill, for power consumed by tenants:	**Paid by owner**, or	For summer:	**N$**	
			For Winter:	**N$**	
	Who is your electricity supplier?		Do you understand your tariff structure?	**Y / N**	
20.	Average monthly spending on other energy sources (diesel, petrol, gas etc.):	**Paid by owner**, or	For summer:	**N$**	
			For Winter:	**N$**	
21.	What kind of light bulbs are used in the building	**Only conventional**	**Conventional and energy saving**	**Energy saving (fluorescent or others)**	**None / unsure / other**
22.	Is the building insulated: roof	**Y / N**	Walls / other:	**Y / N**	
23.	If at all, how is water heated (state number of devices)	Electricity (normal geyser)		Electricity (heat pump geyser)	

[10] Building looks clean and maintained: painted, very few cracks, all windows functioning, all exterior equipment in a state of repair

[11] Building looks clean and maintained, but possibly some windows / doors are broken, or fitting very loosely closed or left open, roof damage, large cracks/openings or other abnormalities, but limited in extent.

[12] Building is very 'leaky' – brick building in disrepair, or typical corrugated iron shack dwelling

		Solar water heater		Gas	
		Other / unsure		None	
24.	How are rooms heated or cooled (state number of devices)	Electricity (large centralized type)		Electricity (air conditioner - conventional)	
		Electricity (air conditioner – inverter)		Electricity (heater)	
		Fans		Water cooling	
		Natural / other			

25.	Is there a policy regulating how [efficiently] employees use energy in the building?			**Y / N**
26.	Is there an automatic building management system controlling the use of energy?			**Y / N**
27.	Is the building equipped with devices that consume a lot of energy (such as many computers, large industrial equipment etc.)	**Y / N**	If yes, have the efficiency of these been considered before purchase?	**Y / N**

28.	Are you planning to acquire / specify high-consumption, equipment in the near future?	**Y / N**	If yes, what type of equipment	

29.	Where no energy saving devices are used (energy saving lamps, water air conditioner):	Are you aware of energy saving alternatives	**Y / N**	
		Reason for not buying / using efficient alternatives	**Price**	**Availability**
			Convenience	**Other**
30.	Where a mix of EE and conventional devices are used:	Reason for not buying / using <u>only</u> efficient alternatives	**Price**	**Availability**
			Convenience	**Other**

31.	Are you aware of energy efficiency ratings on products: Locally?	**Y / N**	Overseas?	**Y / N**
32.	Would your clients be willing to pay higher sales price on products if their energy bill could be lower?			**Y / N**
33.	Do you advise your clients on alternative products or methods that can save energy?			**Y / N**
34.	Have you been advised by your service suppliers on products or methods that can save energy?			**Y / N**
35.	Do you feel that your organization possess sufficient capacity to accurately evaluate the benefits and costs of energy efficiency techniques and technologies?			**Y / N**
36.	Are you familiar with Total-Cost-of-Ownership and Lifecycle Costing concepts with respect to energy efficient products?			**Y / N**
37.	Do you think that you would sell / specify energy efficient products if you had clear information regarding benefits?	**Y / N**	…even if those products were more expensive than other products?	**Y / N**

38.	Do you believe that being energy efficiency could lower energy costs of your clients	**Y / N**	By how much, at most (% or N$)	
39.	Does the company [respondent] have a policy in place regarding the energy efficiency of the products that they retail (e.g. is there a specific percentage of products?)?			**Y / N**
	*For the following questions, actual quantities and sales **do not** have to be disclosed, only percentages*			
40.	If different products performing the same functions are stocked, with some being more efficient than others, what is the **ratio** between the two? **Efficient : Non-efficient**			
41.	Overall, in terms of total stock value, for all stock; what is the **ratio** between **Efficient : Non-efficient** products?			
42.	Can you provide an approximate indication of sales volumes; for the **ratio** between **Efficient : Non-efficient** products?			
43.	Would you say that you have a broad understand and knowledge of most energy efficient / alternative (i.e. non-conventional) products on the market?			**Y / N**
44.	**Additional notes**			

