

# **Preliminary Impact Assessment (PIA)**

## **Industrial Energy Efficiency Improvement in South Africa**

UNIDO project Nos. TE/SAF/11/001, SE/SAF/09/001/A01,  
UE/SAF/09/002 – SAP ID 103097



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11 February 2015

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## *Acronyms*

CPD	Continuous Professional Development
DSM	Demand Side Management
EF	External Factor
EnMS	Energy Management Systems and Standards
ESCO	Energy Services Company
ESO	Energy System Optimisation
FPE	Final Project and Impact Evaluation
GEF	Global Environment Facility
GHG	Greenhouse Gas
IEE	Industrial Energy Efficiency
ID	Impact Driver
IPP	Independent Power Producers
IS	Intermediate States
M&E	Monitoring and Evaluation
NCCRP	National Climate Change Response Policy
NDP	National Development Plan
NEES	South African National Energy Efficiency Strategy
PIA	Preliminary Impact Assessment
PMU	Project Management Unit
PSC	Project Steering Committee
PSEE	Private Sector Energy Efficiency Project
ROtI	Review of Outcomes to Impacts
SA	South Africa
SAEE	South African Energy Efficiency
SA-NCPC	South African National Cleaner Production Centre
SME	Small-to-medium enterprise
TOC	Theory of Change
TOR	Terms of Reference
UNIDO	United Nations Industrial Development Organisation

Environmental Resources Management Southern Africa (Pty) Ltd (ERM) has been commissioned by UNIDO to conduct a Preliminary Impact Assessment (PIA) and a Final Project and Impact Evaluation (FPE) of the South Africa Industrial Energy Efficiency Project (SA IEE Project).

This assignment is being managed jointly by UNIDO and the South African National Cleaner Production Centre (SA-NCPC), and comprises two main tasks. This report contains the findings emerging from Task 1 (namely, the PIA). The PIA has involved an impact assessment of the project's activities and reach to date, to inform Phase II of the SA IEE Project and to develop lessons to inform the FPE (Task 2). The objectives of the PIA are stated in *Section 1.2* below. The second task of the assignment, the FPE, will be completed between September and December 2015.

### 1.1 SA IEE PROJECT OBJECTIVES

The objectives of the SA IEE Project were originally stated in the UNIDO project document (defined prior to the commencement of the project), and were later revised and restated in the May 2013 "Strategic Project Analysis of the SA IEE Project".

The primary development goal for the SA IEE Project is *"To increase industrial energy efficiency in South Africa in order to contribute to national efforts to improve energy security and electricity supply continuity while seeking that GDP growth is not constrained by energy shortages and rising prices"*.

Other broader project objectives noted in the UNIDO project document include:

- *"To increase industrial energy efficiency in South Africa in order to contribute to national efforts to guarantee secure energy and electricity supplies that ensure GDP growth is protected from energy supply disruptions and the effects of energy price increases are mitigated to the greatest degree possible";*
- *"Improve productivity and competitiveness of industrial projects and create more jobs";*
- *"To contribute to the South African Government's objective of realizing a 15% energy efficiency improvement within the Industrial and Mining sector by the end of 2015 as defined under the 3<sup>rd</sup> Review of the National Energy Efficiency of the Republic of South Africa (NEES)";*
- *"The companies participating in the demonstration projects will reduce their energy consumption by 15%, as a direct impact of the demonstration";*

- *'Industrial organizations, while in many cases through investment in industrial energy efficiency, will benefit from reduced production costs incurred in electricity purchases';*
- *'By making a major contribution towards curtailing the energy crisis, industrial firms will benefit from increased, or at least restored, production levels'; and*
- *'Reduced GHG emissions of approximately 22 million tonnes per year which, at the shadow price of carbon, equates to Euro 704 per year'.*

The progress of the SA IEE Project to meeting these objectives is tested and discussed in *Section 7.1*.

## 1.2

### **PIA OBJECTIVES**

The PIA has three primary objectives:

1. To determine the present level of impact of the SA IEE Project and its different sets of activities;
2. To use the experience of conducting the PIA to “pilot” and provide further elements to be incorporated into the FPE methodology; and
3. To assist in the design and development of a potential SA IEE Phase II project for a possible starting date of mid-2015.

The remainder of this report comprises the following sections:

- *Section 2* detailing the methodology employed for the PIA;
- *Section 3* providing some background to the different external factors affecting the adoption of energy efficiency practices;
- *Section 4* showcasing the analysis undertaken and the main findings and results;
- *Section 5* setting out the main recommendations identified by the team for the design of Phase II of the SA IEE Project;
- *Section 6* containing the main lessons learned through the PIA for consideration in the FPE;
- *Section 7* discussing the main findings from the PIA; and
- *Section 8* highlighting the main conclusions drawn by the ERM team regarding the SA IEE Project.



The methodology employed for the PIA, and detailed here, is very similar to the methodology proposed for the FPE. However, as a result of different objectives, the focus of the FPE and PIA do differ and this will be reflected in the final methodologies. The PIA is designed to be more flexible, multiple objectives. The FPE will be more structured and aligned with UNIDO's Evaluation Policy and will include a detailed assessment of relevance, effectiveness, efficiency, sustainability and impact (these evaluation question categories have been incorporated into the PIA although they do not feature explicitly in the reporting of results). Both methodologies use the Global Environment Facility's (GEF) Review of Outcomes to Impacts as the fundamental framework for conducting the assessment and the evaluation (described in *Section 2.1*). The methodologies are summarised, along with the different objectives of each task, in *Figure 2.1*.

**Figure 2.1** *Activities and objectives for Task 1 (PIA) and Task 2 (FPE)*

Task 1: Preliminary Impact Assessment (PIA) September 2014 – March 2015	Task 2: Final Project Evaluation (FPE) September 2015 – December 2015
<p><b>Objective</b></p> <ul style="list-style-type: none"> <li>• To determine the present level of impact of the different sets of project activities,</li> <li>• To inform the FPE methodology and</li> <li>• To assist in the design and development of a potential SA IEE Phase II project for a possible starting date of mid-2015.</li> </ul> <ul style="list-style-type: none"> <li>▪ Part 1: Project Analysis, Familiarisation and Evaluation Planning.</li> <li>▪ Part 2: Project Database Analysis.</li> <li>▪ Part 3: Stakeholder Interviews and Surveying.</li> <li>▪ Part 4: Data and Survey Analysis, Report Drafting, Presentation and Finalisation.</li> <li>▪ Part 5: M&amp;E System Data Updating and M&amp;E Workshop.</li> </ul>	<p><b>Objective</b></p> <ul style="list-style-type: none"> <li>• To build on the 2014 PIA and provide an assessment on the overall performance of the SA IEE Project.</li> </ul> <ul style="list-style-type: none"> <li>▪ Part 1: Final Project Evaluation Planning.</li> <li>▪ Part 2: Full Project Database Analysis.</li> <li>▪ Part 3: Stakeholder Interviews and Surveying.</li> <li>▪ Part 4: Data and Survey Analysis, Reporting Drafting, Presentation and Finalisation.</li> </ul>

The methodology employed for both tasks looks to assess the relative success of the four components of the SA IEE Project as they were defined following the 2012 project review (see Table 2.1 below).

**Table 2.1** *The four components of the SA IEE Project for consideration*

<i>Component</i>	<i>Description</i>
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<i>Component</i>	<i>Description</i>
<b><i>Component 1.0: Industrial Energy Efficiency Policy and Regulatory Framework Development</i></b>	This should foster an outcome where the capacity of the Government of South Africa is strengthened through the development of policy frameworks that facilitate the implementation of the South African Energy Act and foster improvements in industrial energy efficiency (in line with national climate change mitigation initiatives), through a broad National Energy Efficiency Strategy, the development of industrial energy management planning regulatory tools and technical support measures.
<b><i>Component 2.0: Development, Introduction and Promotion of Energy Management Standards</i></b>	This should foster an outcome where the relevant South African Standardization institutions/bodies are capacitated in regard to adopting, promoting and implementing the international Energy Management Standard ISO 50001 in the national context, while at the same time the national auditing sector is provided with the necessary skills in regard to the operationalization of the Energy Management Standard.
<b><i>Component 3.0: Energy Management and Energy Systems Optimization Capacity Building and Expert Development</i></b>	This should foster an outcome where a core group of South African energy engineers/practitioners (both enterprise and consultancy based) in the fields of EnMS and ESO methodologies is developed, within a framework of professionally recognized and Government accredited training course structures.
<b><i>Component 4.0: EnMS and ESO Demonstration, Awareness Creation and Project Communication</i></b>	The potential energy and financial savings that adopting EnMS and ESO can yield within the South African industrial context is fully demonstrated under targeted programmes of (i) SME energy auditing, (ii) large enterprise ESO assessments, and (iii) EnMS implementation support; while awareness on the two methodologies is broadly raised through project promotional events/initiatives and active participation in relevant industry and government events/initiatives.

The initial methodology ('project plan') drafted by ERM in September 2014 (a separate document submitted to UNIDO) allowed for a flexible approach with a view to evolve the methodology over time to enable the generation of lessons for the FPE. The actual methodology followed, presented below alongside the theoretical approach, is a slightly revised version of the original design, emphasising the flexible approach.

## **2.1 EVALUATION DESIGN AND APPROACH**

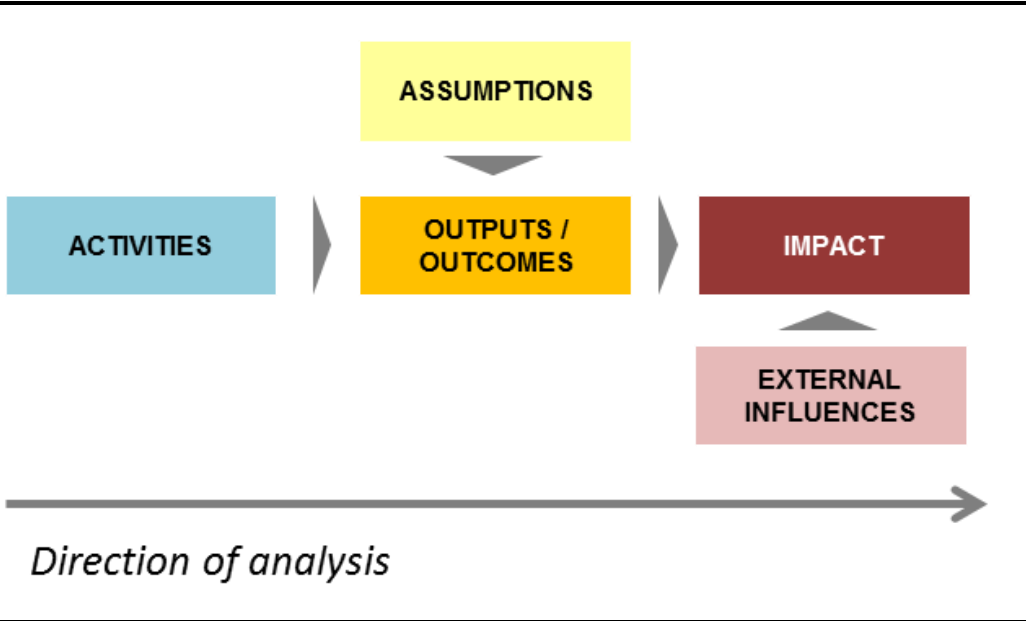
The approach adopted by ERM aimed to evaluate the impacts of the four components of the SA IEE Project utilising the Review of Outcomes to Impacts (ROtI) methodology developed by the GEF Evaluation Office (GEF Evaluation Office and CDC, 2009) (described in *Box 2.1*).

The ROtI methodology was specifically designed to assess the conceptual logic underpinning a project, as captured in the Theory of Change (TOC) and associated logframe, by systematically testing all of the project’s means-ends pathways, namely the expected path from a defined activity to a full impact. The methodology seeks to overcome impact assessment challenges (e.g., resource limitations) by identifying the sequence of conditions and factors deemed necessary to convert project outcomes into the ultimate impact. This approach is based on the premise that once a project’s intended impacts are understood and the TOC and logframe are mapped out, it should be possible to confirm whether the TOC (e.g., the outcomes to impacts pathways) is realistic and in the process of being delivered, and therefore whether the project is on track to deliver its intended impact.

Once the hypothesis of how each outcome would lead to an intended impact has been verified, the approach calls for the evaluator to gather data on the various elements of the pathway to assess the validity of the hypotheses. Results are presented in a structured and transparent way allowing for all stakeholders to interrogate the results. This is particularly valuable in cases where a certain level of subjectivity cannot be avoided.

Figure 2.2 below provides a schematic of how this methodology was applied to the SA IEE Project’s TOC.

Figure 2.2 Schematic of the implementation rationale of the ROtI assessment applied to the SA IEE Project’s TOC



The ROtI methodology typically comprises three stages:

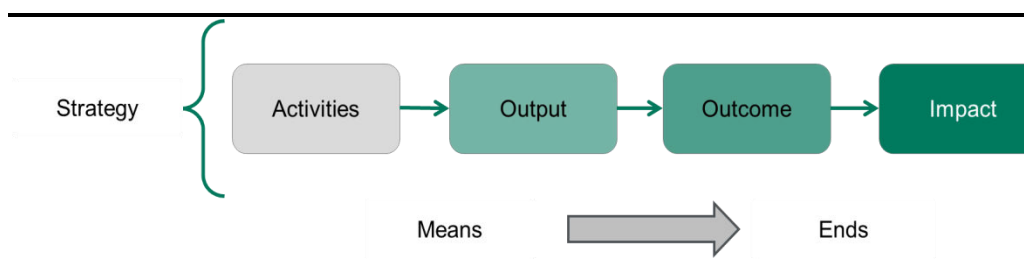
1. Identifying the project's intended impacts;
2. Verifying the project logic; and
3. Analysing the project's outcomes-impacts pathways.

ERM's approach to these three stages for this assessment is set out below.

### 2.1.1 *Identifying the project's intended impacts*

The results chain of the TOC represents the starting point for building the outcomes-to-impact pathways (hereafter referred to as "the pathways"). A generic depiction is shown in *Figure 2.3*. Based on the outcomes of engagements with stakeholders, as well as ERM's own assessment of the SA IEE Project's TOC and logframe, the SA IEE Project's TOC was understood to appropriately capture the main activities, outputs, outcomes, assumptions and external drivers and was therefore used by ERM as a starting point.

**Figure 2.3** *The generic project results chain underlying the TOC approach*



Source: GEF Evaluation Office and CDC, 2009: 2

Indeed, the approach to developing the TOC was participatory and as such key stakeholders' views had been incorporated into the design. The TOC had also been developed with the evaluation in mind. The only drawback with using the TOC as a starting point was that the TOC had been developed mid-way through the SA IEE Project's implementation, which is common given that a TOC is typically only developed at the point of conducting an evaluation. This was, however, considered by ERM not to have any serious consequences for the assessment other than the fact that the indicators are not of much value given that there was little time available to collect data against the indicators. Coupled with the lack of a project baseline, this presented a challenge to the assessment. To overcome the challenge, baseline conditions and indicators were considered and incorporated in assessing the pathway elements through targeted questions in the interviews and surveys. Note, however, that the resultant baseline should be considered as tentative and retrospective.

The TOC was reorganised by ERM so that the elements align with the ROTI methodology. This included splitting some elements and rewording others. For example, "assumptions" in the TOC were split into assumptions and impact drivers (ID), defined as follows:

- *Assumptions*: a declaration of a *status quo* situation that is accepted as true, or certain to happen.
- *Impact Drivers*: the forces that influence or lead to an intermediate state, over which the project has control. In the SA IEE Project, “Outputs” were regarded as impact drivers.

In the end, all impacts associated with the SA IEE Project were included in the final pathways. This was done because if any impacts had not been considered, the factors and conditions for achieving those impacts would not have been included in the assessment. Thus, there was a focus on assessing additional and/ or unintended impacts. This required inputs from stakeholders and a detailed examination of all project documentation to ensure that there was a clear understanding of what the SA IEE Project had tried to achieve, as well as what it may have achieved unintentionally.

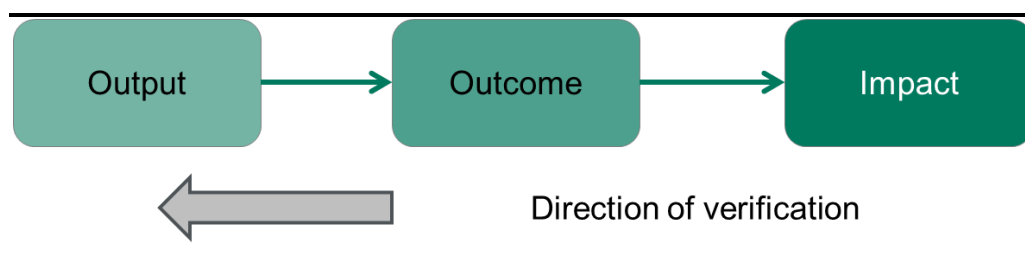
In many cases, the additional / unintended impacts were intangible. Examples of additional / unintended impacts included:

- Improved NCPC brand and improved impacts associated with other NCPC projects, leveraged off the success of the SA IEE Project.
- Developed capacity of NCPC and PSC members.
- The development of a culture more open to energy efficiency and a more constructive discourse around energy systems management.
- Greater sharing of information across competitor businesses / facilities.

### 2.1.2 *Verifying the project logic*

Following the drafting of the pathways, ERM critically reviewed the logic of the project framework. This required the use of the ERM’s expert judgement, engagement with project stakeholders and references to the literature to confirm the assumptions regarding the link between the outputs, outcomes and ultimately the intended impacts. This required ERM to ask the question: “*does it make sense that the outcomes would lead to the intended impacts taking into consideration the assumptions, impact drivers and external factors?*” The generic approach employed by ERM to verify the logical framework is shown in *Figure 2.4*.

Figure 2.4 Generic approach to verifying the logical framework

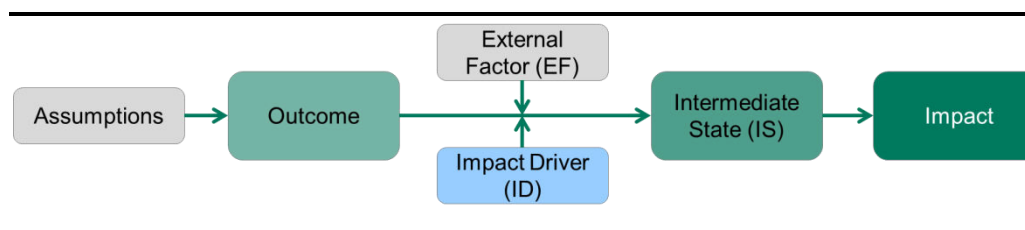


This represented a critical step as the methodology is based on an assumption that should the conditions and factors that would lead to impacts be present, then verifying the presence of those conditions and factors is adequate in proving benefit (impact). This required a level of confidence that the assumptions are valid regarding the contribution of the conditions and factors in leading to the intended impact.

### 2.1.3 Analysing the project's outcomes-impacts pathways

In order to finalise the pathways, i.e., establishing the hypotheses to be tested, ERM added in intermediate states. These intermediate states are the significant factors that, if present, are expected to contribute to the ultimate realisation of project impacts and that are within the ability of the project to influence. At this point, all other elements (assumptions, outcomes, impact drivers and external factors) were represented on the final pathway (the structure of the final, generic, pathways is shown in Figure 2.5). The final pathways constructed by ERM are presented in Annex B. These pathways will form the basis of the assessment for the FPE (although there will be a process undertaken by ERM to review and amend them based on further development up to the point of the evaluation).

Figure 2.5 Generic outcomes-impacts pathway



A total of eight pathways were developed representing each component, which were presented to key stakeholders involved in each of the project components to discuss and confirm the relevance of each element and to identify and address important gaps (see Section 2.2). This was a critical step in ERM's methodology because additional elements had emerged since the TOC was developed. For example, the Private Sector Energy Efficiency Programme (PSEE) run by the National Business Initiative was established, which is an

external factor that is likely to have a significant impact on the overall objective of driving energy efficiency in South Africa (see *Section 3*).

The pathways were also presented to the SA IEE Project team and to the Project Steering Committee (PSC). The process of presenting the pathways to all stakeholders proved challenging as the pathways are complex and stakeholders found it difficult to engage with in the process in a meaningful way. As this process unfolded, ERM resorted to rather presenting the high level themes and key elements relevant to specific stakeholders. In the case of the PSC, the members were asked to indicate their top three priorities to be assessed through this assessment to ensure that these were adequately captured in the pathways. The inputs received from representatives of the PSC against a list of possible priorities are set out in *Table 2.2*.

**Table 2.2** *Inputs received from PSC members on assessment priorities\**

Priority	Peter Mukoma (NBI)	Alf Hartzenburg (on behalf of the NCPC and the PMU)	UNIDO	Ben Cattermole (DFID)	SECO
Potential energy savings (KWh)	X	Primary		X	See these as a single entity as they are inter-related
Realized energy savings (KWh)	X	Primary		X	
tCO2e emissions avoided	X	Secondary		X	
Reduction in energy intensity (per sector)		Primary			
Global competitiveness		Secondary			X
Other		Improved employability and job retention of trained/skilled graduates	X (Agree with Alf)		NCPC institutional strengthening

*\*Priorities indicated by a 'x' or with more information where applicable.*

ERM believes that the final pathways adequately represent the main outcomes as well as the conditions and factors necessary to convert those outcomes to impacts, i.e., the pathways have been found by ERM to be appropriate hypotheses to assess the impacts of the SA IEE Project. The FPE will allow for a further refinement of the pathways and, given exposure to this approach through the FPE, it is expected that stakeholders should be able to engage more meaningfully in the process.