Survey questionnaire form: Specifiers / operators / developers survey

NEEP Annual Survey

SURVEY FORM: Specifiers, asset managers & developers

Survey

1. **Introduction** (Read to respondent): The purpose of the Annual National Survey on Energy Efficiency in Buildings is to provide a basis for evaluating a variety of initiatives that focus on transforming building practices and energy efficiency in new and existing residential and non-residential buildings, specifically for targeted intervention. The information, generated from energy demand, consumption and expenditure in the different building sector categories, would assist the NEEP project in determining the level of market penetration of EE technologies and practices in buildings.
   This survey should take between **8 and 20 minutes per building**. A maximum of **9 questions plus 52 questions per building** will be asked.
   The respondent may refuse to answer any question that they do not feel comfortable answering.

2.	Date				
3.	Contact person name & surname (survey participant)				
4.	Company name				
5.	Company type	**Specifier - architect**	**Specifier – engineer / other**	**Building manager**	**Building owner**

6.	Do you understand what "energy efficiency" is? Can you give a brief explanation?	**Y / N**
7.	Do you understand what "energy conservation" is? Can you give a brief explanation?	**Y / N**
	If answer to either was 'no' then the follow explanation is given: *Energy efficiency* is the goal to reduce the amount of energy required to do something, for example lighting up a room, cooking food or heating water. Energy can be provided by electricity, but also by petrol like in a car or wood like in a wood stove, paraffin, diesel, sun light to name a few. *Energy conservation* is broader than energy efficiency because it includes the efforts of a person or people to make less use of things that use energy, for example to only switch on one light instead of more lights, and not keeping it on for longer than it is needed. This term it also includes the practice of energy efficiency mentioned before. The benefits of being energy efficient and conserving energy are: Less money is spent on wasted energy; The whole country benefits when there is more energy available, because less is wasted; Companies benefit since they reduce overheads and improve their image.	
8.	If either answer was yes, does the company [respondent] have an energy policy in place, either for what type of fittings are put in the building, or how it should be designed to save energy?	**Y / N**
9.	Brief description	
10.	Would you say that you have a broad understanding and knowledge of most energy efficient / alternative (i.e. non-conventional) building design / construction techniques and technologies?	**Y / N**

Complete the following for each major / significant building designed / managed:
If respondents refuse to answer specific questions, make a note at the question and move on to the next.

1.	Location (town, area, street, no.)						
2.	Name of building, if any						
3.	What is the property?	Commercial	**Retail (single)**	**Retail (complex)**	**Services**	**Bulk**	**Other**
		Residential	**Free standing**	**Cluster housing**	**Cluster flats**	**Other**	
		Industrial	**Light**[13]	**Heavy**	**Other**		
4.	If multi-unit, state number of units						
5.	Size of building or size of each even-sized unit (estimate)	**Building**			**Unit**		
6.	Description, if other:						
7.	Estimated density / bulk level of area	**>1 per 150m² / >1**	**~1 per 300m² / ~0.8**		**~1 per 600m² / ~0.4**	**<1 per 750m² / ~0.25**	
8.	Appearance of building envelope	**Well maintained, well controlled**[14]	**Maintained, with areas uncontrolled**[15]		**Unmaintained, in disrepair**[16]		
9.	Is the building / unit	**rented out / sublet**	**sold to 3rd parties**		**other**		
10.	How old is the building?		How long have you owned the building?				
11.	When will you next renovate / expand / sell?		When was the building last renovated?				
12.	Type of meter(s) in building	**Central (1) max demand**	**Central (1) conventional**	**Central (multiple) mixed (conv. & MD)**		**Distributed (multi.) mixed**	
13.	Average monthly electricity bill, for power consumed by tenants:	**Paid by tenant**, or	For summer:	**N$**			
			For Winter:	**N$**			

[13] Mostly storage, some clean / dry industrial activity – such as welding or hand assembly

[14] Building looks clean and maintained: painted, very few cracks, all windows functioning, all exterior equipment in a state of repair

[15] Building looks clean and maintained, but possibly some windows / doors are broken, or fitting very loosely closed or left open, roof damage, large cracks/openings or other abnormalities, but limited in extent.

[16] Building is very 'leaky' – brick building in disrepair, or typical corrugated iron shack dwelling

	Who is your electricity supplier?			Do you understand your tariff structure?	**Y / N**
14.	Average monthly electricity bill, for central / building services:		For summer:	**N$**	
			For Winter:	**N$**	
15.	Average monthly spending on other energy sources (diesel, petrol, gas etc.):	**Paid by tenant**, or	For summer:	**N$**	
			For Winter:	**N$**	
16.	What kind of light bulbs are used in the building	**Only conventional**	**Conventional and energy saving**	**Energy saving (fluorescent or others)**	**None / unsure / other**
17.	Is the building insulated: roof	**Y / N**	Walls / other:	**Y / N**	
18.	How are rooms heated or cooled (state number of devices)	Electricity (large centralized type)		Electricity (air conditioner - conventional)	
		Electricity (air conditioner – inverter)		Electricity (heater)	
		Fans		Water cooling	
		Natural / other			
19.	If at all, how is water heated (state number of devices)	Electricity (normal geyser)		Electricity (heat pump geyser)	
		Solar water heater		Gas	
		Other / unsure		None	
20.	Is there a policy regulating how [efficiently] occupants use energy in the building?				**Y / N**
21.	Is there an automatic building management system controlling the use of energy?				**Y / N**
22.	Is the building equipped with devices that consume a lot of energy (such as many computers, large industrial equipment etc.)		**Y / N**	If yes, have the efficiency of these been considered before purchase?	**Y / N**
23.	Are you planning to acquire / specify high-consumption, equipment in the near future?	**Y / N**	If yes, what type of equipment		
24.	Where no energy saving devices are used (energy	Are you aware of energy saving alternatives		**Y / N**	

	saving lamps, water air conditioner etc.):	Reason for not buying / using efficient alternatives	**Price**	**Availability**
			Convenience	**Other**
25.	Where a mix of EE and conventional devices are used:	Reason for not buying / using only efficient alternatives	**Price**	**Availability**
			Convenience	**Other**

26.	Are you aware of energy efficiency ratings on products: Locally?	**Y / N**	Overseas?	**Y / N**
27.	Are you aware of energy efficiency ratings on buildings: Locally?	**Y / N**	Overseas?	**Y / N**

28.	Would your tenants / clients be willing to pay higher rent (or sales price) if their energy bill could be lower?	**Y / N**
29.	In the case(s) where you pay the energy bill, would you be willing to pay expend additional capex if the energy bill could be lower?	**Y / N**
30.	What pay-back period would you require to justify such capex (months)?	
31.	Are you familiar with Total-Cost-of-Ownership and Lifecycle Costing concepts with respect to energy efficiency techniques and technologies?	**Y / N**
32.	Do you advise your clients on alternative products or methods that can save energy? Have you been advised by your service suppliers on products or methods that can save energy?	**Y / N**
33.	Do you feel that your organization possess sufficient capacity to accurately evaluate the benefits and costs of energy efficiency techniques and technologies?	**Y / N**
34.	Do you consider energy efficiency of products when specifying / making purchases?	**Y / N**

35.	Have you heard of energy audits?	**Y / N**	Have you commissioned such an audit yet?	**Y / N**
36.	Do you think that you would buy / specify energy efficient products if you had clear information regarding benefits?	**Y / N**	…even if those products were more expensive than other products?	**Y / N**
37.	Do you think that you would buy "green" certified buildings? Would your clients want you to specify for a building to be "green"?	**Y / N**	…even if such a building would not recover the cost difference between conventional buildings with possible savings?	**Y / N**
38.	Do you believe that being energy efficiency could lower energy costs	**Y / N**	By how much, at most (% or N$)	
39.	Do you believe that improved energy efficiency would be to the benefit of the [you as] owner?	**Y / N**	How energy efficient do you think the building is (**1**-least, to **5**-most)	

40.	Have you implemented any energy saving / efficiency measures?	**Y / N**	If yes, briefly describe	
41.	**Additional notes**			