At this stage, the hypotheses (“the outcomes-impact pathways”) had been established, all the impacts and other TOC elements had been captured, the logic behind the relationship between the outputs, outcomes and impacts had been found to be valid and the intermediate states to assess had been identified and added. The next step required ERM to determine where to obtain the data needed to assess each element.

This step necessitated (i) collecting data to assess the different elements of the pathways, i.e., to test the hypotheses, and (ii) analysing the data, i.e., scoring the elements to determine the extent to which the hypotheses hold true.

Firstly, ERM mapped stakeholders and databases to the different pathway elements to identify where data needed to be collected in order to assess each element. Thereafter, a field-based approach that incorporated a mix of interviews and surveys was adopted to gather data. Desktop research was also used to gather information from the literature and project documentation (such as regular reports and project monitoring and evaluation (M&E) databases; see *Section 2.2* for the full set of data reviewed). Where information was required from project beneficiaries or other stakeholders then key external stakeholders were surveyed or interviewed (stakeholders interviewed are included in *Section 2.2*).

ERM fielded two surveys. The first, a paper-based survey, was introduced to participants at the South African Energy Efficiency (SAEE) Convention held in Johannesburg on 11 and 12 November 2014. ERM was in attendance to take attendees through the survey. Those people surveyed had not necessarily been exposed to the SA IEE Project and hence future demand and general awareness was able to be assessed through responses to the survey. A copy of the survey fielded is included as *Annex A*. In total, 26 responses to the survey were collected.

The paper survey served as the basis for the design of the second survey, an internet-based survey. This survey was developed for a more specific audience, i.e., those who had been involved in or exposed to the SA IEE Project in one way or another, e.g., trainees, trainers, auditors, representatives from host/demo/candidate plants, energy services companies (ESCO). The survey was released as Part 2 of a two-part survey, with an online survey from Talk2Us forming Part 1 (the Talk2Us survey focused on assessing awareness and the impact of different forms of outreach as part of Component 4; additional details are included in *Section 2.2*). The two online surveys had a similar 'look and feel' and were scheduled to be released one week apart, with the release emails and hyperlinks to be created and sent to stakeholders by the SA IEE Project team. There were some complications hindering the effective release of ERM's Part 2 survey, namely the release email being unknowingly (and inadvertently) sent out later than planned, and the hyperlink to the survey being incorrectly created (hence people were sent to the wrong URL). These complications were compounded by other factors (explored in *Table 2.3*<sup>1</sup>) resulting in an overall very poor response to the online survey (a total of 25 responses). In total, 51 responses were received for both surveys.

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<sup>1</sup> In order to improve the response level to the online survey, ERM called those targeted by the survey to encourage responses. Various reasons were provided by those called as to why they had not responded to the survey. These are captured in *Table 2.3*.



**Table 2.3** *Factors preventing sufficient responses to the Grapevine survey*

<b>Reasons for insufficient response to the Grapevine survey</b>	
•	A number of the telephone numbers assigned to stakeholders in the SA IEE Project databases were incorrect/ out-of-date.
•	A number of the email addresses for stakeholders in the SA IEE Project databases were incorrect, i.e., stakeholders had left that particular company and hence did not receive the release email.
•	A number of stakeholders mentioned that they did not realise there were two parts to the survey. Hence, they ignored the email concerning the ERM Part 2 survey, as they were under the impression that they had already completed the survey.
•	A number of the stakeholders mentioned that they were quite willing to complete the survey but had serious time constraints, due to December being 'a very busy time of the year'.
•	A couple of stakeholders mentioned that if it had been made very obvious in the release email that the survey would only take five minutes to complete, that they would have completed it.

To augment the data collected through the surveys and other stakeholder engagements, ERM embarked on a series of targeted stakeholder interviews. This represented a deviation from the original plan, highlighting the flexible approach to this assessment. The additional interviews conducted are set out in *Section 2.2*.

The pitfalls experienced with using surveys to collect data will feed into the design of the FPE, as discussed in *Section 6*.

**2.1.5** *Scoring the pathway elements*

The final step in the methodology relates to the scoring of the pathway elements in order to assess the extent of progress against, or relevance of, those elements. Once adequate evidence was obtained by ERM to assess each pathway element, the elements were scored based on a constructed scale relevant to each element type (see the ratings tables in *Table 2.4* to *Table 2.7*).

A decision was made by ERM not to use the predefined scoring scale developed by GEF Evaluation Office and CDC (2009: 21). This is because the constructed scoring scales, rather, are tailored to each element type and therefore the final score / rating should be more transparent to the reader than they would if GEF's predefined scale was developed.

**Table 2.4** *ROTI rating system for assumptions*

<b>Rating</b>	<b>Description</b>	<b>Rationale – from delivery perspective</b>
0	Not relevant	The assumption has not be found to hold
1	Vaguely relevant	The assumption has been found to hold to a very limited extent

<b>Rating</b>	<b>Description</b>	<b>Rationale – from delivery perspective</b>
2	Partially relevant	The assumption has been found to hold to a limited extent
3	Relevant	The assumption has been found to hold

**Table 2.5** *ROtI rating system for outcomes*

<b>Rating</b>	<b>Description</b>	<b>Rationale – from delivery perspective</b>
0	Not achieved	Very little progress has been made towards achieving the outcome and the conditions are not in place for future progress.
1	Poorly achieved	Little progress has been made towards achieving the outcome aspect but the conditions are in place for future success.
2	Partially achieved	Moderate and continuing progress is being made towards achieving the outcome, although there is not yet a strong basis for the eventual delivery of the intended project impact.
3	Fully achieved	Substantial progress has been made towards achieving the outcome and a strong basis is in place for eventual delivery of the intended impact.

**Table 2.6** *ROtI rating system or impact drivers*

<b>Rating</b>	<b>Description</b>	<b>Rationale – from delivery perspective</b>
0	Not relevant and not delivered	The impact driver has not been found to have a significant impact in terms of achieving one or more of the intermediate states (transitional conditions)
1	Relevant but not delivered	The impact driver has been found to have an impact in terms of achieving one or more of the intermediate states (transitional conditions) but the project has not delivered adequately to achieve a significant impact
2	Relevant and partially delivered	The impact driver has been found to have an impact in terms of achieving one or more of the intermediate states (transitional conditions) and the project has partially delivered adequately to achieve a significant impact
3	Relevant and delivered	The impact driver has been found to have a significant impact in terms of achieving one or more of the intermediate states (transitional conditions) the project has delivered adequately to achieve a significant impact

**Table 2.7** *ROtI rating system for intermediate states*

<b>Rating</b>	<b>Description</b>	<b>Rationale – from delivery perspective</b>
0	Not achieved	Very little progress has been made towards achieving the intermediate state and the conditions are not in place for future progress.

Rating	Description	Rationale – from delivery perspective
1	Poorly achieved	Little progress has been made towards achieving the intermediate state aspect but the conditions are in place for future success.
2	Partially achieved	Moderate and continuing progress is being made towards achieving the intermediate state, although there is not yet a strong basis for the eventual delivery of the intended project impact.
3	Fully achieved	Substantial progress has been made towards achieving the intermediate state and a strong basis is in place for eventual delivery of the intended impact.

For the PIA, only a selection of priority elements was assessed in a table similar to that depicted in *Table 2.8*. The elements to be assessed were prioritised based on:

1. the initial scoping stakeholder engagements undertaken to understand what was important (including the feedback from the PSC on priority issues);
2. whether it was suitable to assess the element during the PIA (i.e., some elements had not yet commenced – for example, the development of EnMP industrial enterprise development support materials / package as part of component 1); and
3. ERM’s judgement on what should be assessed during the PIA.

During the FPE, all elements will be assessed and rated.

**Table 2.8** *Indicative framework for reporting assessment findings for a specific pathway*

TOC element	Qualitative Assessment	Rating
Outcome 1	> ...	
Outcome 2	> ...	
Impact Driver 1	> ...	
Impact Driver 2	> ...	
Assumption 1	> ...	
Assumption 2	> ...	
Intermediate State 1	> ...	
Intermediate State 2	> ...	

*Section 0* sets out the final ratings for the priority elements. It is not possible to aggregate the ratings into a single figure for the SA IEE Project. Rather, the ratings (and qualitative assessments) have been used to review the progress of the SA IEE Project against the goals defined during project inception. The review of progress against goals is presented in *Section 7.1*.

As discussed in *Section 2.1.4*, data was collected by means of two surveys as well as through interviews with SA IEE Project staff. To supplement this data, the ERM assessment team conducted focussed interviews with individuals considered key external stakeholders associated with the SA IEE Project. These are individuals who have been intimately involved with the SA IEE Project and therefore have considerable insight into the project without any bias. Key external stakeholders include those individuals who are involved or who have been involved i) as trainers within and outside the SA IEE Project; ii) with revising the training material to make it more locally relevant; and iii) in the development of the case studies.

Furthermore, ERM's data was also bolstered by the information collated and analysed by Talk2Us (see *Box 2.2*).

**Box 2.2**      ***Background to Talk2Us assessment***

Talk2Us was commissioned by UNIDO/NCPC in order to evaluate awareness levels that have been created by the SA IEE Project events amongst key stakeholders. This was undertaken simultaneously with the PIA. Part of Talk2Us' mandate was to conduct an audit of all events that were sponsored, presented or hosted by the SA IEE Project. This audit expanded on the number of delegates that attended these events as well as details about delegate opinions on the quality of the events and presentations within these events. ERM reviewed the Talk2Us awareness and event analysis reports and assessed i) which events were most popular amongst respondents; ii) the level of effectiveness of presentations received at these events; and iii) the likelihood of delegate participation in other, future events based on the quality of the presentations received. Lastly, the distribution of delegates across sectors was also assessed to provide an indication of the reach and influence of the awareness activities undertaken SA IEE Project into different economic sectors.

Interviews and engagements were conducted with the stakeholders set out in *Table 2.9*.

**Table 2.9**      ***Interviews conducted during the PIA***

<b>Interviewee</b>	<b>Component</b>	<b>Interview highlights</b>
Pieter Haasbroek (SABS)	Component 2	Insight and verification into the workings of TC242 and the processes associated with SANS ISO 50001 auditing and

		certification.
Alf Hartzenburg (SA IEE Project)	Components 1 - 4	Alf provided a general overview of the SA IEE Project. He also provided ERM with an implementation savings database which was useful for the analysis undertaken.
Hemant Grover (SA IEE Project)	Component 2	Hemant discussed details related to TC242 and SANS ISO 50001 implementation in the country. He also elaborated on the satellite structure of the SA IEE Project and Gauteng as the control hub.
Ansa Liebenberg (MerSETA)	Component 3	Ansa of MerSETA highlighted the potential demand and uptake of interested institutions in providing EnMS and ESO courses.
Julie Wells (SA IEE Project)	Component 4	Julie explained details about the communication and media awareness strategy. She expanded on the different types of media used (newsletter, website, breakfasts etc.) and their desired outcomes.
Milisha Pillay & Ajay Trikam (SA IEE Project)	Component 3	Milisha and Ajay highlighted the successes and challenges of the SA IEE Project in KwaZulu-Natal and the Western Cape, respectively. They also discussed their opinion of their local offices as regional hubs and their interaction with Gauteng as the control hub.
Wynand van der Merwe (SA IEE Project)	Component 3	Wynand provided ERM with details on the training within the SA IEE Project. He also touched on the SAQA accreditation process and the evolution of the course objectives over time.
James New (UNIDO)	Overall assessment	James is the UNIDO project manager and together with Claudia was responsible for the development of the log frame. He also provided ERM with a high level overview of project objectives and a vision of the project's strategic direction.
Claudia Giacobelli (UNIDO)	Overall assessment	Claudia, besides providing an overview of the SA IEE Project, also contributed an understanding of the progress made within Component 1.

Egmont Ottoman (PPC), Ardent Wessels (Toyota), Yunus Moola (Powertech Batteries), Martin Viljoen and Dawie Fourie (Mendelez) and John Volsteedt (Clay Brick Association of South Africa), Wendy da Cruz, Denis van Es (Carbon and Energy Africa), David Mercer (Golder), Reinet Van Zyl (ArcelorMittal)	Overall assessment	These individuals were interviewed as part of the surveys undertaken by ERM. They also presented external views on the SA IEE Project as a whole and discussed their motivations for undertaking SA IEE Project initiatives, initially. These people were considered by ERM to be key external stakeholders to the SA IEE Project.
Gerswynn Mckuur (Technology Innovation Agency)	Overall assessment	Gerswynn was the former National Project Manager of the NCPC, prior to Alf Hartzenburg taking up the role. Consequently, he was able to guide ERM through the early evolution of the SA IEE Project and the thinking of different components in the Theory of Change.
Project Steering Committee	Overall assessment	The PSC provided an introduction to the SA IEE Project initially. They also provided ERM with priority areas to focus on.
Markus Schrader and Janice Golding (SECCO)	Overall assessment	SECCO provided inputs into the design of the PIA approach and helped build an understanding of the SA IEE Project and its context.
Javier Guarnizo (UNIDO Evaluation office)	Methodology and Design	Javier guided ERM on the implementation of the ROTI methodology on his visit to Vienna. This was used for the PIA.
Attendees at the Phase II workshop	Monitoring and Evaluation System	Project beneficiaries provided insight into the actual implementation of EnMS and ESO in companies. They spoke of the challenges and the possible reforms that can be made to the system.
Ronnie Macpherson	Monitoring and Evaluation System	Ronnie discussed the key successes and weaknesses of the development of the TOC for the SA IEE Project.

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Data derived from the 16 SA IEE Project Databases (compiled by the NCPC) were also analysed by ERM (details of these databases is contained within *Table 2.10*).

**Table 2.10 Databases analysed**

<b>Database</b>	<b>Status</b>	<b>Description</b>
1. Policies and regulations adopted with regard to the implementation of the Energy Act	Provided to ERM (not used in the analysis)	The database includes the impact and contribution of SA IEE Project regulations and policies. Details of government departments involved, sectors included and a description of the impact are also included in the database.
2. Database of companies applying for and obtaining SANS/ISO50001 certification	Provided to ERM (used in the PIA)	The database possesses a list of companies in a process of attaining ISO 50001 certification and those who have achieved certification (as at July 2014).
3. Database of certified lead auditors and accredited auditor training providers	Provided to ERM (used in the PIA)	Included in this database are the names of certified SANS ISO 50001 lead auditors together with contact and company details.
4. Database of training organised by the project, facilitated by national and/or international consultant as well as of the people trained at the different levels and disciplines	Provided to ERM (used in the PIA)	This database includes details of all training participants that undertook EnMS and ESO training courses through the SA IEE Project (including the sectors which they have worked in, and the region where they originate).
5. Database of qualified EnMS and ESO Experts, their companies and follow up results	Provided to ERM (used in the PIA)	This database contained the names and contact details of individuals who undertook training in EnMS and ESO in the SA IEE Project together with their company particulars.
6. Record of the process for the training material development;	This was not provided to ERM in a database; however, conversations with SA IEE Project personnel were used to interrogate the process of training material development.	
7. Record of process followed for obtainment of courses accreditation by SaIMechE	This was not provided to ERM within a database; however, conversations with SA IEE Project personnel highlighted the process of accreditation by SaiMechE.	
8. Log-book for the activities facilitated at the Training and Resource Centre	This was not provided to ERM.	
9. Database of EnMS Host, Candidate and Demo Plants and their status in EnMS implementation	Provided to ERM (used in the PIA)	Included in this database are the companies who have participated in the SA IEE Project as host and candidate plants. Details of implementation type (EnMS or ESO) and the start date of
10. Database of ESO Host, Candidate and Demo		

Plants and their status in ESO implementation		implementation are also present.
11. Record of the process for the engagement with Host, Candidate and Demo Plants	This was not provided to ERM.	
12. Database of energy audits conducted, industrial sector, measures implemented, savings achieved, etc.	Provided to ERM (used in the PIA)	The database highlights the details of companies who were involved in SME energy audits and assessments.
13. EnMS and ESO assessments database (including the length of the support, the expert sent to help, potential and realized savings, etc.)		
14. Database of all publications (media and electronic) developed during the project life, with links to the actual content developed	Some publications were provided to ERM, e.g., the case studies); however, details of the conferences, expos and workshops hosted were not provided to ERM (used in the PIA).	Case studies elaborate the details of EnMS and ESO implementation and details on the energy savings and emissions reductions reported.
15. Databases indicating events, conference and seminars participated in and organised.	This was not provided to ERM.	ERM used reports undertaken by Talk2Us who assessed the awareness and capacity building of media campaigns undertaken by the SA IEE Project (based on this data).
16. Online monitoring options as well as the data gathered through appropriately designed online pop-up surveys.	This was not provided to ERM.	

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The analysis set out below considers external factors that will also have an influence on the intended impacts of the SA IEE Project, i.e. the adoption of energy efficiency. A summary of some of the key external impacts considered is included in *Table 3.1* below.

**Table 3.1** *Factors external to the SA IEE Project influencing the adoption of energy efficiency*

External Factor	Description
Carbon Pricing	<p>South Africa is developing a range of measures to transition to a lower carbon economy which have been communicated through official government channels and secondary industry associations to the South African business community. The mechanisms proposed by government to effect this change in 'business as usual' have contributed in part for the uptake in efficiency measures. They include:</p> <ul style="list-style-type: none"> <li>• A carbon tax – a price on carbon designed to shift behaviour away from emissions-intensive activities; and</li> <li>• Carbon budgets – a GHG limit imposed on entities / companies above a certain emissions threshold.</li> </ul> <p>These are currently being developed and the expectation is that they will align with each other. The implications for business, most notably larger energy consumers and emitters within the economy, are potentially significant. There remains a significant degree of uncertainty around the design and implementation of these measures, the most widely publicised of which is the carbon tax. The tax is being designed by National Treasury (development began in 2010) and the intention is that it will be introduced on 1 January 2016 (delayed from 1 January 2015). As it stands, the tax will be a direct tax liability expected to be limited to Scope 1 emissions. The base rate of R120/t CO<sub>2</sub>e, increasing by 10% annually (&lt; 2020). Free Allowances (for 60% of emissions, trade exposure, process emissions, low emissions intensity relative to a sector benchmark and the opportunity to purchase offsets) reduced the effective tax rate to R120 /tCO<sub>2</sub>e on 20 – 40% of emissions. The tax on electricity sector is likely to be passed on to consumers (i.e., extra R0.04/kWh), thus motivating business to reduce liability through absolute reduction in consumption. These mechanisms will serve to both raise awareness around the need to be more energy efficient and also provide industry with incentives to do so.</p>
Similar programmes	<p>The existence in South Africa of other efficiency-focussed initiatives that share common mission statements with the SA IEE Project is almost certainly a driver for the increase in awareness nationally.</p> <p>The key example in the South African context is the National Business Initiative (NBI) Private Sector Energy Efficiency (PSEE) project, which was launched in 2013 in support of the South African government's strategy for reducing energy demand. The project stems from the UK-SA bilateral relationship and is funded by the UK Government's Department for International Development (DFID). PSEE furthermore receives technical support from the UK's Carbon Trust, who has over 10 years' experience in rolling out a similar programme in the UK. The programme will run until</p>

External Factor	Description
Energy price changes	<p data-bbox="595 152 1414 443">November 2015 and will seek to increase awareness of energy efficiency, capability within industry to identify opportunities for energy efficiency and will provide access to available finance and develop a business case for energy-efficiency programmes that would get board-level support. The PSEE aims to support around 60 large companies with annual energy spend over R45m, about 1000 medium sized companies with annual energy spend between R750k and R45m and remote assistance will be provided to small businesses to adopt and implement energy efficient best practices into their businesses through an informative website and helpline.</p> <p data-bbox="595 479 1414 801">Electricity tariff hikes are a key, if not the key, driver of the adoption of EnMS and ESO in South Africa. The proposed National Energy Regulator of South Africa (NERSA) -approved hikes in energy costs between April 2013 and March 2018 represent an increase of at least 47% in electricity costs for businesses over the five-year period. In addition, fluctuating fuel prices will also impact total energy spend. An additional increase is due in 2015 following the approval of the regulatory clearing account for Eskom. It is expected that electricity supply in South Africa will remain under great pressure for at least the next five years, with energy supply constraints posing a real threat to business sustainability.</p> <p data-bbox="595 837 1414 1061">The significance of electricity price hikes in the South African context mirrors published trends in the adoption of energy efficiency in other countries. For example, in Australia, 82% of environmental or energy managers for large industrial companies respondents reported the carbon price had a moderate to highly significant impact on the adoption of energy efficiency measures, followed by a nationally-sanctioned energy efficiency programme at 80%<sup>1</sup>.</p>
Global operational drivers (RSA subsidiaries of European companies competing on energy efficiency performance)	<p data-bbox="595 1099 1414 1357">A number of large multi-national companies operate within South Africa or are headquartered in South Africa. Due to the legislative pressure in terms of energy and emissions within countries of operation, it is not uncommon for South African operations to be exposed to EnMS and ESO through the wider group. Increasingly, EnMS is being adopted by corporates as a group standard, with associated global awareness campaigns. The level of awareness amongst larger global companies operating in South Africa is partially a factor of the increased adoption of EnMS and ESO globally.</p>
Increased awareness and other regulatory drivers	<p data-bbox="595 1395 1414 1686">General environmental and sustainability awareness, driven through a combination of legislative pressure (for example, National Environmental Management Air Quality Act, 2004) and voluntary disclosure (GRI-compliant integrated annual reporting and Carbon Disclosure Project submissions, for example), have in part contributed to general increase in awareness around ESO and notably EnMS, where a key output of the monitoring and verification component of the management system is reliable and verifiable data which can be readily communicated to a broad range of stakeholders.</p> <p data-bbox="595 1722 1414 1946">Awareness around EnMS and ESO training is in part due to the need to build capacity in the energy sector, both in terms of job creation and employment equity. In the South African context, employment equity, or Broad Based Black Economic Empowerment (B-BBEE) is a key driver of policy across sectors. A key example with reference to energy is the Petroleum and Liquid Fuels Charter released by the then Department of Minerals and Energy in November 2000 which states that black South</p>

<sup>1</sup> ClimateWorks Australia (2013): Tracking Australia's Progress Towards a Low Carbon Economy. Melbourne, Victoria Retrieved from [www.climateworksaustralia.org/tracking-progress](http://www.climateworksaustralia.org/tracking-progress).