Survey questionnaire form for: Manufacturers

NEEP Annual Survey

SURVEY FORM: Manufacturers

Survey

1. **Introduction** (Read to respondent): The purpose of the Annual National Survey on Energy Efficiency in Buildings is to provide a basis for evaluating a variety of initiatives that focus on transforming building practices and energy efficiency in new and existing residential and non-residential buildings, specifically for targeted intervention. The information, generated from energy demand, consumption and expenditure in the different building sector categories, would assist the NEEP project in determining the level of market penetration of EE technologies and practices in buildings.
   This survey should take between **8 and 15 minutes** to complete. A maximum of **69 questions** will be asked.
   The respondent may refuse to answer any question that they do not feel comfortable answering.

2.	Date	
3.	Contact person name & surname (survey participant)	
4.	Company name	

5.	Do you understand what "energy efficiency" is? Can you give a brief explanation?	**Y / N**
6.	Do you understand what "energy conservation" is? Can you give a brief explanation?	**Y / N**
	If answer to either was 'no' then the follow explanation is given: *Energy efficiency* is the goal to reduce the amount of energy required to do something, for example lighting up a room, cooking food or heating water. Energy can be provided by electricity, but also by petrol like in a car or wood like in a wood stove, paraffin, diesel, sun light to name a few. *Energy conservation* is broader than energy efficiency because it includes the efforts of a person or people to make less use of things that use energy, for example to only switch on one light instead of more lights, and not keeping it on for longer than it is needed. This term it also includes the practice of energy efficiency mentioned before. The benefits of being energy efficient and conserving energy are: Less money is spent on wasted energy; The whole country benefits when there is more energy available, because less is wasted; Companies benefit since they reduce overheads and improve their image.	
7.	If either answer was yes, does the company [respondent] have an energy policy in place, either for what type of fittings are put in the building, or how it should be designed to save energy?	**Y / N**
8.	Brief description	
9.	Would you say that you have a broad understanding and knowledge of most energy efficient / alternative (i.e. non-conventional) building design and operation techniques and technologies?	**Y / N**

If respondents refuse to answer specific questions, make a note at the question and move on to the next.

42.	Location (town, area, street, no.)	

43.	Name of building, if any						
44.	What is the property?	Commercial	**Retail (single)**	**Retail (complex)**	**Services**	**Bulk**	**Other**
		Residential	**Free standing**	**Cluster housing**	**Cluster flats**	**Other**	
		Industrial	**Light**[17]	**Heavy**	**Other**		
45.	Size of building or size of each even-sized unit (estimate)	**Building**			**Unit**		
46.	Description, if other:						
47.	Estimated density/bulk level of area around respondent	**>1 per 150m² / >1**	**~1 per 300m² / ~0.8**	**~1 per 600m² / ~0.4**	**<1 per 750m² / ~0.25**		
48.	Appearance of building envelope	**Well maintained, well controlled**[18]		**Maintained, with areas uncontrolled**[19]		**Unmaintained, in disrepair**[20]	
49.	Is the building / unit	**owned**		**rented**		**other**	
50.	How old is the building?			How long have you owned the building?			
51.	When will you next renovate / expand / sell?			When was the building last renovated?			
52.	Type of meter(s) in building	**Central (1) max demand**	**Central (1) conventional**	**Central (multiple) mixed (conv. & MD)**	**Distributed (multi.) mixed**		
53.	Average monthly electricity bill, for power consumed by respondent:	**Paid by owner**, or		For summer:	**N$ /month**		
				For Winter:	**N$ /month**		
	Who is your electricity supplier?				Do you understand your tariff structure?	**Y / N**	
54.	Average monthly electricity bill, for central / building services:			For summer:	**N$ /month**		
				For Winter:	**N$ /month**		
55.	Average monthly spending on	**Paid by tenant**, or		For summer:	**N$ /month**		

[17] Mostly storage, some clean / dry industrial activity – such as welding or hand assembly

[18] Building looks clean and maintained: painted, very few cracks, all windows functioning, all exterior equipment in a state of repair

[19] Building looks clean and maintained, but possibly some windows / doors are broken, or fitting very loosely closed or often left open, roof damage, large cracks/openings or other abnormalities, but limited in extent.

[20] Building is very 'leaky' – brick building in disrepair, or typical corrugated iron shack dwelling

	other energy sources (diesel, petrol, gas etc.):		For Winter:	**N$ /month**	
56.	What kind of light bulbs are used in the building	**Only conventional**	**Conventional and energy saving**	**Energy saving (fluorescent or others)**	**None / unsure / other**
57.	Is the building insulated: roof	**Y / N**	Walls / other:	**Y / N**	
58.	How are rooms heated or cooled (state number of devices)	Electricity (large centralized type)		Electricity (air conditioner - conventional)	
		Electricity (air conditioner – inverter)		Electricity (heater)	
		Fans		Water cooling	
		Natural / other			
59.	If at all, how is water heated (state number of devices)	Electricity (normal geyser)		Electricity (heat pump geyser)	
		Solar water heater		Gas	
		Other / unsure		None	
60.	Is there a policy regulating how [efficiently] employees use energy in the building?			**Y / N**	
61.	Is there an automatic building management system controlling the use of energy?			**Y / N**	
62.	Is the building equipped with devices that consume a lot of energy (such as many computers, large industrial equipment etc.)	**Y / N**	If yes, have the efficiency of these been considered before purchase?	**Y / N**	
63.	Are you planning to acquire / specify high-consumption, equipment in the near future?	**Y / N**	If yes, what type of equipment		
64.	Where no energy saving devices are used (energy saving lamps, water air conditioner etc.):	Are you aware of energy saving alternatives		**Y / N**	
		Reason for not buying / using efficient alternatives		**Price**	**Availability**
				Convenience	**Other**
65.	Where a mix of energy saving and conventional devices are used:	Reason for not buying / using only efficient alternatives		**Price**	**Availability**
				Convenience	**Other**
66.	Are you aware of energy efficiency ratings on products: Locally?	**Y / N**	Overseas?	**Y / N**	

67.	Are you aware of energy efficiency ratings on buildings: Locally?	**Y / N**	Overseas?	**Y / N**
68.	If renting: Would you be willing to pay higher rent if your energy bill could be lower?			**Y / N**
69.	In the case(s) where you pay the energy bill, would you be willing to pay expend additional capex if the energy bill could be lower?			**Y / N**
70.	What pay-back period would you require to justify such capex (months)?			
71.	Are you familiar with Total-Cost-of-Ownership and Lifecycle Costing concepts with respect to energy efficiency techniques and technologies?			**Y / N**
72.	Have you been advised by your service suppliers on products or methods that can save energy?			**Y / N**
73.	Do you feel that your organization possess sufficient capacity to accurately evaluate the benefits and costs of energy efficiency techniques and technologies?			**Y / N**
74.	Do you consider energy efficiency of products when specifying / making purchases?			**Y / N**
75.	Have you heard of energy audits?	**Y / N**	Have you commissioned such an audit yet?	**Y / N**
76.	Do you think that you would buy / specify energy efficient products if you had clear information regarding benefits?	**Y / N**	…even if those products were more expensive than other products?	**Y / N**
77.	Do you think that you would buy "green" certified buildings? Would your clients want you to specify for a building to be "green"?	**Y / N**	…even if such a building would not recover the cost difference between conventional buildings with possible savings?	**Y / N**
78.	Do you believe that being energy efficiency could lower energy costs	**Y / N**	By how much, at most (% or N$)	
79.	Do you believe that improved energy efficiency would be to the benefit of the [you as] owner?	**Y / N**	How energy efficient do you think the building is (**1**-least, to **5**-most)	
80.	Have you implemented any energy saving / efficiency measures? **Y / N**		If yes, briefly describe	
81.	**Additional notes**			

Survey questionnaire form: Architects survey

Date	
Company name	

Introduction: This survey, the Annual National Survey on Energy Efficiency in Buildings, is conducted through the Renewable Energy and Energy Efficiency Institute of the Polytechnic of Namibia. Its purpose is to evaluate people's awareness and use of energy saving methods and products. This survey is to be used to plan future initiatives to increase the use of energy saving techniques to benefit Namibia's economy and reduce our reliance on other countries for imported energy. This survey should take between **5 and 10 minutes**. **14 questions** will be asked. The respondent may refuse to answer any question that they do not feel comfortable answering.