External Factor	Description
Other training providers	<p data-bbox="596 152 1417 344">Africans should attain at least 25% ownership and control of all facets of the liquid fuels industry. A recent audit (2011) of progress against implementation goals indicated a slow pace of transformation and in response additional focus has been placed on capacity building. Increased awareness of EnMS and ESO, most specifically training, can thus be attributed to national job creation and employment equity imperatives.</p> <p data-bbox="596 383 1417 638">There are other training institutions providing similar training and in related fields. Examples of these include ESO and EnMS course offerings of institutes and industry associations, for example, the South African National Energy Development Institute (SANEDI), Energy Training Foundation (EnTF) and also independent consultancies such as Terra Firma (Terra Firma Academy) and SGS Energy Management Training. The market share of these training practitioners is limited but considered to a contributor to raising awareness around the need to move to energy efficient practices.</p>

The initial analysis is presented according to the ROTI framework for reporting assessment findings per pathway (with the pathways set out in *Annex B*). Each priority pathway element is assessed as detailed in *Section 2.1.5*. Each element has a unique number within each pathway. Where elements are relevant across pathways they are labelled with letters. This information has been used to inform the review of project objectives described in *Section 7.1*. These tables need to be viewed in conjunction with the pathways (*Annex B*) to understand the logical framework and the context informing the assessment and the reported results.

Additional evidence to support some of the ratings is included in *Annex C*.

#### **4.1** *COMPONENT 1.0: INDUSTRIAL ENERGY EFFICIENCY POLICY AND REGULATORY FRAMEWORK DEVELOPMENT*

This component aimed to foster an outcome where the capacity of the Government of South Africa is strengthened through the development of policy frameworks that facilitate the implementation of the South African Energy Act and foster improvements in industrial energy efficiency (in line with national climate change mitigation initiatives). This was to be achieved through a broad National Energy Efficiency Strategy, the development of industrial energy management planning regulatory tools and technical support measures. The review is presented according to the different outputs.

##### **4.1.1** *Outputs 1.1 – 1.4: assistance in developing policy frameworks that aid the implementation the South African Energy Act*

Outputs 1.1 – 1.4 aimed to assist the Government of South Africa in the development of policy frameworks that aid the implementation of the South African Energy Act so that improvements are fostered in industrial energy efficiency (in line with national climate change mitigation initiatives), through a broad National Energy Efficiency Strategy (NEES), the development of industrial Energy Management Planning regulatory tools and technical support measures. Acknowledging that the promulgation process is outside of the control of the SA IEE Project, the ERM assessment team considered progress related to the 2nd review of the NEES to have been made but to a limited extent. The formation of a work group, external panels and the undertaking of stakeholder consultation indicates that the SA IEE Project team has been proactive in trying to facilitate the promulgation and the development of capacity to implement (in government) and to meet the requirements (in the private sector). The detailed review informing this assessment is presented in *Table 4.1*.

**Table 4.1 Rating for outputs 1.1 - 1.4**

TOC Element	Qualitative/ Quantitative Assessment	Rating
Outcome 1: Set of policy development support activities that facilitate the implementation of the South African Energy Act and better foster an enabling environment for improving industrial energy efficiency through the development of the "2nd Review of the S. African National Energy Efficiency Strategy (NEES)"	<ul style="list-style-type: none"> <li>Policy development support activities such as stakeholder consultation, work groups and expert panels have been set up; however, much of the effectiveness of these activities will be determined following the promulgation of the NEES. Given factors outside of the control, namely Parliament’s promulgation process of the NEES, of the SA IEE Project, there has been limited progress towards achieving the outcome however it is felt that the project has contributed to ensuring the conditions are in place for future impact.</li> </ul>	2
Outcome 4: Set of activities that support the evaluation of the potential of EnMS and ESO methodologies in regard to their possible contribution to the National Climate Change Response Policy (NCCRP) and the initial/ harmonization of reporting functions of industrial/ enterprises and responsible line Departments.	<ul style="list-style-type: none"> <li>It is not possible to assess this outcome at present. Achievement of this outcome has been limited by factors outside of the control of the SA IEE Project, namely Parliament’s promulgation process of the NEES.</li> </ul>	N/A
ID1: 2 <sup>nd</sup> review of the NEES is promulgated	<ul style="list-style-type: none"> <li>The 2nd review has been submitted to Parliament. This is a relevant step to the country-wide promotion of energy efficiency in South Africa. However, the fact that the NEES has only been submitted suggests that the impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact. Promulgation of the NEES falls outside the sphere of influence of the SA IEE Project but will influence the longer term impact of the project’s activities.</li> </ul>	2
ID3: Working groups and expert panels set up	<ul style="list-style-type: none"> <li>“The SA IEE Project established a work group and even though they met regularly, progress was slow” (SA IEE Project personnel, pers. comm, 2014). ‘Progress’ here refers to policy development support activities undertaken by the work groups and expert panels set up.</li> </ul>	<ul style="list-style-type: none"> <li>Confirmation and rating only possible following promulgation of the 2<sup>nd</sup> review of NEES.</li> </ul>
ID4: Stakeholder consultation workshop undertaken	<ul style="list-style-type: none"> <li>Little progress has been made on these TOC elements as it is dependent on the 2<sup>nd</sup> review of the NEES being promulgated. Considering that the NEES</li> </ul>	

TOC Element	Qualitative/ Quantitative Assessment	Rating
	has been submitted suggests that the future conditions are in place; however, it must be noted, as in ID1, that the promulgation is not completely in the sphere of influence of the SA IEE Project.	
ID7: Host and demo plants and case studies undertaken	<ul style="list-style-type: none"> <li>▪ 20 companies were chosen as “host” plants with 22 EnMS and ESO component training sessions being undertaken at these selected host plants.</li> <li>▪ 77 companies were selected as “candidate plants” with 90 EnMS and ESO candidate trainings secured in these plants as at October 2014.</li> <li>▪ Case Studies: 73 companies were signed up to be case study companies, however, only 21 case studies have been completed in these companies as at 23 June 2014.</li> <li>▪ 77% of participants surveyed at the SA IEE Project have never been exposed to the case studies of the SA IEE Project.</li> <li>▪ The fact that assessments and case studies have been undertaken suggests that progress has been made: This impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact. Specifically, by undertaking EnMS and ESO implementation in host and candidate plants, other companies are exposed to energy efficiency activities which could illustrate to government that there is a demand for EnMS and ESO activities in industry, therefore the 2<sup>nd</sup> review of the NEES is promulgated.</li> </ul>	2
ID8: Other media awareness and promotional events undertaken	<ul style="list-style-type: none"> <li>▪ “Business breakfasts undertaken by the NCPC” (SA IEE Project personnel pers. comm., 2014).</li> <li>▪ Talk2Us conducted a focussed awareness study on individuals (<math>n = 84</math>) who were engaged with the SA IEE Project from 2010 – 2014. They were asked about their exposure to different event/awareness types (workshops, expos, case studies etc.) held by the SA IEE Project. Workshops stood out: 53.6% suggested</li> </ul>	2

TOC Element	Qualitative/ Quantitative Assessment	Rating
	<p>that they recalled the workshops held by the SA IEE Project (Talk2Us, 2014)<sup>1</sup>.</p> <ul style="list-style-type: none"> <li>▪ Participants were mostly exposed to the SA IEE Project through newspaper articles (60%) as opposed to magazine articles (40%) and radio programming (0%).</li> <li>▪ The SA IEE Project website is live (<a href="http://ncpc.co.za/home-ieee">http://ncpc.co.za/home-ieee</a>).</li> <li>▪ The SA IEE Project newsletter was discontinued from July 2012 as it was not effective. The newsletter was only emailed to individuals on the NCPC database who were already aware of SA IEE Project. Consequently, the newsletter did not have the desired reach as it did not target individuals who may not have been aware of the SA IEE Project.</li> <li>▪ Of the participants surveyed at the SAEE convention, 77% were not aware of the SA IEE Project.</li> <li>▪ The impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact. Specifically, additional media awareness could facilitate the uptake of EnMS and ESO activities which will illustrate to government that there is a demand for EnMS and ESO in industry and the 2<sup>nd</sup> review of the NEES.</li> </ul>	

## 4.2

### ***COMPONENT 2.0: DEVELOPMENT, INTRODUCTION AND PROMOTION OF ENERGY MANAGEMENT STANDARDS***

This component aims to foster an outcome where the relevant South African Standardisation institutions/bodies are capacitated with regards to adopting, promoting and implementing the international Energy Management Standard ISO 50001 in the national context, while at the same time the national auditing sector is provided with the necessary skills in regard to the operationalisation of the Energy Management Standard. The review is presented according to the different outputs.

<sup>1</sup> The recall measurement is a variable that indicates a respondent's ability to recall key messages shared with a particular group or audience. The recall measurement establishes how much of an impression a certain type of exposure has had on the affected party.

#### 4.2.1

#### Outputs 2.1, 2.4 and 2.5

There was limited institutional awareness and capacity building with regard to the development and introduction of an Energy Management Standard compatible with the National ISO 50001 (SANS/ ISO50001). However, there was no indication that there is a lack of capacity regarding national institutions to effectively administer activities relating to the standard. Awareness raising in the private sector could have been more effective; however, most of companies who were exposed to the SA IEE Project used the standard as an implementing guideline and reference point in industry. These actions set the basis for improved impact in the future. The detailed review is included in *Table 4.2*.

**Table 4.2** *Rating for outputs 2.1, 2.4 and 2.5*

TOC Element	Qualitative/Quantitative Assessment	Rating
O1: Outcome (Output 2.1) National institutional awareness and capacity building activities in regard to the development and introduction of the National ISO 50001 compatible Energy Management Standard (SANS/ ISO50001)	<ul style="list-style-type: none"> <li>▪ National institutional capacity building has occurred. The SANS ISO 50001/50002 is a certifiable (and auditable) standard. Capacity building occurred with a study tour to Sweden to familiarise South African experts with ISO 50001 accreditation processes. Capacity building has also been facilitated through the SA IEE Project where courses are offered.</li> <li>▪ With regards to awareness, roadshows were never undertaken by SABS therefore the understanding of SANS ISO 50001 may not be as good as it possibly could be. Therefore, progress is moderate and continuing progress towards achieving the outcome of national institutional and capacity building in relation to SANS ISO 50001 is understood; however, there is not yet a strong basis for the eventual delivery of the intended project impact.</li> </ul>	2
O2: Outcome (Output 2.4.) Set of EnMS SANS/ISO50001 industry publicity and promotional events	<ul style="list-style-type: none"> <li>▪ These were not undertaken by the SABS and therefore were never supported by the SA IEE Project as was initially envisioned.</li> </ul>	0
ID1: Study tour undertaken for SABS & SANAS capacity for ISO 50001	<ul style="list-style-type: none"> <li>▪ A study tour to Sweden was undertaken by SABS and SANAS representatives for capacity building in SANS/ISO 50001. The representatives were accompanied by SA IEE Project personnel.</li> </ul>	3
ID2: National institutional awareness and capacity building specific to SANS 50001	<ul style="list-style-type: none"> <li>▪ An SABS representative who participated in the study tour to Sweden stated that roadshows were initially planned by SABS to build capacity and awareness of ISO 50001 but these were not undertaken.</li> </ul>	2



TOC Element	Qualitative/Quantitative Assessment	Rating
	<ul style="list-style-type: none"> <li>This impact driver has been found to have a significant effect in terms of achieving one or more of the intermediate states that would lead to a substantial number of companies implementing EnMS system elements. It is acknowledged that it is the responsibility of SABS to undertake awareness activities related to the ISO 50001 with support from the SA IEE Project.</li> </ul>	
ID3: Awareness and capacity undertaken by the SA IEE Project media and communication team specific to SANS 50001	<ul style="list-style-type: none"> <li>“No awareness or capacity building activities were undertaken by the NCPC. It is important to note that the responsibility of these awareness activities lies with SABS. We had planned to support the SABS if they undertook roadshows however this did not materialise.” (SA IEE Project personnel pers. comm., 2014).</li> <li>It is likely that increased awareness could have increased the uptake of SANS ISO 50001 accreditation audits (Rating = 1, Relevant but the intermediate driver does not deliver adequately to facilitate full impact of the intermediate state). It must be noted that the awareness responsibilities are not the primary objective of the SA IEE Project.</li> </ul>	1
ID 4: Awareness and capacity building geared towards companies related to alignment/ certification	<ul style="list-style-type: none"> <li>Awareness and capacity building activities related towards company alignment and certification of SANS ISO 50001 was not undertaken by the SA IEE Project.</li> <li>This assessment found that 90% of companies who participated in the SA IEE Project confirmed that they use the SANS ISO 50001 standard as a guideline (<math>n = 10</math>). The increased awareness to companies about the usage of SANS ISO 50001 as a guideline could have yielded significantly more alignment to the SANS ISO 50001 standard in companies.</li> <li>Therefore, this impact driver (awareness and capacity building related to alignment/ certification) will have an impact in terms of achieving the intermediate states related to the uptake and implementation of the SANS ISO 50001 standard; however, the project has not delivered adequately to achieve a significant impact.</li> </ul>	1
ID5: Roadshows undertaken	<ul style="list-style-type: none"> <li>“Roadshows, were to be undertaken by</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
	<p>the SABS, however they were cancelled, twice. The NCPC had agreed to support the SABS in these awareness campaigns” (SA IEE Project personnel pers. comm., 2014).</p> <ul style="list-style-type: none"> <li>This ID was rated as a “2” as roadshows were to be undertaken by SABS and not the SA IEE Project therefore the influence of embarking on roadshows was out of the control of the SA IEE Project. However, roadshows could have been significant in creating awareness of SANS ISO 50001 and are therefore relevant.</li> </ul>	
ID6: Influential stakeholders present at Roadshows	<ul style="list-style-type: none"> <li>No road shows were undertaken. See ID 5.</li> </ul>	1
ID7: Host and demo plants and case studies will illustrate savings facilitating alignment	<ul style="list-style-type: none"> <li>20 companies were chosen as “host” plants with 22 EnMS and ESO component training sessions being undertaken in these selected host plants.</li> <li>77 companies were selected as “candidate plants” with 90 EnMS and ESO candidate trainings secured in these plants as at October 2014.</li> <li>Case Studies: 73 companies were signed up to be case study companies however only 21 case studies have been completed in these companies as at 23 June 2014.</li> <li>77% of participants surveyed as part of this assessment have never been exposed to the case studies of the SA IEE Project.</li> <li>The fact that assessments and case studies have been undertaken suggests that progress has been made: This impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact. Specifically, by undertaking EnMS and ESO implementation in host and candidate plants, other companies are exposed to energy efficiency activities which could lead to increased alignment or certification of the SANS ISO 50001 standard in industry.</li> </ul>	2
ID8: Other media awareness and promotional events undertaken drive companies to align to SANS ISO 50001	<ul style="list-style-type: none"> <li>“Business breakfasts undertaken by the NCPC” (SA IEE Project personnel pers. comm., 2014).</li> <li>Talk2Us conducted a focussed awareness</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
	<p>study on individuals (<math>n = 84</math>) who were engaged with the SA IEE Project from 2010 – 2014. They were asked about their exposure to different event/awareness types (workshops, expos, case studies etc.) held by the SA IEE Project. Workshops stood out: 53.6% suggested that they recalled the workshops held by the SA IEE Project (Talk2Us, 2014).</p> <ul style="list-style-type: none"> <li>▪ Participants were mostly exposed to the SA IEE Project through newspaper articles (60%) as opposed to magazine articles (40%) and radio programming (0%).</li> <li>▪ The SA IEE Project website is live (<a href="http://ncpc.co.za/home-ieee">http://ncpc.co.za/home-ieee</a>).</li> <li>▪ The SA IEE Project newsletter was discontinued from July 2012 as it was not effective. The newsletter was only emailed to individuals on the NCPC database who were already aware of SA IEE project. Consequently, the newsletter did not have the desired reach as it did not target individuals who may not have been aware of the SA IEE Project.</li> <li>▪ Of the participants surveyed at the SAEE convention, 77% were not aware of the SA IEE Project.</li> <li>▪ The impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact. Specifically, additional media awareness could facilitate the uptake of EnMS and ESO activities which will expose other companies to EnMS and ESO activities and possibly lead to increased certification and alignment of the SANS ISO 50001 standard.</li> </ul>	
A3: SAATCA accreditation adds value	<ul style="list-style-type: none"> <li>▪ The assumption has been found to hold.</li> <li>▪ Initially, SAATCA accreditation was the preferred option for EnMS and ESO course certification; however, SAQA accreditation was seen to be more beneficial in terms of the recognition of courses. Furthermore, companies had mentioned that they considered the earning of CPD points as beneficial.</li> </ul>	3
A4: Certified auditing is more credible	<ul style="list-style-type: none"> <li>▪ The assumption has not been found to hold true.</li> </ul>	0

TOC Element	Qualitative/Quantitative Assessment	Rating
	<ul style="list-style-type: none"> <li>90% of companies who were surveyed in this assessment stated that they used the SANS ISO 50001 as a reference point and guideline to implementation in industry; therefore certified auditing can be seen to be unnecessary (<math>n = 10</math>).</li> </ul>	
A5: Participation in TC242 leads to relationships with relevant bodies to develop conditions that facilitate the uptake of ISO 50001	<ul style="list-style-type: none"> <li>Key respondents supported this assumption therefore the assumption has been found to hold.</li> <li>Participation has the mutual benefit of being able to influence what ends up in the standards and provides insight into what will be happening in terms of energy management</li> </ul>	3
A6: SETA involvement can expand road show impacts	<ul style="list-style-type: none"> <li>No evidence to support or reject this assumption. Road shows were not undertaken by the SABS. Therefore, it is not possible to speculate on what effects SETA involvement could have had on road shows undertaken.</li> </ul>	N/A
IS 1: Companies are exposed to capacity building, publicity event and awareness efforts. These relate directly to ISO 50001 & ISO 50002	<ul style="list-style-type: none"> <li>If no capacity building and awareness activities were undertaken specific to SANS 50001 by the SA IEE Project, companies could not be exposed to these activities.</li> </ul>	N/A
IS A: The SANS standards becoming a <i>reference point/guideline</i> for companies to implement EnMS or EnMS elements (without aiming for certification)	<ul style="list-style-type: none"> <li>90% of company representatives interviewed for the SA IEE Project survey suggested that they use the SANS standard as a guideline (<math>n = 10</math>).</li> <li>There is evidence of companies adopting system elements (<i>Table 8.6 in Annex C</i>) of SANS ISO 50001 (rather than opting for full certification). This suggests that future conditions are in place for this intermediate state to reach full impact; however, a lack of awareness raising related to SANS ISO 50001 may have hindered or slowed down the process of the intermediate state reaching full impact. It must be noted that some capacity building related to SANS ISO 50001 has taken place through the training courses offered during the SA IEE Project.</li> </ul>	2
IS B: EnMS elements are in place	<ul style="list-style-type: none"> <li>All company representatives and consultants, who were involved in the SA IEE Project, implemented EnMS elements in industry (<math>n = 9</math>). A breakdown of which EnMS elements were implemented is denoted in <i>Table 8.6 in Annex C</i>.</li> </ul>	3

TOC Element	Qualitative/Quantitative Assessment	Rating
	<ul style="list-style-type: none"> <li>▪ Most EnMS elements were implemented in companies that undertook EnMS implementation.</li> <li>▪ Therefore, substantial progress has been made towards achieving the intermediate state and there is a strong basis for the eventual delivery of the intended impact.</li> </ul>	

#### 4.2.2

#### *Outputs 2.2 and 2.3*

The SA IEE Project was instrumental in developing a national energy management standard compatible with the ISO Energy Management Standard ISO 50001 (SANS/ ISO50001) and facilitating the use of it as a guideline for implementing EnMS system elements. The project has built capacity of an adequate number of lead auditors and auditors to meet demand for certification. Therefore, adequate national capacity in SANS ISO 50001 exists in industry which can be attributed to the SA IEE Project. Demand for certification has been limited. If the SA IEE Project enhances awareness activities on SANS ISO 50001 and the demand increases, it is questionable whether there will be enough capacity to deal with the increased demand for certification. The detailed review is included in *Table 4.3*.

**Table 4.3**

***Rating for outputs 2.2 and 2.3***

TOC Element	Qualitative/Quantitative Assessment	Rating
O1: Outcome (Output 2.2) National Energy Management Standard compatible with the ISO Energy Management Standard ISO 50001 (SANS/ ISO50001)	<ul style="list-style-type: none"> <li>▪ Achieved. This provides a strong basis is in place for eventual delivery of the intended impact.</li> </ul>	3
O1: Outcome (Output 2.3) National capacity programme for the successful operation of the EnMS standards SANS/ ISO50001, including all required accreditation and certification functions	<ul style="list-style-type: none"> <li>▪ Training courses, mentoring and on-site support are available through the SA IEE Project which will promote the EnMS standards for SANS ISO 50001. It is difficult to assess this outcome as the demand for certification has not been appreciable. According to one key external stakeholder, there is a sufficient amount of auditors to manage the demand for certification. However, the awareness for SANS ISO 50001 certification to industry has been sufficient so the demand will likely increase.</li> <li>▪ Therefore, moderate and continuing progress has been made towards achieving the outcome, although there is not yet a strong basis for the eventual delivery of the intended project impact.</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
ID1: SANS/ISO50001 developed & published	<ul style="list-style-type: none"> <li>▪ Yes, available online at <a href="http://www.sanas.co.za/manuals/pdfs/TR%2072-01.pdf?manualsPage=16">http://www.sanas.co.za/manuals/pdfs/TR%2072-01.pdf?manualsPage=16</a></li> <li>▪ The SANS ISO 50001 standard is relevant and will contribute to energy efficiency implementation in the future; however, at present the standard is used as a guideline in industry.</li> <li>▪ The published standard is deemed by the ERM assessment team to have a significant impact as it facilitates alignment to the SANS ISO 50001 standard possibly leading to certification in the future.</li> </ul>	3
ID2: SANS/ISO50002 developed and published	<ul style="list-style-type: none"> <li>▪ The project has delivered adequately.</li> </ul>	3
ID3: Auditors & lead auditors trained	<ul style="list-style-type: none"> <li>▪ 16 auditors and 29 lead auditors have been trained in the assessment of SANS ISO 50001.</li> <li>▪ A SABS representative stated that “There is a sufficient amount of auditors trained to deal with the demand for certification of SANS ISO 50001.” This impact driver (auditors and lead auditors trained) has been found to have a significant impact in achieving the intermediate states as it illustrates that expertise is available for the uptake of certification of the SANS ISO 50001.</li> </ul>	3
ID4: assessors (SANAS) trained	<ul style="list-style-type: none"> <li>▪ A key external stakeholder stated that currently there are no assessor initiatives in place. Assessors would be responsible for evaluating the audits conducted by certified ISO 50001 auditors. Assessors may become more prominent in the future if the demand for ISO 50001 accreditation increases.</li> </ul>	N/A
ID5: SA IEE Project staff represented on the TC242	<ul style="list-style-type: none"> <li>▪ Two members from the SA IEE Project (past and present) were represented on the TC242 committee.</li> <li>▪ The presence of the SA IEE Project staff represented on the TC242 committee (impact driver) is significant as it contributes to the achieving TC242 participants and participation across regions and geographies.</li> </ul>	3
ID6: Formal SANS/ ISO 50001 accreditation and certification processes are in place, nationally.	<ul style="list-style-type: none"> <li>▪ 14 companies are currently either certified or in the process of being certified in South Africa indicating that this impact driver (formal SANS ISO</li> </ul>	3

TOC Element	Qualitative/Quantitative Assessment	Rating
	50001 accreditation) has been found to have a significant impact in terms of achieving the intermediate states (uptake of certification in SANS ISO 50001). The project has delivered adequately to achieve a significant impact.	
ID7: Lead auditors recognised by SAATCA	<ul style="list-style-type: none"> <li>▪ The project has partially delivered adequately to achieve a significant impact: recognition is temporary and dependant on relationships with individuals.</li> <li>▪ “IEE reached an agreement with SAATCA where IEE would work with SAATCA to develop lead auditors and capacitate them in terms of ISO 50001 certification”: (SA IEE Project personnel, pers. comm., 2014). The IEE will need to re-engage with SAATCA owing to the change of management at SAATCA.</li> </ul>	2
A4: Standardisation (certification) bodies are aware of ISO 50001 requirements	<ul style="list-style-type: none"> <li>▪ The assumption has been found to hold true to a limited extent.</li> <li>▪ The SANS ISO 50001 standard is in the public domain (online) and is therefore available for certification bodies that are interested in SANS ISO 50001 certification. However, the fact that SANS ISO 50001 awareness was not undertaken by SABS could possibly mean that other certification bodies are not aware of the standard.</li> </ul>	2
A5: Auditors require training	<ul style="list-style-type: none"> <li>▪ It is the professional judgement of the assessment team that this assumption holds. However, there is no evidence to support or reject this assumption as the demand for auditing prior to the SA IEE Project would need to be assessed.</li> </ul>	2
IS 1: Auditors & lead auditors available to perform audits of the implemented standard	<ul style="list-style-type: none"> <li>▪ According to a key external stakeholder, “the number of ISO 50001 auditors and lead auditors trained, is sufficient to meet the demand and uptake for audits and certification.”</li> <li>▪ 29 Lead Auditors are available to industry. 15 Companies are involved in accreditation process in some capacity (as at September 2014). See <i>Figure 8.1</i> in <i>Annex C</i>.</li> <li>▪ A sufficient number of auditors present to meet demand and uptake for certification suggests that there is continuing progress in achieving the</li> </ul>	3

TOC Element	Qualitative/Quantitative Assessment	Rating
	intermediate state. However, it is difficult to state by how much the demand for SANS ISO 50001 certification will increase in the future (owing to improved awareness and capacity building), therefore it difficult to comment on whether the number of auditors trained will be sufficient to meet the demand.	
IS 2: Auditors & lead auditors remain in South Africa	<ul style="list-style-type: none"> <li>Currently the uptake of certification of the SANS ISO 50001 by industry has been slow; therefore, it is not possible to assess this currently. This element will be addressed in the FPE.</li> </ul>	N/A
IS 3: Auditors & lead auditors are available to industry	<ul style="list-style-type: none"> <li>A key external stakeholder stated “There are a sufficient number of auditors trained to deal with the demand for certification of SANS ISO 50001.”</li> <li>A sufficient number of auditors present to meet demand and uptake for certification suggests that there is continuing progress in achieving the intermediate state. However, it is difficult to state by how much the demand for SANS ISO 50001 certification will increase in the future (owing to improved awareness and capacity building), therefore it difficult to comment on whether the number of auditors trained will be sufficient to meet the demand (in the future).</li> </ul>	2
IS A: The SANS standards becoming a <i>reference point/guideline</i> for companies to implement EnMS or EnMS elements (without aiming for certification)	<ul style="list-style-type: none"> <li>90% of company representatives interviewed for the SA IEE Project survey stated that they use the SANS standard as a guideline (<math>n = 10</math>).</li> <li>There is evidence of companies adopting system elements (<i>Table 8.6 in Annex C</i>) of SANS ISO 50001 (rather than opting for full certification). This suggests that future conditions are in place for this intermediate state to reach full impact; however, a lack of awareness raising related to SANS ISO 50001 may have hindered or slowed down the process of the intermediate state reaching full impact. It must be noted that some capacity building related to SANS ISO 50001 has taken place through the training courses offered during the SA IEE Project.</li> </ul>	2
IS B: EnMS elements are in place	<ul style="list-style-type: none"> <li>Yes, the nine respondents who were involved in the SA IEE Project as either as consultants or company representatives</li> </ul>	2



TOC Element	Qualitative/Quantitative Assessment	Rating
	<p>did implement the pertinent EnMS elements (see <i>Figure 8.27</i> in <i>Annex C</i>). A breakdown of which EnMS elements were implemented is denoted in <i>Table 8.6</i>.</p> <ul style="list-style-type: none"> <li>Most of the EnMS elements were implemented in companies who undertook potential aligning to the SANS ISO 50001 standard. Moderate and continuing progress has been made towards achieving the intermediate state, although there is not yet a strong basis based on evidence attained for the eventual delivery of the intended project impact.</li> </ul>	
IS 6: participation in TC242 leverages impacts across other geographies	<ul style="list-style-type: none"> <li>Anecdotal evidence supports this and it is the opinion of the assessment team that the achievement of this intermediate state creates a strong basis for eventual delivery of the intended impact: Participation in the TC242 by SA IEE Project team members will allow for increased awareness of regional issues and will thereby improve the impacts envisioned across different regions.</li> </ul>	3

### 4.3

#### **COMPONENT 3.0: ENERGY MANAGEMENT AND ENERGY SYSTEMS OPTIMIZATION CAPACITY BUILDING AND EXPERT DEVELOPMENT**

The objective of this component is to foster an outcome where a core group of South African energy engineers/practitioners (both enterprise and consultancy based) in the fields of EnMS and ESO methodologies is developed, within a framework of professionally recognised and Government-accredited training course structures. The review is presented according to the different outputs.

#### 4.3.1

##### **Output 3.1**

The SA IEE Project has significantly developed the capacity required to implement EnMS and ESO in industry. The courses developed are locally relevant (and currently undergoing a process to further customise the content) and are expected to be more relevant in the future. Continuous Professional Development (CPD) accreditation has increased the credibility and sustainability of the courses. The development of qualification material and the support provided towards registration of the qualification is additional to what was originally planned and is expected to contribute significantly to delivering the capacity needed to drive energy efficiency in industry. The detailed review is included in *Table 4.4*.

**Table 4.4 Rating for output 3.1**

TOC Element	Qualitative/ Quantitative Assessment	Rating
O1: Outcome (Output 3.1) A credible and sustainable national training system on EnMS and ESO appropriately recognized by relevant engineering professional bodies and initial development stage activities for nationally registered qualifications.	<ul style="list-style-type: none"> <li>For a credible and sustainable training system to be present there must be sufficient demand for EnMS and ESO courses, an appropriate number of facilitators and trainers, appropriately trained trainers and a recognised qualification to attract trainees. At this stage, it is not possible to comment of whether there is a “significant” demand for courses; however, we can postulate that elements are in place for a credible and sustainable training system to be present in the future.</li> </ul>	2
O1.1 (Sub-outcome): training is CPD accredited	<ul style="list-style-type: none"> <li>Based on the effectiveness of CPD points in driving participation in training in other areas, there is substantial progress being made towards achieving the outcome and a strong basis is in place for eventual delivery of the intended impact.</li> <li>The uptake and participation in courses is likely to be higher in courses that are CPD accredited. Consequently, there has been substantial progress made in the accrediting of courses thereby achieving this outcome.</li> </ul>	3
O1.2 (Additional Outcome): Nationally registered EnMS and ESO qualification is developed	<ul style="list-style-type: none"> <li>The qualification has been developed and has been submitted to SAQA for accreditation. This outcome can be properly assessed once the qualification is accredited by SAQA; thereafter, an assessment of demand for SAQA accredited courses can be determined.</li> </ul>	N/A
ID B: Training materials developed, available and of a high quality.	<ul style="list-style-type: none"> <li>Training materials have been developed by the SA IEE Project team.</li> <li>The training material is available to trainers.</li> <li>“The NCPC is the preferred distributor of the material as bestowed by UNIDO” (SA IEE Project personnel pers. comm, 2014).</li> <li>All key external stakeholders stated that the training materials were of a high quality. The training material is currently being revised to ensure that it is more reflective of the local context.</li> <li>Another key external stakeholder stated that he felt that assessments were only performed by a select pool of participants</li> </ul>	3

TOC Element	Qualitative/ Quantitative Assessment	Rating
	<p>as not all participants trained were able to undertake energy assessments to the quality required by businesses.</p> <ul style="list-style-type: none"> <li>It is difficult to assess whether it was the level of the training material not being appropriate or whether it was the level of trainers that resulted in not all participants being capacitated enough to implement EnMS and ESO in industry.</li> <li>This driver relates to multiple intermediate states (quality of training material disseminated to EnMS and ESO trainees is suitable; training material is locally relevant); the SA IEE Project has managed to deliver adequately on all aspects of the impact driver and it is the opinion of the ERM assessment team that trainees will be capacitated sufficiently to implement learnings in industry.</li> </ul>	
ID2: CPD accreditation achieved	<ul style="list-style-type: none"> <li>SA IEE Project staff indicated that the accreditation is in place and this was confirmed by interviewees. "Yes, courses were CPD accredited (SaMEchi)": (SA IEE Project personnel, pers. comms, 2014).</li> </ul>	3
ID3: Qualification material developed	<ul style="list-style-type: none"> <li>Material and curriculum developed but not yet registered. "International benchmarking will begin in October 2014 with final submission to SAQA next year in May 2015" (SA IEE Project pers. comms., 2014).</li> </ul>	2
ID4: Qualification curriculum developed	<ul style="list-style-type: none"> <li>It is difficult to assess whether the registration of the qualification to SAQA is relevant as it has not been fully registered as yet and therefore the effects on the demand or uptake of courses cannot be ascertained at this stage.</li> </ul>	2
ID5: Qualification registered	<ul style="list-style-type: none"> <li>It is difficult to assess whether the registration of the qualification to SAQA is relevant as it has not been fully registered as yet and therefore the effects on the demand or uptake of courses cannot be ascertained at this stage.</li> </ul>	1
A2: Local trainers would need to replace international trainers for the training system to be sustainable	<ul style="list-style-type: none"> <li>Assumption has been found to hold.</li> <li>An SA IEE Project member stated that all trainers were now local and therefore the assumption is true that local trainers have replaced international trainers.</li> </ul>	3
A3: CPD points adds to credibility and demand	<ul style="list-style-type: none"> <li>The assumption has been found to hold.</li> <li>The earning of CPD points was mentioned by key external stakeholders interviewed; suggesting that they do add to the credibility of courses.</li> </ul>	3
A 4: Support from QCTO and	<ul style="list-style-type: none"> <li>No evidence to support or reject this</li> </ul>	N/A

TOC Element	Qualitative/ Quantitative Assessment	Rating
SETA will contribute to qualification development	assumption. This will be further assessed during the FPE.	
A A: Not enough availability of EnMS and ESO national experts in SA	<ul style="list-style-type: none"> <li>▪ The assumption has been found to hold.</li> <li>▪ A SA IEE Project team member stated prior to the SA IEE Project being initiated there was a scarcity of EnMS and ESO courses and expertise in the country.</li> </ul>	3
IS A: People trained in South Africa, remain in South Africa	<ul style="list-style-type: none"> <li>▪ All consultants trained in EnMS and ESO who responded to the SA IEE Project survey stated that they conduct audits and energy assessments in South Africa (<math>n = 12</math>).</li> <li>▪ All consultants working in South Africa suggest that substantial progress has been made in achieving the intermediate state and this bodes well for a sustainable and credible training system. It must be noted that training courses have been undertaken from 2010 to 2014. Consequently, constant monitoring of whether trainees have remained (and implement EnMS and ESO) in the country should be undertaken; this ensures that capacity is not only built but retained over time.</li> <li>▪ The sample size is quite low hence caution must be taken when assessing the rating of this intermediate state.</li> </ul>	3
IS B: people work in a context where they can apply what they have learnt	<ul style="list-style-type: none"> <li>▪ All respondents who undertook training and conducted SME audits work in enterprises where they can apply what they have learnt in training (<math>n = 5</math>).</li> <li>▪ As mentioned in ID B, a key informant interviewee stated that he felt too many people were trained (numbers of participants) and the quality of participants was not as stringently evaluated as it could have been. Another key informant interviewee stated that he felt that assessments were only performed by a select pool of participants as not all participants trained were able to undertake energy assessments to the quality required by business. It is difficult to assess whether the level of the training material was not appropriate or the level of trainers is responsible for not all participants being capacitated enough to implement industry.</li> <li>▪ Only moderate progress has been</li> </ul>	2

TOC Element	Qualitative/ Quantitative Assessment	Rating
	<p>achieved with regards to achieving the intermediate state and there is not yet an indication of whether the eventual delivery of the project impact will be delivered.</p>	
IS C: Trainees are able to get the buy-in of top management to introduce EnMS and ESO in their facilities	<ul style="list-style-type: none"> <li>▪ The assessment conducted suggests that the extent to which trainees implement energy efficiency in their companies is limited by the buy-in of top management. A key external stakeholder stated that even though several people from a particular company may be trained, it can sometimes be a “box-ticking” exercise whereby companies have a quota of capacity building initiatives that they need to achieve in a given year therefore participants may not implement what they have learnt at their companies after the training.</li> <li>▪ Based on anecdotal evidence, it has been determined that little progress has been achieved with regards to achieving the intermediate state and there is not yet an indication of whether the eventual delivery of the project impact will be delivered.</li> </ul>	1
IS E: Training material is locally relevant	<ul style="list-style-type: none"> <li>▪ Attempts are currently being made by SA IEE Project team to make training material and examples more applicable to the local context. This was confirmed by a key external stakeholder. Only moderate progress has been achieved with regards to achieving the intermediate state and there is not yet an indication of whether the eventual delivery of the project impact will be delivered.</li> </ul>	2
IS 1: There is demand for CPD accredited EnMS & ESO courses	<ul style="list-style-type: none"> <li>▪ See <i>Table 8.1, Table 8.2, Figure 8.2, Figure 8.3 in Annex C.</i></li> <li>▪ For all ESO courses (train the trainer, end user, expert and intro) across different target audiences (consultants, company representatives and policy makers), 1 356 individuals were trained.</li> <li>▪ For all EnMS (train the trainer, end user, expert and intro) across different target audiences (consultants, company representatives and policy makers), 1 181 individuals were trained.</li> <li>▪ From the mentioning of CPD points in interviews, it is the professional judgement of the ERM assessment team</li> </ul>	2

TOC Element	Qualitative/ Quantitative Assessment	Rating
	<p>that courses that are CPD accredited have driven demand and uptake for EnMS and ESO courses. However, there is still not enough evidence to determine the effects of CPD accreditation and earning CPD points on enhancing the demand for EnMS and ESO courses.</p> <ul style="list-style-type: none"> <li>Therefore, there has been moderate progress towards achieving the intermediate state and a strong basis is in place for eventual delivery of the intended impact.</li> </ul>	
IS 4: Trainees establish training courses outside of the SA IEE Project	<ul style="list-style-type: none"> <li>Of the three national trainers surveyed, two trainers stated that they acted as a national trainer within the SA IEE Project, while one national trainer did not respond (<math>n = 3</math>).</li> <li>A key external stakeholder indicated that he/she provided training that was outside the realm of the SA IEE Project. This is an indication that the SA IEE Project has managed to influence the uptake and demand for EnMS and ESO implementation. A member of the SA IEE Project team stated that conclusions could not be easily established as there was no data collected post the undertaking of EnMS and ESO courses, if participants had chosen to work independently.</li> <li>There has been partial progress made in achieving the intermediate state and a strong basis is in place for eventual delivery of the intended impact.</li> </ul>	2

### 4.3.2

#### *Output 3.2*

Feedback on the training was extremely positive noting the practical / experiential nature of the training as particularly beneficial. There has been uptake of all types of courses within the SA IEE Project. Over 2 200 people have been trained in EnMS or ESO courses. Assessing the extent to which training has led to implementation is challenging. Evidence suggests that training has contributed towards implementation of EnMS and ESO but this assessment has not been able to quantify these savings. Demand for implementation is driven by factors such as electricity price increases but, in the opinion of the ERM assessment team, the SA IEE Project has played a significant role in facilitating this implementation. The detailed review is included in *Table 4.5*.