Do you understand what "energy efficiency" is? Can you give a brief explanation? (Y/N)	
Do you understand what "energy conservation" is? Can you give a brief explanation? (Y/N)	
If answer to either was 'no' then the follow explanation is given: *Energy efficiency* is the goal to reduce the amount of energy required to do something, for example lighting up a room, cooking food or heating water. Energy can be provided by electricity, but also by petrol like in a car or wood like in a wood stove, paraffin, diesel, sun light to name a few. *Energy conservation* is broader than energy efficiency because it includes the efforts of a person or people to make less use of things that use energy, for example to only switch on one light instead of more lights, and not keeping it on for longer than it is needed. This term it also includes the practice of energy efficiency mentioned before. The benefits of being energy efficient and conserving energy are: • Less money is spent on wasted energy. • The whole country benefits when there is more energy available, because less is wasted. • Household benefits because they can save or spend the money on other things.	

General awareness & implementation

How familiar are you with energy efficient products and techniques: Scale of 1 (not at all) to 10 (expert)	
Do you discuss energy efficient solutions with all your clients? (Y/N)	
Do you encourage clients to think about these issues? (Y/N)	
Can you provide clients with hard- or softcopy information detailing what energy efficiency is, why it is important and what the latest developments in the world are regarding this? (Y/N)	
Are you able & do you have enough information on hand to provide them with Cost : Benefit ratios and repayment periods of the cost differences between more efficient and older technologies? (Y/N)	
Do you attempt to incorporate efficient thermal design (orientation, promoting air flow, proper materials) into every design, apart from specific client requests? (Y/N)	
Do you have any non-biased (i.e. non product related) information on hand regarding efficient techniques and technologies? (Y/N)	

Are your clients interested in energy efficiency issues, even if only a passing interest? (Y/N)	
Could you estimate a percentage of clients interested in such issues? (%)	
Do you feel the building industry (building codes, governmental regulators etc.) supports or opposes the incorporation of energy efficiency in buildings? (Y/N)	
Have you noticed an improvement in institutional support (government or otherwise) of energy efficiency in the building sector / built environment in the last five years? (Y/N)	
Have you noticed an improvement in the awareness of energy efficiency issues amongst your clients in the last 5 years? (Y/N)	

Survey questionnaire form: Real estate agents survey

Renewable Energy & Energy Efficiency Institute (REEEI)

NEEP Annual Survey
SURVEY FORM:
Real estate

Introduction (For survey participants)

The purpose of the Annual National Survey on Energy Efficiency in Buildings is to provide a basis for evaluating a variety of initiatives that focus on transforming building practices and energy efficiency in new and existing residential and non-residential buildings, specifically for targeted intervention. The information, generated from energy demand, consumption and expenditure in the different building sector categories, would assist the NEEP project in determining the level of market penetration of EE technologies and practices in buildings.
This survey should take between 7 and 10 minutes. A maximum of 36 questions will be asked.

The respondent may refuse to answer any question that they do not feel comfortable answering. ***All answers are treated in strict confidentiality***. Hover mouse over fields to receive tips.

Date (yy-mm-dd)

Respondent full name or surname

Company name

Do you understand what "energy efficiency" is? Could you give a brief explanation? Check if yes ☐

Do you understand "energy conservation"? Can you give a brief explanation? Check if yes ☐

If answer to either was 'no' then the follow explanation is provided:

If answer to either was 'no' then the follow explanation is given: Energy efficiency is the goal to reduce the amount of energy required to do something, for example lighting up a room, cooking food or heating water. Energy can be provided by electricity, but also by petrol like in a car or wood like in a wood stove, paraffin, diesel, sun light to name a few. Energy conservation is broader than energy efficiency because it includes the efforts of a person or people to make less use of things that use energy, for example to only switch on one light instead of more lights, and not keeping it on for longer than it is needed. This term it also includes the practice of energy efficiency mentioned before. The benefits of being energy efficient and conserving energy are: Less money is spent on wasted energy; The whole country benefits when there is more energy available, because less is wasted; Companies benefit since they reduce overheads and improve their image.