**Table 4.5 Rating for output 3.2**

TOC Element	Qualitative/Quantitative Assessment	Rating
O1: Outcome (Output 3.2) Industrial enterprise and consultant base trained in the EnMS and the ESO topics of: pumps, steam, compressed air, motors, fans.	<ul style="list-style-type: none"> <li>▪ There have been over 2200 people trained within the SA IEE Project in both EnMS and ESO aspects. Based on feedback from stakeholders is the opinion of the ERM assessment team that substantial progress has been made towards achieving the outcome and a strong basis is in place for eventual delivery of the intended impact.</li> </ul>	3
ID B: Training materials developed, available and of a high quality.	<ul style="list-style-type: none"> <li>▪ Training materials have been developed by the SA IEE Project team.</li> <li>▪ The training material is available to trainers.</li> <li>▪ “The NCPC is the preferred distributor of the material as bestowed by UNIDO” – (SA IEE Project personnel, pers. comm. 2014).</li> <li>▪ All key informant interviewees stated that that the training materials were of a high quality. The training material is being currently being revised to ensure that it is more reflective of the local context.</li> <li>▪ A key external stakeholder stated that he felt too many people were trained and the quality of participants was not as stringently evaluated as it could have been (“There is much contestation over the issue of quality vs. quantity of participants trained”).</li> <li>▪ Another key external stakeholder stated that he felt that assessments were only performed by a select pool of participants as not all participants trained were able to undertake energy assessments to the quality required by businesses.</li> <li>▪ It is difficult to assess whether the level of the training material was not appropriate or the level of trainers is responsible for not all participants being capacitated enough to implement industry.</li> <li>▪ This driver relates to multiple intermediate states (quality of training material disseminated to EnMS and ESO trainees is suitable; training material is locally relevant); however, the SA IEE Project has only partially delivered adequately to achieve a significant overall impact</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
ID2: Experts trained in ESO	<ul style="list-style-type: none"> <li>▪ In total, 34 experts have been trained in ESO (see <i>Figure 8.5 in Annex C</i>).</li> <li>▪ The impact driver has been found to have an impact in terms of achieving one or more of the intermediate state and the project has partially delivered adequately to achieve a significant impact. Because experts trained in ESO are now available to industry suggests that the impact driver has been found to make an impact in achieving the intermediate state of trainees implementing ESO in industry.</li> </ul>	2
ID3: people trained in advance EnMS	<ul style="list-style-type: none"> <li>▪ In total, 50 experts trained in EnMS (see <i>Figure 8.5 in Annex C</i>).</li> <li>▪ The impact driver has been found to have an impact in terms of achieving one or more of the intermediate state and the project has partially delivered adequately to achieve a significant impact. Because experts trained in EnMS are now available to industry suggests that the impact driver has been found to make an impact in achieving the intermediate state of trainees implementing EnMS in industry.</li> </ul>	3
ID4: Qualification registered	<ul style="list-style-type: none"> <li>▪ "International benchmarking will begin in October with final submission to SAQA next year in May" - (SA IEE Project personnel, pers. comm. 2014)</li> <li>▪ It is difficult to assess whether the registration of the qualification to SAQA is relevant as it has not been fully registered as yet and therefore the effects on the demand of courses cannot be ascertained.</li> </ul>	N/A
A A: Not enough availability of EnMS and ESO national experts in SA	<ul style="list-style-type: none"> <li>▪ The assumption has been found to hold.</li> <li>▪ A member of the SA IEE Project team stated that courses in energy efficiency were relatively new to the country and that courses at the level of those offered by the SA IEE Project were not available at other institutions in the country.</li> </ul>	3
IS A: People trained in South Africa, remain in South Africa.	<ul style="list-style-type: none"> <li>▪ All consultants trained in EnMS and ESO who responded to the SA IEE Project survey stated that they conduct audits and energy assessments in South Africa (<math>n = 6</math>).</li> <li>▪ All consultants working in South Africa suggest that substantial progress has been</li> </ul>	3



TOC Element	Qualitative/Quantitative Assessment	Rating
	<p>made in achieving the intermediate state and this bodes well for an outcome a sustainable and credible training system.</p> <ul style="list-style-type: none"> <li>▪ The sample size is quite low hence caution must be taken when assessing the rating of this intermediate state.</li> </ul>	
IS B: people work in a context where they can apply what they have learnt	<ul style="list-style-type: none"> <li>▪ All respondents who undertook training and conducted SME audits work in enterprises where they can apply what they have learnt in training (<math>n = 5</math>).</li> <li>▪ As mentioned in ID B, a key external stakeholder stated that he felt too many people were trained (numbers of participants) and the quality of participants was not as stringently evaluated as it could have been. Another key informant interviewee stated that he felt that assessments were only performed by a select pool of participants as not all participants trained were able to undertake energy assessments to the quality required by business. It is difficult to assess whether the level of the training material was not appropriate or the level of trainers is responsible for not all participants being capacitated enough to implement industry.</li> <li>▪ Only moderate progress has been achieved with regards to achieving the intermediate state and there is not yet an indication of whether the eventual delivery of the project impact will be delivered.</li> </ul>	2
IS C: trainees are able to get the buy-in of top management to introduce EnMS and ESO in their facilities	<ul style="list-style-type: none"> <li>▪ The assessment conducted suggests that the extent to which trainees implement energy efficiency in their companies is limited by the buy-in of top management. A key external stakeholder stated that even though several people from a particular company may be trained, it can sometimes be a “box-ticking” exercise. Companies have a certain quota of capacity building initiatives that they need to achieve in a given year. Therefore, participants may not be able to implement what they have learnt at their companies after the training despite having a qualification in EnMS and ESO.</li> <li>▪ Therefore, only little progress has been achieved with regards to achieving the intermediate state and there is not yet an indication of whether the eventual</li> </ul>	1

TOC Element	Qualitative/Quantitative Assessment	Rating
	delivery of the project impact will be delivered.	
IS E: Training material is locally relevant	<ul style="list-style-type: none"> <li>Attempts are currently being made by the SA IEE Project team to make training material and examples more applicable to the local context. This was confirmed by key external stakeholders. Only moderate progress has been achieved with regards to achieving the intermediate state and there is not yet an indication of whether the eventual delivery of the project impact will be delivered.</li> </ul>	2
IS 1: Trainees implement EnMS	<ul style="list-style-type: none"> <li>As mentioned previously, some companies view training courses as a purely “box-ticking” exercise and therefore the course remains a theoretical exercise that is not practically implemented. Furthermore, a key informant interviewee stated that there was a problem of “quality versus quality” with regards to those selected for courses and selection of participants into courses was not as stringent as it should have been. He also stated that he felt that only a small pool of individuals was used to implement EnMS and ESO in industry which in his opinion was an indication of inadequate capacitation.</li> </ul>	2
IS 2: Trainees implement ESO	<ul style="list-style-type: none"> <li>Therefore, only moderate and continuing progress is being made towards achieving the intermediate state, although there is not yet a strong basis for the eventual delivery of the intended project impact.</li> </ul>	1
IS 3: NCPC capacity developed	<ul style="list-style-type: none"> <li>NCPC staff have received the following training: <ul style="list-style-type: none"> <li>5 expert trainers from NCPC</li> <li>NCPC Steam trainees: 19</li> <li>NCPC EnMS Trainees: 37</li> <li>NCPC Comp Air Trainees: 10</li> <li>NCPC Fans Trainees: 20</li> <li>NCPC Motor Trainees: 17</li> <li>NCPC Pump Trainees: 0</li> </ul> </li> <li>Feedback from key stakeholders indicates that NCPC capacity has been developed and this creates a strong basis for eventual delivery of the intended impact.</li> </ul>	3

### 4.3.3

### Outputs 3.3 and 3.4

The SA IEE Project has facilitated the uptake of courses within regional hubs and delivered SME audits that are spread geographically across the regions. This will facilitate implementation across the major industrial areas in the country. The presence of national trainers replacing international trainers and the undertaking of training inside and outside the SA IEE Project sets the basis for a sustainable benefit in the future. The detailed review is included in *Table 4.6*.

**Table 4.6** *Rating for outputs 3.3 and 3.4*

TOC Element	Qualitative/Quantitative Assessment	Rating
O1: Outcome (Output 3.3). National trainers (including senior industry respected consultants) trained in EnMS and ESO for engagement as course facilitators to replace International experts.	<ul style="list-style-type: none"> <li>All national trainers are local: This is an indication that national training capacity is sufficient and there is no concern with losing international expertise as local trainers can replace them. Therefore, substantial progress has been made towards achieving the outcome and a strong basis is in place for eventual delivery of the intended impact.</li> </ul>	3
O1: Outcome (Output 3.4). National Training and Resource Centre Structure (with Gauteng serving a coordination and control hub for satellite facilities in KZN and W. Cape) for delivering EnMS and ESO training to industry and consulting personnel.	<ul style="list-style-type: none"> <li>Evidence of training and SME audits in different regions and the presence of regional project managers are indicators that there is indeed a geographical spread of services across regional hubs. Anecdotal evidence suggests that Gauteng does serve as a control hub, e.g., Gauteng has a budget 1.5 that of the regional hubs. This was confirmed by SA IEE Project personnel. It is, however, difficult, to postulate the extent to which Gauteng has acted as a controlling hub. Moderate and continuing progress is being made towards achieving the outcome, although there is not yet a strong basis for the eventual delivery of the intended project impact.</li> </ul>	2
ID B: Training materials developed, available and of a high quality.	<ul style="list-style-type: none"> <li>Training materials have been developed by the SA IEE Project team.</li> <li>The training material is available to trainers.</li> <li>“The NCPC is the preferred distributor of the material as bestowed by UNIDO” - (SA IEE Project personnel, pers. comm. 2014)</li> <li>All key informant interviewees stated that that the training materials were of a high quality. The training material is being currently being revised to ensure that it is more reflective of the local</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
	<p>context.</p> <ul style="list-style-type: none"> <li data-bbox="724 219 1209 412">▪ Some key external stakeholders stated that they felt that assessments were only performed by a select pool of participants as not all participants trained were able to undertake energy assessments to the quality required by businesses.</li> <li data-bbox="724 450 1209 607">▪ It is difficult to assess whether the level of the training material was not appropriate or the level of trainers is responsible for not all participants being capacitated enough to implement industry.</li> <li data-bbox="724 645 1209 904">▪ This driver relates to multiple intermediate states (quality of training material disseminated to EnMS and ESO trainees is suitable; training material is locally relevant); however, the SA IEE Project has only partially delivered adequately to achieve a significant overall impact.</li> </ul>	
<p>ID1: The selection process evaluating potential trainers is in place and appropriate</p>	<ul style="list-style-type: none"> <li data-bbox="724 938 1209 1167">▪ A member of the SA IEE Project team stated that these courses were offered to participants who had a technical or engineering background as the course content included data collection, numerical techniques and engineering principles.</li> <li data-bbox="724 1205 1209 1688">▪ A key external stakeholder stated that he felt that there was much contestation over the issue of ‘quality vs. quantity of participants trained.’ An external stakeholder stated that he felt too many people were trained (numbers of participants) and the quality of participants wasn’t as stringently evaluated as it could have been. Another key informant interviewee stated that he felt that assessments were only performed by a select pool of participants as not all participants trained were able to undertake energy assessments to the quality required by business.</li> <li data-bbox="724 1727 1209 1919">▪ Therefore, the impact driver has been found to have an impact in terms of achieving one or more of the intermediate states but the project has not delivered adequately to achieve a significant impact.</li> </ul>	<p>1</p>
<p>ID2: People trained as national trainers</p>	<ul style="list-style-type: none"> <li data-bbox="724 1953 1209 2007">▪ Total Facilitators trained in EnMS across regions (28) (see <i>Figure 8.4</i> in <i>Annex C</i>).</li> </ul>	<p>3</p>

TOC Element	Qualitative/Quantitative Assessment	Rating
	<ul style="list-style-type: none"> <li>Total Facilitators trained in ESO across regions (48) (see <i>Figure 8.5 in Annex C</i>).</li> <li>Hence, the impact driver has been found to have a significant impact in terms of achieving one or more of the intermediate states and the project has delivered adequately to achieve a significant impact.</li> </ul>	
ID3: New trainers train people as part of SA IEE Project courses	<ul style="list-style-type: none"> <li>Of the three national trainers surveyed, two trainers stated that they acted as a national trainer within the SA IEE Project, while one national trainer did not respond (<math>n = 3</math>).</li> <li>The data quality is not sufficient to evaluate this intermediate state appropriately.</li> </ul>	N/A
ID4: Trainers are awarded with a UNIDO certificate of competence	<ul style="list-style-type: none"> <li>All trainers who successfully undertook training as a national trainer were awarded with a UNIDO certificate of competence.</li> </ul>	3
ID 5: SA IEE Project has established regional coverage and placing the TRCs within NCPC will ensure coordination of approaches among the centres (regional hubs in place).	<ul style="list-style-type: none"> <li>Yes, the control hub is located at the CSIR in Pretoria (Gauteng) with regional hubs in KZN (Durban) and Western Cape (Cape Town).</li> <li>The undertaking of training courses by individuals in different regions, case studies completed in different regions and SME audits conducted in different regions suggests that there is indeed regional coverage promoted by the TRC.</li> </ul>	3
ID6: Trainees trained in different regions	<ul style="list-style-type: none"> <li>EnMS Trainers (7 in each region - Gauteng, KZN, WC and EC) (see <i>Figure 8.6, Figure 8.7, Figure 8.8, Figure 8.9 in Annex C</i>).</li> <li>ESO Trainers - (12 in each region - Gauteng, KZN, WC, EC) (see <i>Figure 8.6, Figure 8.7, Figure 8.8, Figure 8.9 in Annex C</i>).</li> <li>The impact driver has been found to have a significant impact in terms of achieving one or more of the intermediate states and the project has delivered adequately to achieve a significant impact.</li> <li>The fact that trainees have been trained in different regions suggests that this impact driver has had an effect in realising the intermediate state (IS 3: satellite structure delivering national coverage).</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
ID 7: Gauteng acts as a control hub	<ul style="list-style-type: none"> <li>▪ “Gauteng has a 1.5x the budget that the regional hubs.” (SA IEE Project personnel, pers. comm, 2014).</li> <li>▪ Anecdotal evidence provided by the SA IEE Project team suggested that Gauteng does indeed act as a control hub.</li> </ul>	3
A1: Company willingness to engage and permit access to their facilities	<ul style="list-style-type: none"> <li>▪ Assumption found to hold.</li> <li>▪ 20 companies were chosen as “host” plants with 22 EnMS and ESO component training sessions being undertaken in these selected host plants.</li> <li>▪ 77 companies were selected as “candidate plants” with 90 EnMS and ESO candidate trainings secured in these plants as at October 2014.</li> </ul>	3
A1: Not enough availability of EnMS and ESO national experts in SA	<ul style="list-style-type: none"> <li>▪ The assumption has found to hold.</li> <li>▪ It is the opinion of the assessment team that this holds as SA IEE Project team members did state that prior to the initiation of the SA IEE Project there was a lack of EnMS and ESO courses and expertise in South Africa but further interrogation will be conducted as part of the FPE.</li> </ul>	3
A2: Gauteng has more industrial activities than other regions	<ul style="list-style-type: none"> <li>▪ The assumption has been found to hold.</li> </ul>	3
IS 1: International trainers leave and are replaced by national trainers (trained by the programme)	<ul style="list-style-type: none"> <li>▪ The presence of capacitated local trainers to replace international trainers would make the training system more sustainable. This has been confirmed by SA IEE Project personnel where he stated that all national trainers, currently, are local. Hence, substantial progress has been made towards achieving the outcome and a strong basis is in place for eventual delivery of the intended impact.</li> </ul>	3
IS 4: Trainers establish training courses outside of the SA IEE Project	<ul style="list-style-type: none"> <li>▪ Of the three national trainers surveyed, two trainers stated that they acted as a national trainer within the SA IEE Project, while one national trainer did not respond (<math>n = 3</math>).</li> <li>▪ A key external stakeholder indicated that he/she provided training that was outside the realm of the SA IEE Project. This is an indication that the SA IEE Project has managed to influence the</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
	uptake and demand for EnMS and ESO implementation. A member of the SA IEE Project team stated that conclusions could not be easily established as there was no data collected post the undertaking of EnMS and ESO courses, if participants had chosen to work independently.	
IS 3: Satellite structure delivers appropriate national coverage	<ul style="list-style-type: none"> <li>It is not possible to assess this intermediate state currently. The data quality with regards to regional uptake of courses, audits and assessments is too poor to make an accurate overall assessment. This will be assessed further in the FPE.</li> </ul>	N/A
IS 4: Gauteng facilitates alignment of quality, training, guidelines, policy and administration with other regions	<ul style="list-style-type: none"> <li>Even though, SA IEE Project personnel suggested that Gauteng does act as control hub and that they do indeed have a bigger budget than regional hubs. There is not yet enough evidence to determine the extent to which they have facilitated alignment of quality, training, guidelines, policy and administration with other regions.</li> <li>This will be further assessed in the FPE.</li> </ul>	N/A

#### 4.4

#### **COMPONENT 4.0: ENMS AND ESO DEMONSTRATION, AWARENESS CREATION AND PROJECT COMMUNICATION**

The component aims to demonstrate the potential energy and financial savings that adopting EnMS and ESO can yield within the South African industrial context under targeted programmes of: i) SME energy auditing; ii) large enterprise ESO assessments; and iii) EnMS implementation support, while awareness on the two methodologies is broadly raised through project promotional events/initiatives and active participation in relevant industry and government events/initiatives. The review of the component outputs is presented below.

#### 4.4.1

#### **Outputs 4.1 and 4.2**

The ERM assessment team concluded that the SA IEE Project has managed to partially reach their stated objectives. Financial and energy savings (and associated CO<sub>2</sub>e savings) have been achieved. It is difficult to determine the extent to which the SA IEE Project has driven implementation leading to these savings. It is the opinion of the ERM assessment team that the project has contributed significantly to facilitating these savings. There are limitations in terms of how the data is measured and therefore the results need to be interpreted with care. A number of the stakeholders interviewed as part of the PIA noted the challenge in reporting savings data given that it is too early to

expect recipients of training or direct SA IEE Project support to have implemented significant savings and for those savings to have been sustained over time. It is certainly too early for some of the indirect savings (due to the various multiplier effects associated with the project activities) to be assessed. Importantly, those savings that have been reported have not undergone a formal M&V process and therefore should be regarded as indicative. At the same time, given that not all impacts are measured, the reported savings will likely underestimate the total beneficial impacts.

Job creation was stated as being a potential benefit of EnMS and ESO implementation; however, data quality received on job retention was inadequate to enable a proper assessment of this. A separate review of the socio-economic impacts of the SA IEE Project is currently being conducted by ERM. The detailed review is included in *Table 4.7*.

**Table 4.7 Rating for outputs 4.1 and 4.2**

TOC Element	Qualitative/Quantitative Assessment	Rating
O1: Outcome (Output 4.1) Programme of industrial SME Energy Auditing (Estimated 200) – based on ESO principles and topics.	<ul style="list-style-type: none"> <li>SME audits have been conducted in industry. Even though the magnitude of the effect of SME audits on influencing other companies to undertake EnMS and ESO is uncertain, it is the ERM assessment team’s professional judgement that demonstrating savings in real examples could have possibly influenced companies to undertake EnMS and ESO practices.</li> </ul>	2
O2: Outcome (Output 4.2) Pilot programmes of (i) Pilot/ Demonstration Enterprise ESO Assessments and implementation; (ii) Pilot/ Demonstration Enterprise-level EnMS development and implementation	<ul style="list-style-type: none"> <li>As with Outcome O1, the fact that EnMS and ESO demo plant assessments were undertaken can be deemed as partial progress in achieving this overall project outcome; however, considering that 77% of participants surveyed by ERM had not been exposed to the case studies, for example, indicates that the effectiveness of these activities could be limited.</li> </ul>	2
ID1: # of audits conducted (disaggregation by sector and size)	<ul style="list-style-type: none"> <li>Altogether, SME audits were undertaken in 227 companies. The agro-processing (29%), automotive (22%) and metals allied and engineering (15%) sectors were the sectors with the highest percentages of SME audits undertaken (see <i>Figure 8.14, Table 8.3 in Annex C</i>).</li> <li>This impact driver is relevant and even though the magnitude of whether it has had a partial or full impact achieving the intermediate states is difficult to ascertain, we believe that SME audits have played an integral role in illustrating financial and energy savings and potential emission reductions</li> </ul>	3



TOC Element	Qualitative/Quantitative Assessment	Rating
	thereby influencing other companies of the benefits of EnMS and ESO implementation.	
ID2: # of EnMS pilots and demonstration plants	<ul style="list-style-type: none"> <li>▪ The fact that EnMS, ESO demo plant assessments and case studies were conducted is partial progress in achieving intermediate states and the overall project goal; however, the fact that 77% of participants surveyed by ERM had not been exposed to the case studies, for example, indicates that these impact drivers could have been more effective in terms of media coverage.</li> </ul>	2
ID3: # of ESO pilots and demonstration plants	<ul style="list-style-type: none"> <li>▪ Supporting evidence: <ul style="list-style-type: none"> <li>▪ EnMS Demo Plants: 45</li> <li>▪ ESO Demo Plants: 28</li> <li>▪ SME Demo Plants: 57</li> <li>▪ Case Studies: 57</li> <li>▪ Case Studies Completed: 21</li> </ul> </li> </ul>	
ID 4: Energy plans established	<ul style="list-style-type: none"> <li>▪ According to the survey undertaken, of the nine company representatives and consultants who were involved in implementing EnMS elements, seven entities had energy plans established.</li> <li>▪ This is an indication that EnMS elements, in this case energy plans, are becoming the reference point for implementation of energy efficiency in industry. Hence, the impact driver has been found to have a significant impact in terms of achieving one or more of the intermediate states and the project could be considered to have delivered adequately to achieve a significant impact.</li> </ul>	3
ID 5: Companies that have implemented EnMS elements	<ul style="list-style-type: none"> <li>▪ 90% of all companies who were involved in the SA IEE Project, implemented EnMS elements (<math>n = 10</math>).</li> <li>▪ There is evidence of companies adopting system elements (<i>Table 8.6 in Annex C</i>) of SANS ISO 50001 (rather than opting for full certification). Therefore, the impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact.</li> </ul>	2
A1: Availability of eligible auditors (ID 3 of Output 2.3 & 2.3)	<ul style="list-style-type: none"> <li>▪ Assumption found to hold to a limited extent.</li> <li>▪ Owing to the slow uptake for SANS ISO 50001 certification it is difficult to</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
	ascertain whether the auditors available to industry will be sufficient to meet the demand for accreditation. Even though one key external stakeholder stated that he thought that the number of auditors was sufficient to meet the demand; SANS ISO 50001 awareness raising was never undertaken by the SABS therefore there is a potential for the demand to increase. As a result, this assumption is found to only partially hold.	
A3: Suitable consultants are available and interested	<ul style="list-style-type: none"> <li>▪ This assumption holds to a very limited extent.</li> <li>▪ Even though over 2200 people have been trained in EnMS and ESO, one key external stakeholder suggested that the consultants were only selected from a small pool of qualified EnMS and ESO trainees. The stakeholder expressed the view that not all individuals trained in ESO and EnMS are available in industry and as such not all trainees in EnMS and ESO are contributing their knowledge to industry.</li> </ul>	1
A4: Company willingness to participate	<ul style="list-style-type: none"> <li>▪ This assumption has been found to hold.</li> <li>▪ Companies have been found to accept EnMS and ESO demo and candidate plant roles; however, the willingness of companies to implement energy efficient saving strategies post assessment is still unclear.</li> </ul>	3
A5: Offer of programme is enough to convince demo companies to share info	<ul style="list-style-type: none"> <li>▪ This assumption has been found to hold.</li> <li>▪ A SA IEE Project team member stated that companies are more willing to share energy information and this is evident from the detailed information collected in the databases that were provided to ERM for evaluation.</li> </ul>	3
A6: Host and candidate plants will implement & report back	<ul style="list-style-type: none"> <li>▪ This assumption has been found to hold to limited extent. (Figures are reported in the assessment of intermediate states.)</li> </ul>	2
IS A: EnMS system elements are in place in companies implementing EE	<ul style="list-style-type: none"> <li>▪ Nine company representatives and consultants were involved in the implementation of EnMS elements. A breakdown of which EnMS elements were implemented is included in <i>Table 8.6</i> in <i>Annex C</i>.</li> <li>▪ There is evidence of companies adopting system elements (<i>Table 8.6</i> in <i>Annex C</i>) of</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
	SANS ISO 50001 (rather than opting for full certification). This suggests that future conditions are in place for this intermediate state to reach full impact however a lack of awareness raising related to SANS ISO 50001 may have hindered or slowed down the process of the intermediate state reaching full impact. It must be noted that some capacity building related to SANS ISO 50001 has taken place through the training courses offered during the SA IEE Project.	
IS B: Energy savings achieved (ZAR) (break payback, CAPEX, etc)	<ul style="list-style-type: none"> <li>▪ For host-candidate plant implementation, the metals and fabrication sector reported the highest financial savings (R 566 149 257) (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>▪ The non-metallic minerals (R106 968 667) and automotives (R49 248 698) also reported significant savings (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>▪ Host-Candidate Plants that implemented EnMS reported the highest savings as compared to other implementation types (R 650 011 949) (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>▪ Highest ZAR savings (R208 017 774) were realized in projects that were initiated from 2011 and 2014 (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>▪ The fact that energy consumption and energy cost savings have been achieved is an indication that progress has been made with regards to the initial objectives envisioned by the SA IEE Project. However, it is not possible for the ERM assessment team to comment on the magnitude of savings as initial estimates of energy consumption and spend savings prior to the SA IEE Project implementation were not captured. Therefore, it is not possible to estimate the percentage change of energy savings (KWh and ZAR) and whether realized savings could be attributed to the SA IEE Project.</li> <li>▪ It is the professional judgement of the ERM assessment team that KWh consumption savings by participating companies have been considerable. No quantitative objectives were envisioned</li> </ul>	3

TOC Element	Qualitative/Quantitative Assessment	Rating
IS C: Other media awareness and promotional events undertaken	<p data-bbox="756 152 1203 376">with regard to a reduction in cost of energy purchased; however, using our professional judgement, we can conclude that not only have cost savings been achieved, they have been significant in implementing companies within the SA IEE Project.</p> <ul style="list-style-type: none"> <li data-bbox="724 416 1187 573">▪ Therefore, there has been substantial progress made towards achieving the intermediate state with a strong basis in place for the realization of the full intended impact in the future.</li> <li data-bbox="724 611 1187 703">▪ “Business breakfasts undertaken by the NCPC” (SA IEE Project personnel pers. comm., 2014).</li> <li data-bbox="724 741 1203 1066">▪ Talk2Us conducted a focussed awareness study on individuals (<math>n = 84</math>) who were engaged with the SA IEE Project from 2010 - 2014. They were asked about their exposure to different event/awareness types (workshops, expos, case studies etc.) held by the SA IEE Project. Workshops stood out: 53.6% suggested that they recalled the workshops held by the SA IEE Project (Talk2Us, 2014).</li> <li data-bbox="724 1104 1187 1261">▪ Participants were mostly exposed to the SA IEE Project through newspaper articles (60%) as opposed to magazine articles (40%) and radio programming (0%).</li> <li data-bbox="724 1299 1118 1361">▪ The SA IEE Project website is live (<a href="http://ncpc.co.za/home-ieee">http://ncpc.co.za/home-ieee</a>).</li> <li data-bbox="724 1400 1203 1686">▪ The SA IEE Project newsletter was discontinued from July 2012 as it was not effective. The newsletter was only emailed to individuals on the NCPC database who were already aware of SA IEE Project. Consequently, the newsletter did not have the desired reach as it did not target individuals who may not have been aware of the SA IEE Project.</li> <li data-bbox="724 1724 1203 1816">▪ Of the participants surveyed at the SAEE convention, 77% were not aware of the SA IEE Project.</li> <li data-bbox="724 1854 1203 2042">▪ Therefore, moderate and continuing progress is being made towards achieving the intermediate state, although there is not yet a strong basis for the eventual delivery of the intended project impact.</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
IS 2: Significant savings identified through the audits (ID/IS)	<ul style="list-style-type: none"> <li>▪ Total savings from SME audits – 111 598 255 ZAR/ Annum (see <i>Figure 8.15, Figure 8.16, Figure 8.17 in Annex C</i>).</li> <li>▪ Total KWh saved from SME audits – 108 830 617 ZAR/ Annum (see <i>Figure 8.15, Figure 8.16, Figure 8.17 in Annex C</i>).</li> <li>▪ The agro-processing sector reported the highest ZAR savings, highest KWh and highest CO<sub>2</sub>e emissions compared to all other sectors (45%, 44% and 44% respectively). The metal allied and engineering sector also recorded savings in ZAR savings, KWh and CO<sub>2</sub>e emissions ranging between 20% - 25% higher compared to other sectors.</li> <li>▪ The fact that energy consumption and energy cost savings have been achieved is an indication that progress has been made with regards to the initial objectives envisioned by the SA IEE Project. However, it is not possible for the ERM assessment team to comment on the magnitude of savings as initial estimates of energy consumption, costs and emissions prior to the SA IEE Project implementation were not captured. Therefore, it is not possible to estimate the percentage change of energy savings (KWh and ZAR) and whether realized savings could be attributed to the SA IEE Project.</li> <li>▪ It is the professional judgement of the ERM assessment team that KWh consumption savings by participating companies have been considerable. No quantitative objectives were envisioned with regard to a reduction in cost of energy purchased; however, using our professional judgement, we can conclude that not only have cost savings been achieved, they have been significant in implementing companies within the SA IEE Project.</li> <li>▪ Therefore, there has been substantial progress made towards achieving the intermediate state with a strong basis in place for the realization of the full intended impact in the future.</li> </ul>	3
IS 4: jobs retained through savings achieved	<ul style="list-style-type: none"> <li>▪ 67% of respondents believe that the SA IEE Project did not influence job retention (<i>n = 9</i>; see <i>Figure 8.27 in Annex C</i>).</li> </ul>	N/A

TOC Element	Qualitative/Quantitative Assessment	Rating
	<ul style="list-style-type: none"> <li>This intermediate state was found not to influence the overall project objective. However, owing to the small sample size, caution must be taken when drawing conclusions for this element. This intermediate state will be more comprehensively examined in the socio-economic study commissioned by UNIDO.</li> </ul>	
IS 4: jobs created (e.g., through production increases facilitated by EE)	<ul style="list-style-type: none"> <li>All respondents in the assessment stated that they believed that no jobs had been created by the implementation of SA IEE Project initiatives (<math>n = 9</math>).</li> <li>One key informant interviewee elaborated on the effects of energy efficiency implementation on job creation: he stated that in certain companies energy efficiency implementation had influenced job creation. A lack of internal expertise for the forming of an energy management team had resulted in companies employees in more people with the relevant experience.</li> <li>Consequently, there has been substantial progress in the intermediate state delivering the overall project impact.</li> </ul>	3
IS 6: tCO <sub>2</sub> e reduced <sup>1</sup>	<ul style="list-style-type: none"> <li>Potential tCO<sub>2</sub>e from SME Audits – 107 154 tCO<sub>2</sub>e (see <i>Figure 8.17, Figure 8.19, Figure 8.22, Figure 8.25 in Annex C</i>).</li> <li>tCO<sub>2</sub>e avoided for host-candidate plants: 570 743 tCO<sub>2</sub>e (see <i>Figure 8.17, Figure 8.19, Figure 8.22, Figure 8.25 in Annex C</i>).</li> <li>tCO<sub>2</sub>e avoided was highest in host-candidate plants that implemented EnMS (189 454 tCO<sub>2</sub>e). tCO<sub>2</sub>e avoided were highest in the metal and fabrication sector.</li> <li>The initially envisioned SA IEE Project emission reduction target was 22 million tonnes of CO<sub>2</sub>e per year. It is not possible to make annual saving reduction comparisons as data was not collected on an annual basis; rather, it reflected emission reductions till that point with the base year being the start year of implementation.</li> </ul>	2

<sup>1</sup> It must be noted that tCO<sub>2</sub>e reductions could be underestimated as they were calculated using an emission factor of 995 grams CO<sub>2</sub>/ kWh instead of the emission factor stated in the Eskom Integrated Annual Report (2011) of 990 grams CO<sub>2</sub>/kWh.

TOC Element	Qualitative/Quantitative Assessment	Rating
	<ul style="list-style-type: none"> <li>With the assumption that CO<sub>2</sub>e emission reductions were recorded on an annual basis; the collective emission reduction savings are considerably lower than the 22 million tonnes of reduction envisioned on an annual basis.</li> <li>On this basis, we conclude that moderate progress has been made with regards to emission reductions however there is not yet a strong basis for full impact being realized in the future.</li> </ul>	
IS 7: Rands saved	<ul style="list-style-type: none"> <li>For host-candidate plant implementation, the metals and fabrication sector reported the highest financial savings (R 566 149 257) (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>The non-metallic minerals (R106 968 667) and automotives (R49 248 698) also reported significant savings (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>Host-Candidate Plants that implemented EnMS reported the highest savings as compared to other implementation types (R 650 011 949) (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>Highest ZAR savings (R208 017 774) were realized in projects that were initiated from 2011 and 2014 (see <i>Figure 8.20, Figure 8.23, Figure 8.26 in Annex C</i>).</li> <li>As mentioned in IS 2, even though no quantitative objectives were envisioned with regard to a reduction in the cost of energy purchased (energy savings); we can, using our professional judgement, conclude that not only have cost savings been achieved, they have been significant in implementing companies within the SA IEE Project.</li> <li>Therefore, there has been substantial progress made on this intermediate state and there is a strong inclination that the full impact will be realized in the future.</li> </ul>	3

#### 4.4.2

#### *Outputs 4.3 and 4.4*

The effectiveness of the project communication and awareness raising has improved over time. Based on the recent communications audit undertaken by Talk2Us, related activities have been well received. However, evidence

suggests that awareness has not been raised to a level that would drive significant additional demand. The detailed review is included in *Table 4.8*.

**Table 4.8** *Rating for outputs 4.3 and 4.4*

TOC Element	Qualitative/Quantitative Assessment	Rating
O1: Outcome (Output 4.3) Case studies of EnMS and ESO pilots enterprises	<ul style="list-style-type: none"> <li>The fact that EnMS and ESO pilot plant assessments and case studies were undertaken can be deemed as partial progress in achieving the overall project goal; however, considering that 77% of participants surveyed by ERM had not been exposed to the case studies, for example, indicates that the effectiveness of these activities could be lacking.</li> </ul>	1
O2: Outcome (Output 4.4) Design and implementation of Communication Strategy for the promotion of the EnMS and ESO methodologies as well as project promotional and EnMS/ ESO awareness activities which also target high-level management engagement	<ul style="list-style-type: none"> <li>The communication strategy implemented by the SA IEE Project team includes the participation and co-ordination of events, newsletters sent to the NCPC database, a website detailing the activities of the SA IEE Project and case studies of host and candidate plants and SME audits. The effectiveness of the current media strategy is questionable. In the assessment, it was found that 77% of people were not aware of the SA IEE Project which suggests that the reach of the SA IEE Project could have been greater.</li> <li>Consequently, only moderate and continuing progress has been made towards achieving the outcome, and there is not yet a strong basis for the eventual delivery of the intended project impact.</li> </ul>	2
ID1: Communications strategy is in place	<ul style="list-style-type: none"> <li>“From component deliverables of the SA IEE Project, a communications strategy was developed. This will be operational until June 2015”: (SA IEE Project personnel, pers. comm. 2014).</li> <li>Considering that 77% of survey respondents within the assessment conducted by ERM had not heard of the SA IEE Project suggests that even though the communication strategy is in place; it could possibly be revised such that it is more effective.</li> <li>Therefore, the impact driver (a communication strategy being in place) has been found to have an impact in terms of achieving one or more of the intermediate states (transitional conditions). However, the assessment finding that not all respondents were</li> </ul>	2



TOC Element	Qualitative/Quantitative Assessment	Rating
	<p>aware of the SA IEE Project is an indicator that it has only been partially delivered adequately to achieve significant impact.</p>	
ID2: Breakdown of exposure to the SA IEE project by sector	<ul style="list-style-type: none"> <li>84 respondents who were exposed to the SA IEE Project were included in the Talk2Us survey analysis. Most individuals were found to be from the energy sector or from the consulting industry (Talk2Us, 2014).</li> </ul>	2
ID3: Peer learning within UNIDO	<ul style="list-style-type: none"> <li>There is no evidence to reject or support this impact driver.</li> </ul>	N/A
ID 4: # of events (including statement on quality, reach and relevance)	<ul style="list-style-type: none"> <li>Workshops stood out: 53.6% suggested that they recalled the workshops held by the SA IEE Project (Talk2Us, 2014).</li> <li>On a scale of 1 to 5, with 1 being extremely unlikely and 5 being extremely likely, 46.1 % of respondents suggested that they would be extremely likely to attend another workshop while 38.46% of participants indicated that they were likely to attend other workshops (Scale = 4). (Talk2Us, 2014). This is an indicator that event presentations were well received and were of a high quality.</li> <li>76.92 % of respondents responded that the information shared at workshops was '<i>slightly relevant</i>' to them. (Talk2Us, 2014).</li> </ul>	3
ID 5: # of conferences (including statement on quality, reach and relevance (e.g., peer reviewed?))	<ul style="list-style-type: none"> <li>According to the Talk2Us Awareness Study, conferences only received a recall percentage of 8.70%. Furthermore, respondents seemed to remember workshops more as they were more "hands-on" and practical as opposed to conferences (Talk2Us, 2014).</li> <li>It is not possible to determine the number of conferences that the SA IEE Project personnel participated in as the Talk2us event report clustered conferences, workshops, expos and case studies as "events".</li> <li>The fact that SA IEE Project personnel have participated in the conferences suggests that this impact driver has made an impact in achieving the intermediate states however the project has partially delivered adequately to achieve a significant impact.</li> </ul>	2

TOC Element	Qualitative/Quantitative Assessment	Rating
ID 6: Outreach (including statement on quality, reach and relevance)	<ul style="list-style-type: none"> <li>Besides conference participation, events hosted, general outreach (online articles and newsletters published) is difficult to assess. However, we have received confirmation from the SA IEE Project personnel that general outreach has been undertaken. Therefore, this impact driver has been found to have an impact in terms of achieving one or more of the intermediate states and the project has partially delivered adequately to achieve a significant impact.</li> </ul>	2
ID 5: Specific audiences targeted	<ul style="list-style-type: none"> <li>Evidence is not sufficient to support or reject this impact driver.</li> </ul>	N/A
ID 6: Website exists	<ul style="list-style-type: none"> <li>Yes, the website does exist. (<a href="http://ncpc.co.za/home-ieee">http://ncpc.co.za/home-ieee</a>).</li> <li>Even though this website exists we are not able to assess the impact driver as data is not available on website traffic as an indicator of how effective the website has been.</li> </ul>	1

One of the objectives of the PIA was to gather information to inform the design of a Phase II of the SA IEE Project, which was being designed in parallel to the PIA being conducted. These lessons have been 'drip-fed' to the Phase II design team (UNIDO and ECO) and are listed comprehensively here:

*There is a need for tools to overcome practical challenges (behavioural, financial and technical).*

- Some feedback indicated that a number of practical challenges to implementing EnMS and ESO, other than skills and the knowledge needed for implementation, were not given adequate attention. It was reported that often these present more significant challenges and therefore greater attention is needed on finance options, change management approaches and tools to convince top management.
- Focus on sustaining rather than implementing systems and provide long term implementation support

*Conduct follow-ups at regular intervals to allow for early identification of opportunities to contribute to sustainable benefits and for the SA IEE Project to learn.*

- Follow ups, in the form of surveys, interviews and specifically site visits, would contribute to ensuring the sustainability of EnMS and ESO interventions and would provide an opportunity to access greater information and learnings that would benefit the training and implementation support elements of the SA IEE Project.

*The administrative burden needs to be reduced.*

- Efforts to make the task of implementation (and motivation) easier would stimulate greater implementation, for example, through the development and use of IT systems and other tools that reduce the administrative burden.

*The ISO systems and certification process needs to be harmonised.*

- There is a significant administrative load associated with ISO certification. Increasing the uptake of certification will require that ISO systems are better harmonised.

*Standards guide implementation, and as such ESO standards should be developed.*

- Few companies have become certified but results show that ISO 50001 has provided a good guideline / framework for implementing elements of EnMS and starting to manage energy more from a systems perspective.

Establishing ESO standards as part of Phase II should also provide value as a guideline / framework for companies to implement ESO (in a similar way to EnMS).

*Consideration should be given to extending the two day course (bridge the gap between advanced and expert).*

- The two day course was not seen to be long enough to capacity meaningful implementation of EnMS and ESO. Given the challenge in taking people (particularly technical or production personnel) away from their jobs to be able to attend the expert training, a course that bridges the two could be better attended and contribute to greater levels of implementation.

*Efforts should be put into fast tracking the engagement processes.*

- Contracting candidate / host plants sooner will increase the effectiveness of the practical experience (identified as a key benefit of the project) and momentum will be maintained if interventions with companies are implemented soon after expectations are set.

*An M&E system should be set up from the start.*

- The M&E system should:
  - Focus on identifying what information is required (linked to the TOC);
  - Align the requirements with the reporting requirements of government (avoid duplicity and reduce burden);
  - Create formal systems;
  - Build flexibility into the approach;
  - Establish continual progress monitoring processes;
  - Establish the priority indicators upfront;
  - Allocate resources to manage and drive the M&E functions;
  - Define roles and responsibilities;
  - Allow for course correction;
  - Begin the PIA earlier; and
  - Maintain an updated list of stakeholder contact details.

These recommendations for the M&E system are further detailed in ERM's accompanying M&E System Report.

## 5.1

### ***PRIORITY INDICATORS FOR THE PHASE II M&E SYSTEM***

Based on the experience of the PIA, possible priority indicators are presented in *Table 5.1*. These will need to be augmented based on the outcomes and intended impacts of Phase II. The indicators reported here are broad and would need to be refined (and specific metrics chosen) as part of finalising Phase II. In all cases, a significant focus should be on trying to assess impact or

proxies for impact. This requires resources and therefore in most cases only periodic collection of data will be possible. A prioritisation approach should be adopted based on the Phase II TOC and logframe. Information gathered needs to be specific to each component or pathway element.