If either answer was yes, does the company [respondent] have an energy policy in place, either for what type of fittings are put in the building(s), or how it should be designed to save energy? Check if yes ☐

Brief description of polices:

Do your clients make any enquiries with regard to the energy efficiency devices in buildings they wish to rent / acquire / sell? Check if yes ☐

*Examples of these devices: energy saving lamps, microwave, solar water heater, efficient air conditioning or water coolers, etc.

If yes, what percentage of your clients typically make such enquiries, on a monthly basis? <10%

Do your clients make any enquiries with regard to the buildings they wish to rent / acquire / sell as being "green" or "sustainble"? Check if yes ☐

If yes, what percentage of your clients typically make such enquiries, on a monthly basis? <10%

*Green/sustainable buildings are those built specifically to minimize energy consumption or other impacts on the environment and may have been built using non-conventional materials or in special shapes or be fitted with high grade insulation (such as double glazing, cavity walls or high grade ceiling insulation) to this purpose

Have you noticed any changes in [the number of] houses on the market which specifically contain energy efficient devices? Haven't noticed

Have you noticed any changes in [the number of] houses on the market which are specifically constructed as "green" or "sustainable" houses? Haven't noticed

In an effort to guage the magnitude of this issue in the Namibian market, we confidentially request the following information:
Please state the number of properties, of given size and type, processed by your company, on average per month (whether sold, bought or rented)

Residential, small: Bachelor / single bed

Residential, medium: two bedroom

Residential, large: three bedroom

Residential, very large: more than three bedroom

Commercial small: <100m²

Commercial large: <100m²

Industrial small: <150m²

Industrial small: <150m²

Are you aware of efficiency ratings on products: Locally? Check if yes ☐ In foreign countries / overseas? ☐

Are you aware of efficiency ratings on buildings: Locally? Check if yes ☐ In foreign countries / overseas? ☐

Would your tenants / clients be willing to pay higher rent (or sales price) if their energy bill could be lower? Check if yes ☐

Are you familiar with Total-Cost-of-Ownership and Lifecycle Costing concepts with respect to evaluating energy efficiency techniques and technologies? Check if yes ☐

Do you advise your clients on alternative products or buildings that can save energy? Have you been advised by service suppliers on products or methods that can save energy? Check if yes ☐

Do you feel that your organization possess sufficient capacity to accurately evaluate the benefits and costs of energy efficiency techniques and technologies and "green" buildings? Check if yes ☐

Do you think that your clients may want to buy "green" buildings? Check if yes ☐ ...even if such a building would not recover the cost difference between conventional buildings with possible savings? ☐

Do you believe that being energy efficiency would lower your energy costs? Check if yes ☐ By how much (% or N$)?

Do you believe that improved energy efficiency would be to the benefit of the building owner? Check if yes ☐ How would you score your building in terms of being energy and temperature efficient (1= least efficient, 5=most)? 1

Any other comment:

Please click on the submit button to send out the survey. When asked which email program to use, you will most likely want to use the "Desktop Email Application" option to send out the email using Outlook, Outlook Express, Thunderbird or whichever email program you are using.

Alternatively. the form cn be printed out and faxed to 061-250279, Attn.: F Mushangwe or scanned and emailed to fungai@lithon.com Email

Survey questionnaire form: Financial institutions survey

1. Does your organization have a specific policy or policies regarding its own acquisition and use of energy efficient technologies and / or practices that reduce electricity and other energy consumption (internally)?
2. Does your organization have a policy(ies) in place regarding the financing of energy efficiency technologies and / or renewable energy devices?
    a. If so, do you offer preferential financing in such cases?
    b. Also, do you have a specific listing of equipment that would qualify for such financing?
3. [If not:] Is there any current planning to bring such policies in place?
4. Are there any market / institutional barriers that you would like to identify, that is hampering your organization in providing preferential financing for these technologies?
5. Are there any market / institutional barriers that you would like to identify, that you feel is hampering these technologies coming to market in scale?