**Table 5.1** *Priority Indicators for the Phase II M&E system*

Category	Broad Indicators	Descriptions
Energy	<ul style="list-style-type: none"> <li>▪ Electricity savings</li> <li>▪ Non-electrical savings</li> <li>▪ Financial savings associated with reduced energy cost</li> </ul>	<p>Focus on implementation, e.g., conduct follow ups to understand the extent to which opportunities identified as part of the audits have been implemented and what the achieved savings are.</p> <p>Savings should be gathered based on different support categories, for example:</p> <ul style="list-style-type: none"> <li>○ Direct savings: EnMS &amp; ESO pilot and demo plants</li> <li>○ Indirect savings: audit recommendations implemented and associated savings, trainee implementation and associated savings, etc.</li> </ul> <p>Information should be gathered on sustained savings. For example:</p> <ul style="list-style-type: none"> <li>○ Conduct follow up interviews / surveys to</li> <li>○ Conduct trend analyses</li> </ul> <p>Try to determine indirect savings associated with non-direct beneficiaries exposed to the Project (through awareness activities or via trainees) implementing energy efficiency initiatives.</p>
Climate change	<ul style="list-style-type: none"> <li>▪ CO2e reductions / avoided emissions</li> </ul>	<p>Energy savings (and possible process emission improvements) should be converted to CO<sub>2</sub>e and broken down into direct and indirect savings.</p>
Competitiveness and productivity	<ul style="list-style-type: none"> <li>▪ Financial savings</li> <li>▪ Investments facilitated by financial savings</li> </ul>	<p>Request qualitative information on how the following have been affected over the time when savings occurred:</p> <ul style="list-style-type: none"> <li>○ Investments leading to increased production</li> <li>○ Investments leading to improved product quality</li> </ul> <p>Request information on the results of increased production or improved product quality (e.g., access to different markets). Request information on the likely outcomes associated with financial savings over the period., e.g.:</p> <ul style="list-style-type: none"> <li>○ Salary increases (will affect livelihoods / induced employment)</li> <li>○ Reinvestment</li> <li>○ Dividends</li> <li>○ Or if not significant enough to determine.</li> </ul>
People	<ul style="list-style-type: none"> <li>▪ Trainees</li> <li>▪ Trainers</li> <li>▪ Energy efficiency beneficiaries (job creation)</li> </ul>	<p>Training: gather data on trainers &amp; trainees per course offered at different time. Include:</p> <ul style="list-style-type: none"> <li>○ Race, gender, skill level, employer / place of work.</li> </ul>

Category	Broad Indicators	Descriptions
	/ retention)	<p>Conduct follow ups to determine:</p> <ul style="list-style-type: none"> <li>○ Working context (e.g. responsibility, sector, geography), energy efficiency implementation following training, challenges, support needs.</li> </ul> <p>Energy efficiency beneficiaries: through engagements with companies implementing energy efficiency, request information on:</p> <ul style="list-style-type: none"> <li>○ Jobs created since time of SA IEE Project intervention</li> <li>○ Jobs retained since SA IEE Project intervention</li> <li>○ Increases in disposable income of employees</li> <li>○ Qualitative information on the perceived beneficiaries of energy efficiency at the implementing companies.</li> <li>○ In all cases, gather data on the demographics of employees and where they are located.</li> </ul>
System elements	<ul style="list-style-type: none"> <li>▪ List of system elements<sup>1</sup></li> </ul>	<p>Request information on which system elements are in place.</p> <p>Use follow up to check / validate claims (this will provide an opportunity to provide additional support to ensure sustainability but will also provide useful lessons).</p>
Awareness	<ul style="list-style-type: none"> <li>▪ Number and impact of events, conferences, outreach and articles</li> <li>▪ Number and impact of case studies</li> <li>▪ Website and newsletter reach and impact</li> </ul>	<p>Gather data on the quantity and quality of following (including statement on quality, reach and relevance):</p> <ul style="list-style-type: none"> <li>○ Events</li> <li>○ Conferences</li> <li>○ Outreach</li> <li>○ Articles</li> </ul> <p>Conduct follow up engagements with attendees to determine perceptions and understand how information was used.</p> <p>Gather data on the impact of case studies, the website and newsletters (e.g., reach and whether action taken given information provided through each medium).</p>

<sup>1</sup> System elements refer to ISO 50001 requirements that are in place (even if a company only implements some of the elements and does not intend to become certified. For example: an energy policy is in place; an energy management team has been established; an energy baseline has been conducted, etc.

The PIA process has provided valuable insights that will improve the design of and indeed the final results of the FPE. The most important of these lessons include:

- The Outcomes-Impact pathways (i.e., based on the ROtI methodology) provide a useful framework for conducting the analysis.
  - Validating each pathway only works where stakeholders are given time to understand the pathway development process.
  - Validation will be more targeted for the FPE.
- Agreeing the pathways with stakeholders took longer than anticipated during the PIA; presenting them to stakeholders for input was difficult to manage and should take place earlier in the FPE. Agreeing on the hypotheses earlier will allow more time for data collection.
- Data should be collected using a combination of focus groups, targeted interviews and surveys.
- Surveys should be much shorter and designed for a specific type of stakeholder (i.e., highly targeted). In addition, should another online survey be fielded in the FPE, it should be a standalone survey and not coupled with another survey, and it should be fielded earlier in the year and not during December (see *Table 2.3*).
- Different wording was used in some of the pathways by different members of the Project Management Unit (PMU) that was not shared with the ERM at the beginning. Any changes to the wording and elements included in the pathways should be bedded down prior to the FPE.
- Sign off of the Plan by the PMU is required prior to data collection and analysis.
- The PSC has a number of sometimes conflicting views and priorities. The PMU needs to provide guidance on how to manage expectations appropriately and should play an active role in this regard (this has been done as part of the PIA)
- Open conversations/ interviews with a variety of stakeholders yielded good information and insights.

### 7.1 PROGRESS TOWARDS SA IEE PROJECT OBJECTIVES

Based on the information collected, an assessment of the SA IEE Project's progress against the objectives set out in the "Strategic Project Analysis of the SA IEE Project" document (May 2013; see *Section 1.1*) was undertaken by the ERM team. The results are set out in *Table 7.1*.

**Table 7.1** *Progress towards SA IEE Project objectives*

Objectives	Review
To increase industrial energy efficiency to contribute to energy security, and supports GDP growth.	<p>The SA IEE Project has contributed to industrial energy efficiency and is expected to contribute significantly to future industrial energy efficiency by contributing to an enabling environment through:</p> <ul style="list-style-type: none"> <li>• stimulating the supply of skills needed to support / drive implementation;</li> <li>• stimulating demand through assisting to identify efficiency opportunities, informing the regulator environment driving energy efficiency in the country and building awareness;</li> <li>• contributing to frameworks to guide implementation of EnMS and ESO; and</li> <li>• contributing to an institutional environment that supports and acknowledges systemic industrial energy efficiency.</li> </ul> <p>The indirect contribution to the enabling environment and the multiplier effects associated with training and awareness raising (for example) will contribute to significant energy efficiency in the future. Ascribing the specific impacts to the SA IEE Project is not possible.</p> <p>GDP growth is a function of many variables of which access to cheap and reliable energy is a key example. The impact of the SA IEE Project's activities to improved industrial energy efficiency will have had a positive impact on GDP but the extent of that impact cannot be determined.</p>
To improve productivity and competitiveness of industrial projects and create more jobs	<p>The SA IEE Project has contributed to improvements in productivity and competitiveness but the extent to which is uncertain. There are examples of where this has contributed to job retention and, to a lesser extent, enabled growth and productivity increases that lead to job creation. It is not</p>



	<p>possible to comment on the Project level impacts other than to support assertions that the project has contributed to productivity / competitiveness and job retention / creation. As with other areas, it is expected that the benefits of the project activities will be realised in the future. The SA IEE Project has contributed to reducing company costs.</p>
<p>To contribute to a 15% energy efficiency improvement in the industrial and Mining sector by 2015 as defined under the 3<sup>rd</sup> Review of the NEES</p>	<p>The delay in promulgating the NEES has prevented this goal from being achieved. It is clear, however, that the SA IEE Project has had contributed to industrial energy efficiency and, more importantly, has contributed to the establishment of an enabling environment needed to achieve these sorts of government objectives.</p>
<p>Companies participating in the demonstration projects will reduce their energy consumption by 15%, as a direct impact of the demonstration</p>	<p>The SA IEE Project has played both a direct and indirect role in facilitating the reduction in energy consumption of demonstration companies. There is, however, insufficient data to estimate the percentage change in energy consumption relative to the baseline at this stage. Specifically, there is no baseline data against which to determine percentage reduction. The ERM assessment team is of the opinion that the savings are substantial but, due to a lack of information, cannot make a definitive call in this regard. Additional effort will be made to gather the data necessary to assess this as part of the FPE. Further discussions between the ERM assessment team and the SA IEE Project team will be necessary to see how and the extent to which this can be achieved.</p>
<p>Contribute to increased productivity levels by helping to mitigate energy supply / price risks faced by industrial firms</p>	<p>There are <i>ad hoc</i> examples of this in companies where the SA IEE Project has had a significant and direct role to play. The challenge is that productivity levels are a function of many variables that are outside of the SA IEE Project or implementing companies' control. The SA IEE Project has contributed to this objective but it is not possible to determine the extent of this contribution.</p>
<p>Reduce GHG emissions by approximately 22 million tons per year</p>	<p>This goal does not distinguish between direct and indirect reductions. If indirect reductions expected in the future are included, then it is likely that the long term effects of the enabling environment to which the SA IEE Project contributed will exceed this target. This cannot be quantified: it is not possible to ascribe savings to the SA IEE Project specifically.</p>

South African GDP growth is projected to slow to 2.1% in 2015<sup>1</sup> owing to a number of external factors, some of which are highlighted in Section 3 above. Against this economic backdrop, it is anticipated that demand for programmes such as the SA IEE Project, which assist companies in minimising operational expense and exposure to energy supply risk (while preserving profit margins), will increase.

### 7.2.1

#### *Factors influencing increase in future demand*

Key factors influencing GDP growth locally is the crisis of electricity supply and anticipated electricity tariff increases. It is anticipated that these have a direct influence on increasing the demand for ESO and EnMS services in the South African context.

Eskom, the single supplier of electricity in the country, is facing a supply-side crisis and is severely constrained in terms of what it can do to overcome this crisis. Some of these constraints include:

- A poor credit rating;
- A price increase together with a government support package that does not adequately meet Eskom's shortfall of R225 billion;
- An inability to increase its generation capacity in order to alleviate the supply crisis and increase revenue;
- An inability to increase its customer base through servicing international markets;
- Delay in bringing online new generation capacity at Medupi and Kusile; and
- The exacerbating effect of deteriorating thermal efficiency at existing power stations due to lack of investment in maintenance.

With limited access to capital, Eskom is reliant on government funding or tariff increases to ensure its sustainability and profitability. As regulated tariff increases and government support are not likely to address the funding shortfall in the immediate future, Eskom is unlikely to find itself in a position where is able to make the necessary infrastructural and maintenance investments to overcome the current supply crisis. The current lack of transmission and distribution infrastructure and an enabling environment for independently produced power means that supply from Independent Power

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<sup>1</sup> World Economic Outlook Update January 2015. International Monetary Fund. Retrieved from <http://www.imf.org/external/pubs/ft/weo/2015/update/01/pdf/0115.pdf>

Producers (IPP) is unlikely going to make a significant impact in the short term. Technology and services which reduce private sector dependence on the Eskom grid will thus remain in desirable from both a supply and demand perspective.

### 7.2.2 *Factors diminishing future demand*

A number of factors may moderate the macro-economic impacts of increasing electricity tariffs and supply constraints on the demand for energy efficiency services. Most notable are competition from other funded energy efficiency programmes and independent consultants in both the assessment and training space (many of whom have entered the market following successful participation in Phase I of the SA IEE Project). A number of SMEs (227 during Phase I) have already been subject to assessment. The SA IEE Project is thus faced with a decreasing number of target companies and the 'commoditisation' of energy efficiency assessment services as more players enter the market. Given the increased availability of independent local expertise and the ambitious assessment targets set by other national energy efficiency programmes such as the NBI PSEE, it is likely that the increase in demand for SA IEE Project services will be impacted negatively.

Overall, demand for energy efficiency services and associated capacity building is anticipated to increase as companies are pushed to explore all avenues to maintain competitive advantage both in an increasingly resource-constrained environment. As an established and credible institution, the SA IEE Project is ideally poised to take advantage of this.

### 7.3 *POTENTIAL CO-BENEFITS OF ENERGY EFFICIENCY IN THE SOUTH AFRICAN CONTEXT*

The overarching goal of the National Development Plan (NDP) of South Africa is to create an inclusive economy that is more dynamic and equitable with a long term vision of 11 million jobs created by 2030. Besides the vision to create more employment for South Africa, there is an acknowledgement by government that job creation needs to be honed within the framework of the green economy and the movement towards a low-carbon development pathway.

In addition and concurrent to stated NDP development goals, South Africa has committed to a Greenhouse Gas emissions trajectory that peaks at 34% below a "Business as Usual" trajectory (1990 baseline year) in 2020 and 40% in 2025, remains stable for around a decade, and declines thereafter in absolute terms<sup>1</sup>.

Considering the above, South Africa requires a "co-benefits" approach which satisfies both development and climate objectives through focussed

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<sup>1</sup> Department of Environmental Affairs (2011): *National Climate Change Response White Paper*.

development plans and/or sectoral policies<sup>1</sup>. The SA IEE Project has the potential to contribute positively and meaningfully in this regard. Some of the acknowledged and potential co-benefits of Phase I of the SA IEE Project are explored below.

### **7.3.1 *Greenhouse gas emissions reductions***

Through targeted ESO, EnMS and SME programmes at demo and pilot plants, the SA IEE Project has contributed directly to the saving of 567,765 t CO<sub>2</sub>e<sup>2</sup> in both Scope 1 direct and Scope 2 indirect emissions. These reductions were achieved across a wide variety of industrial sectors.

### **7.3.2 *Health and Wellbeing***

Projects to improve efficiency and/or reduce GHG emissions from energy systems have the strongest co-benefits potential, that is to say, the ability to mitigate climate change and protect health<sup>3</sup>. Air pollution from transport and combustion-related industrial process emissions contributes to a range of respiratory and cardiovascular diseases<sup>4</sup>. Efficiency opportunities identified at demo and pilot plants through the SA IEE Project which focus on effective vehicle and fuel management, the sourcing of efficient vehicles and fuels contribute to the reduction of harmful transport-related air pollutants. Furthermore, operational and process efficiencies and more capital-intensive initiatives such as heat recovery reduce the demand for fossil fuels as a source of energy and consequently reduce emissions of pollutants (PM<sub>10</sub>, SO<sub>x</sub> and NO<sub>x</sub>). Reducing the demand for grid electricity energy also reduces the emissions from fossil fuel burning power plants which are ubiquitous in the South African context.

### **7.3.3 *Industrial Productivity and Competitiveness***

There are numerous improvements in productivity that energy efficiency initiatives can deliver, including increased profit, safer working conditions, consistency and improvement in quality and output, reduced capital and operating costs and reductions in waste. The implementation of an EnMS and various ESO measures at the ArcelorMittal Saldanha Works plant provided a sustainable business model to increase and enhance the company's competitiveness (key external stakeholder, pers comm., January 2015). Furthermore, as a result of the engagement with the SA IEE Project, two initiatives were implemented at the plant namely, an Energy Strategy and the Management Infrastructure programme focused on the optimisation of

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<sup>1</sup> Miyatsuka, A. and Zussman, E. (2012): *Fact Sheet No.1: What are Co-Benefits? Asian Co-Benefits Partnership*. Retrieved from <http://www.cobenefit.org/publications/index.html#fact>

<sup>2</sup> Giacovelli, C.: Project Highlights Facts and Figures (presentation to the Project Steering Committee, September 2014). Numbers correct as at 23 June 2014.

<sup>3</sup> Smith, K.R. and Haigler, E. (2008). *Co-Benefits of Climate Mitigation and Health Protection in Energy Systems: Scoping Methods*. *Annu. Rev. Public Health* 2008. 29:11–25.

<sup>4</sup> Ryan, L. and Campbell, N. (2012): *Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements*. International Energy Agency Insights Series. Retrieved from [http://www.iea.org/publications/insights/ee\\_improvements.pdf](http://www.iea.org/publications/insights/ee_improvements.pdf).

resources available within the plant, eliminating duplication and wastage within the plant's operations and the development of reporting processes.

#### 7.3.4 *Job Retention and Creation*

Anecdotal evidence collected through both this study and by the UNIDO/NCPC team suggests that efforts associated with the SA IEE Project have resulted in job retention as well as creation at certain companies. At present, a study is underway to provide a qualitative and quantitative evaluation of these and other potential socio-economic impacts of Phase I of the SA IEE Project. Hence, at this point substantive qualitative evidence is not available to point to the exact impact of the SA IEE Project's impact on job retention and creation in South Africa.

#### 7.3.5 *Energy Provider and Infrastructure Benefits*

A number of potential benefits accrue to energy providers as a result of energy efficiency and demand-side energy management, the primary benefit being a reduction in operating costs. Although it can be argued that increased efficiency results in decreased revenues due to a waning demand, it must be noted that the cost of increasing generation and transmission capacity in most cases far exceeds the impact of energy efficiency measures<sup>1</sup>.

#### 7.3.6 *Reduced Energy Related Expenditure*

In countries such as South Africa which both imports and exports fossil fuels, domestic energy efficiency is important as reduced energy demand domestically releases capacity for revenue-generating exports (most specifically coal, gas and electricity to neighbouring countries including Botswana, Mozambique, Namibia, Zimbabwe, Lesotho, Swaziland and Zambia). Similarly, improved energy efficiency domestically means that foreign exchange reserves are not excessively depleted through fuel imports.

#### 7.3.7 *Energy Security*

Long term energy security considers "Four A's"<sup>2</sup> namely:

- Availability (geological);
- Affordability (economic);
- Acceptability (environmental and social); and
- Accessibility (geopolitical).

A reduction in energy demand can have a positive impact (directly or indirectly) on all of these. However, the most significant impact is noted in the absolute reduction in demand through emergency energy efficiency and

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<sup>1</sup> Ryan, L. and Campbell, N. (2012) *Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements*. International Energy Agency Insights Series. Retrieved from [http://www.iea.org/publications/insights/ee\\_improvements.pdf](http://www.iea.org/publications/insights/ee_improvements.pdf).

<sup>2</sup> Aponte, A. et al. (2007) *A Quest for Energy Security in the 21<sup>st</sup> Century: Resources and Constraints*. Asia Pacific Energy Research Centre.

demand reduction measures implemented since 2008 to stabilise the South African grid.

### 7.3.8 *Private/Public sector skills and knowledge transfer*

Behavioural changes that are likely to emanate from the SA IEE Project can be considered a co-benefit. The implementation of energy efficiency measures and behaviours in the workplace may result in behavioural change as employees retain the knowledge and skills learned through the SA IEE Project and implement this knowledge in their homes and potentially at future employers. A behaviour shift may extend beyond the implementation of energy efficiency in the home and workplace into other areas, such as the usage of more sustainable transportation or the use of eco-labelled or sustainable products.

### 7.3.9 *Macro-Economic Effects*

There is the potential that the adoption of energy efficiency measures in the private sector directly stimulates the growth and development of renewable and efficient energy technologies and associated EnMS and ESO services. Furthermore, reduced energy prices and costs for industry enable increased production and consequently, exports.

This assessment has been conducted to understand the activities and reach of the SA IEE Project to date, to inform Phase II of the SA IEE Project and to develop lessons to inform the FPE (Task 2). The FPE will be undertaken in compliance with the UNIDO Evaluation Policy. This process will include a more comprehensive assessment of the following key issues:

- Project design;
- Project relevance;
- Project effectiveness and impact;
- Project efficiency;
- Project sustainability; and
- Project coordination and management.

The PIA has focused predominantly on project effectiveness and impact; however, the final conclusions stemming from the PIA are presented according to these key issues. These initial findings will be incorporated into the FPE.

### 8.1

#### *PROJECT DESIGN*

- The project identification and formulation, as well as ongoing adjustment and prioritisation of activities, is the function of a highly participatory process. The Project Steering Committee (PSC) is made up of relevant SA IEE Project, government, funding agency and business representatives. The PSC receives quarterly reports, meets regularly and plays an important role in the prioritisation of activities and is invested in the outcomes. This structure has contributed to achieving relevant outcomes.
- A process of revising the project's Logical Framework and developing the project's TOC has served to align efforts and expectations and, in the opinion of the ERM assessment team, has resulted in more significant impacts. Not having a TOC in place from the outset of the project resulted in some uncoordinated activities during the beginning but these appear to have been resolved following the TOC and logframe development process. Interviews with stakeholders involved in this process indicated that the process was highly successful.
- The objectives of the project are clear; however, measuring and evaluating the attainment of these is limited by a lack of indicators and information needed to assess the indicators (this is discussed in more detail in ERM's accompanying report on the SA IEE Project M&E system).

## 8.2 *PROJECT RELEVANCE*

- The high level of involvement of stakeholders (PSC members as well as beneficiaries) in the process of designing the project has contributed significantly to relevant outcomes.
- The project reflects national priorities and, through the TOC and revised logframe, maps out how the activities are intended to contribute to those priorities.
- Given the current electricity supply crisis in South Africa, the timing of the project has allowed for the creation of an enabling environment that will allow more companies in the industrial sector to mitigate electricity supply risks.

## 8.3 *PROJECT EFFICIENCY*

- Generally, the project appears to have been well run. There were examples of good and bad administration and delivery of activities but generally feedback was positive and the positive impacts indicate an efficient project.
- The training was particularly well received. Managing expectations and taking “a long time” to deliver was sometimes quoted as a weakness of the project implementation.

## 8.4 *PROJECT SUSTAINABILITY*

- The project focused on systems and creating an enabling environment for systems implementation that would lead to long-term sustainable energy efficiency implementation in industry. The project has made direct investments in energy management systems, trained local trainers, capacitated the local certification bodies and delivered many skilled people to supply services needed to implement energy efficiency. The project has undoubtedly contributed in this regard.
- A weakness often reported by stakeholders was the lack of support around ensuring the sustainability of systems. However, given limited resources and the current culture around energy consumption in the country, this level of follow up and support was outside of the scope of Phase I. This is, however, an important area to consider in the design of Phase II.

## 8.5 *PROJECT COORDINATION AND MANAGEMENT*



- The project has been well coordinated and managed. The NCPC and UNIDO teams involved in the project are, in the opinion of the ERM assessment team, highly capable and effective. Both teams provided useful and substantial contributions to the PIA process.
- The biggest weakness, recognised by the PMU, has been the *ad hoc* and uncoordinated approach to monitoring and evaluation. This has limited the learning opportunities as well the opportunity to identify important areas needing further support.

## 8.6 PROJECT EFFECTIVENESS AND IMPACT

These summary conclusions draw from the detailed analysis in *Section 0* and have been structured according to the four project components.

### 8.6.1 *Against Component 1*

*Component 1: the project has contributed to an enabling regulatory environment but impacts have been limited by the delay in promulgating the reviewed NEES*

- Acknowledging that the promulgation process is outside of the control of the SA IEE Project, the ERM assessment team considers progress related to the 2<sup>nd</sup> review of the NEES to have been made but to a limited extent. The formation of a work group, external panels and the undertaking of stakeholder consultation are indicators that the SA IEE Project team has been proactive in trying to facilitate the promulgation and the development of capacity to implement (in government) and to meet the requirements (in the private sector).

### 8.6.2 *Against Component 2*

*Component 2: the project has contributed significantly to adopting, promoting and implementing SANS / ISO 50001 in the national context. It has not driven significant demand for certification but has stimulated the implementation of system elements using the standard as a guideline*

- There was limited institutional awareness and capacity building in regard to the development and introduction of the National ISO 50001 compatible Energy Management Standard (SANS/ ISO50001). However, there was no indication that there is a lack of capacity regarding national institutions to effectively administer activities relating to the standard. Awareness-raising in the private sector could have been more effective although most of companies exposed to the SA IEE Project used the standard as an implementing guideline and reference point in industry. These actions set the basis for improved impact in the future.
- The SA IEE project was instrumental in developing a national energy management standard compatible with the ISO Energy Management

Standard ISO 50001 (SANS/ ISO50001) and facilitating the use of it as a guideline for implementing EnMS system elements. The project has built capacity of an adequate number of lead auditors and auditors to meet demand for certification. Therefore, adequate national capacity in SANS ISO 50001 exists in industry and this can be attributed to the SA IEE Project. Demand for certification has been limited. If the SA IEE Project enhances awareness activities on SANS ISO 50001 and the demand increases, it is questionable whether there will be enough capacity to deal with the increased demand for certification.

### 8.6.3

#### *Against Component 3*

*Component 3: The SA IEE Project has significantly developed capacity needed to implement EnMS and ESO in industry and created a basis for the supply of credible training into the future*

- The courses developed are locally relevant (and through a process to further customise the content) are expected to be more relevant in the future. Continuous Professional Development (CPD) accreditation has increased the credibility and sustainability of the courses. The development of qualification material and the support provided towards registration of the qualification is additional to what was originally planned and is expected to contribute significantly to delivering the capacity needed to drive energy efficiency in industry.
- Feedback on the training was extremely positive noting the practical / experiential nature of the training as particularly beneficial. There has been uptake of all types of courses within the SA IEE Project. Over 2 200 people have been trained in EnMS or ESO courses. Assessing the extent to which training has led to implementation is challenging. Evidence suggests that training has contributed towards implementation of EnMS and ESO but this assessment has not been able to quantify these savings. Demand for implementation is driven by factors such as electricity price increases but, in the opinion of the ERM assessment team, the SA IEE Project has played a significant role in facilitating this implementation.
- The SA IEE Project has facilitated the uptake of courses within regional hubs and delivered SME audits that are spread geographically across the regions. This will facilitate implementation across the major industrial areas in the country. The presence of national trainers replacing international trainers and the undertaking of training inside and outside the SA IEE Project sets the basis for a sustainable benefit in the future.

### 8.6.4

#### *Against Component 4*

*Component 4: The SA IEE project has facilitated energy, CO2e and financial savings and has contributed to an enabling environment that will deliver significantly greater savings in the future. Awareness raising has improved over time but requires greater*

*reach and use of the materials to stimulate more significant demand for EnMS and ESO implementation*

- The ERM assessment team concluded that the SA IEE Project has managed to partially reach their stated objectives. Financial and energy savings (and associated CO<sub>2</sub>e savings) have been achieved. It is difficult to determine the extent to which the SA IEE Project has driven implementation leading to these savings. It is the opinion of the ERM assessment team that the project has contributed significantly to facilitating these savings. There are limitations in terms of how the data is measured and therefore the results need to be interpreted with care. A number of the stakeholders interviewed as part of the PIA noted the challenge in reporting savings data given that it is too early to expect recipients of training or direct SA IEE Project support to have implemented significant savings and for those savings to have been sustained over time. It is certainly too early for some of the indirect savings (due to the various multiplier effects associated with the project activities) to be assessed. Importantly, those savings that have been reported have not undergone a formal M&V process and therefore should be regarded as indicative. At the same time, given that not all impacts are measured, the reported savings will likely underestimate the total beneficial impacts. Job creation was stated as being a potential benefit of EnMS and ESO implementation however data quality received on job retention was inadequate. A separate review of the socio-economic impacts is being conducted by ERM.
- The effectiveness of the project communication and awareness raising has improved over time. Based on the recent communications audit, related activities have been well received. However, evidence suggests that awareness has not been raised to a level that would drive significant additional demand.

Annex A

## SAEE Convention Survey

## *Main Questionnaire*

### **1. Respondent Profile**

1.1 What category do you fall in?

- Policy maker / public sector official
- Company representative
- Consultant

#### **1.2 Policy maker/ public sector official**

1.2.1 Which organisation do you work for?

---

1.2.2 Contact details (if willing)

---

#### **1.3 Company representative**

1.3.1 Which company do you work for?

---

1.3.2 Sector?

- Agro-processing
- Chemical-liquid fuels
- Metal processing
- Mining and minerals
- Automotive manufacturing
- Other (please specify)

---

1.3.3 Would you classify your company as a SME?

- Yes
- No

1.3.4 Estimated number of employees?

---

1.3.5 Estimated annual spend on energy (or annual turnover)?

---

1.3.6 Contact details (if willing)

---

## 1.4 Consultant

1.4.1 Which sectors do you work in?

---

1.4.2 Contact details (if willing)

---

## 2. Project Exposure

2.1 In what capacity, have you participated within the SA IEE Project?

Recipients of training   
*[Go to question 3, 5 and then implementation questionnaire]*

Host/Candidate Plant   
Pilot Plant   
Demonstration Plant   
SME audit recipient   
*[Go to question 5, and then Implementation questionnaire]*

Have not been exposed in the project   
*[Go to question 4 and 5 only]*

Other, please specify

---

*[Go to questions according to response]*

## 3. Training

3.1 If you received training, in what capacity was this:

National Trainer EnMS   
National Trainer ESO   
*[Go to question 3.3]*

SANS 50001 Auditor   
SANS 50001 Lead Auditor   
*[Go to question 3.8]*

Trainee in EnMS

Trainee in ESO   
[Go to question 3.11]

3.2 When did you complete this training?

---

If a Trainer,

3.3 Have you facilitated training after being trained as a national trainer (under the SA IEE Project)?

Yes   
No

3.3.1 If yes, do you work with the IEE to offer courses or do you operate independently of the IEE?

Within the IEE   
Independent of the IEE

3.4 On completion of the IEE course for national trainers you were awarded with a UNIDO certificate of competence. Did this influence your initial choice to apply for the national trainers' course?

Yes   
No

3.5 Do you feel the EnMS and ESO trainers' course from the SA IEE Project; adequately capacitated you to undertake training in industry?

Yes   
No

3.6 As a national trainer, have you applied to the National Qualification Framework, to offer accredited courses?

Yes   
No

3.7 How would you rate the quality of the training you received?

Poor	Average	Good	Excellent

If auditor / lead auditor

3.8 Did you feel adequately capacitated to assess and audit EnMS and ESO implementation in industry?

Yes  
No

3.9 How would you rate the quality of the training you received?

Poor	Average	Good	Excellent

3.10 Do you have any additional comments on the training you received?

---

---

---

If a trainee

3.11 Please specify the component of EnMS that you were trained in (eg. Fans, Steam, Pumps)?

---

3.12 How would you rate the quality of the training you received?

Poor	Average	Good	Excellent

3.13 How have you used the training you received?

Yes  
No

3.14 Are you currently working in the energy efficiency field?

Yes  
No

3.15 Are you working in South Africa?

Yes  
No

4. *Assessing potential future demand (only for those NOT exposed to SA IEE Project)*



4.1 Would you be willing to undertake EnMS and ESO training and/or EnMS and ESO implementation at your company/organisation?

Yes

No

4.1.1 If no, please specify why?

---

---

4.1.2 If yes, can you provide details on which type of training you would be interested in?

National Trainer EnMS

National Trainer ESO

SANS 50001 Auditor

SANS 50001 Lead Auditor

Trainee in EnMS

Trainee in ESO

4.1.3 If interested in training, what is the motivator?

Job retention

Increased production

Enhanced reputation

Investor confidence

Cost savings

Energy security

Emission reductions (mitigation benefits)

Other

4.2 Does your organisation have adequate capacity to implement EnMS and ESO?

Yes

No

4.3 Are you aware of the SANS/ ISO 50001 EnMS Standard?

Yes

No

4.3.1 If yes, would you consider ISO50001 certification?

Yes  
No

4.3.2 If no, why not?

---

---

5. *Awareness*

- Have you accessed the SA IEE Project/ NCPC website?

Yes   
No

- If yes, did you find the website useful?

Yes   
No

- Have you seen any of the SA IEE Project case studies?

Yes   
No

- If yes, did reading the case study(s) improve your understanding or awareness of EE?

Yes   
No

- If yes, did this influence your decision to implement EE?

Yes   
No

- Have you seen the SA IEE Project newsletter?

Yes   
No

- If yes, did you read the newsletter?

Yes   
No

- If yes, did you find the content relevant and/or useful?

Yes   
No

- Do you feel that the profile of the NCPC has been raised as a result of the SA IEE Project? (Ie had you heard about NCPC prior to 2010?)

Yes   
No

- Do you feel that other NCPC programmes have been more effective as a result of the SA IEE Project? (Ie improved capacity within the NCPC as a result of the SA IEE Project.)

Yes   
No

### *Implementation Questionnaire*

#### **1. General**

1.1. Name of the company where energy efficiency activities were undertaken?

---

1.2. What sector is this company in?

---

1.3. Contact details for this company?

---

#### **2. Implementation of system elements**

2.1. ISO 50001 - Is the company:

Certified   
In the process of becoming certified   
Intend to become certified   
Not interested in certification

2.2. Has SANS/ISO 50001 acted as a guide in implementing system elements?

Yes   
No

2.3. Are any of the following system elements in place?

2.3.1. An energy policy is in place   
2.3.2. An energy management team has been established

- 2.3.3. A management representative been appointed to drive EnMS
- 2.3.4. There is adequate competence in the organisation to implement EnMS / ESO
- 2.3.5. An energy baseline has been conducted
- 2.3.6. Energy performance indicators have been defined
- 2.3.7. An energy management plan, including responsibilities, is in place and relevant individuals understand it
- 2.3.8. M&E systems are in place to measure and report energy consumption
- 2.3.9. Opportunities for improving energy performance are identified on an ongoing basis
- 2.3.10. Energy objectives / targets have been set
- 2.3.11. The organisation's energy policy and performance is communicated internally / externally
- 2.3.12. Energy is considered in design activities
- 2.3.13. Energy is considered in procurement processes
- 2.3.14. Processes are in place to identify non-conformities and to take corrective and preventative action

2.4. Do you intend implementing EnMS elements in the future?

Yes

No

### 3. *Implementation of energy efficiency initiatives*

3.1. Have you implemented energy efficiency initiatives as part of:

Demonstration Plant

Host Plant

Candidate Plant

Pilot Plant

Recommendations from the SME Audits

Other (Please specify)



---

3.2. Please provide an estimated figure for energy savings achieved (in kWh and ZAR?)

---

3.3. What investments were made to facilitate these energy savings?

---



---

3.4. What enabled the energy efficiency investments?

Budget/ Access to Funding

High level management buy-in/support

Government support programme (please specify)

---

Recommendations from the SME Audits

---

Other (Please specify)

3.5. Has the initiative resulted in indirect savings being achieved? E.g., Have individuals / companies with secondary exposure to the SASA IEE Project implemented energy efficiency initiatives?

Yes

No

3.5.1. If yes, please describe

---

---

#### 4. *Socio-economic impacts*

##### **Jobs**

5.1. Did the initiatives lead to job retention?

Yes

No

4.2.1. If yes, how many jobs were retained?

---

5.2. Did the initiatives lead to any new jobs created?

Yes

No

4.2.1. If yes, how many jobs were created?

---

##### **Competitiveness**

5.3. Can you provide an estimate of the amount of money saved?

---

5.4. How were the monetary savings used?

---

---

5.5. Were you able to increase production?

Yes

No

5.6. Can you provide any details of other benefits from energy savings achieved?

---

---

---

**Behaviour change**

5.7. Has the company become more open to sharing energy data and EnMS experience since your exposure to the SA IEE Project?

Yes

No

5.8. Has the SA IEE Project facilitated a successful change management approach in the company?

Yes

No

5.9. Has the SA IEE Project promoted company-vendor energy systems dialogue?

Yes

No

**5. Motivation**

5.1. To what extent were the investments motivated by the following (indicate percent out of 100%)?

SA IEE Project		Industry internal pressure	
Energy prices		International stakeholder	

		pressure	
Carbon Tax		Other government pressures to increase EE	
Energy security		Other: specify	
SA economic downturn			

5.2. What element of the SA IEE Project was most influential in contributing to your decision to invest in energy efficiency?

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**6. Specific question for SME audit recipients**

6.1. Of the recommended opportunities, what % of opportunities was implemented?

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6.2. Which recommended opportunities were not implemented?

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6.3. Why were these specific opportunities not implemented?

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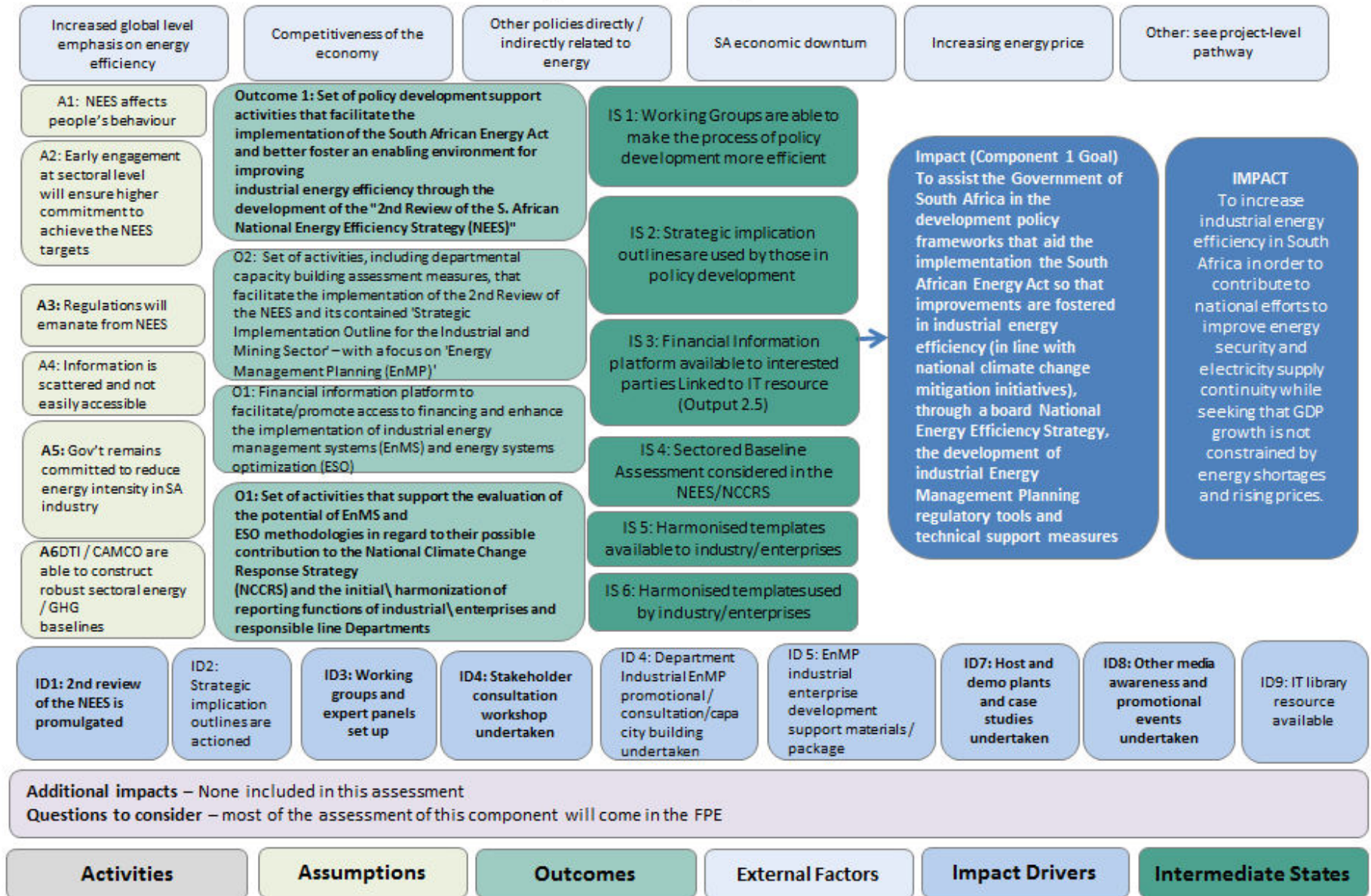
Annex B

## SA IEE Project Pathways



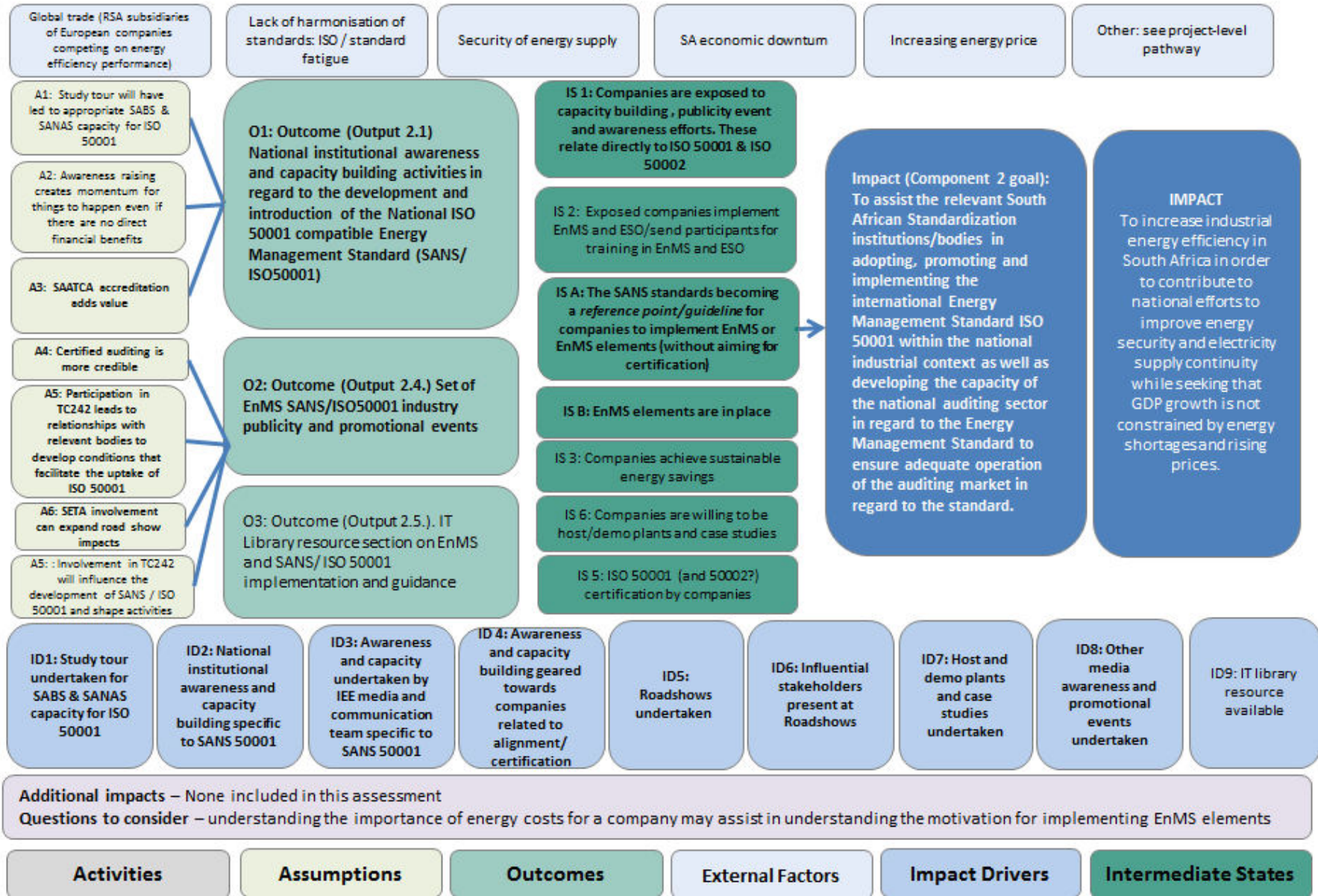
A total of 8 pathways were developed, as set out below. Elements in bold indicate the prioritised elements that have been assessed and rated as part of the PIA (see *Section 2.1.5*). Note that where the elements are named using letters rather than numbers (e.g., IS A instead of IS 2) it is because they are repeated or linked across different pathways.

# Pathway: Outputs 1.1-1.4

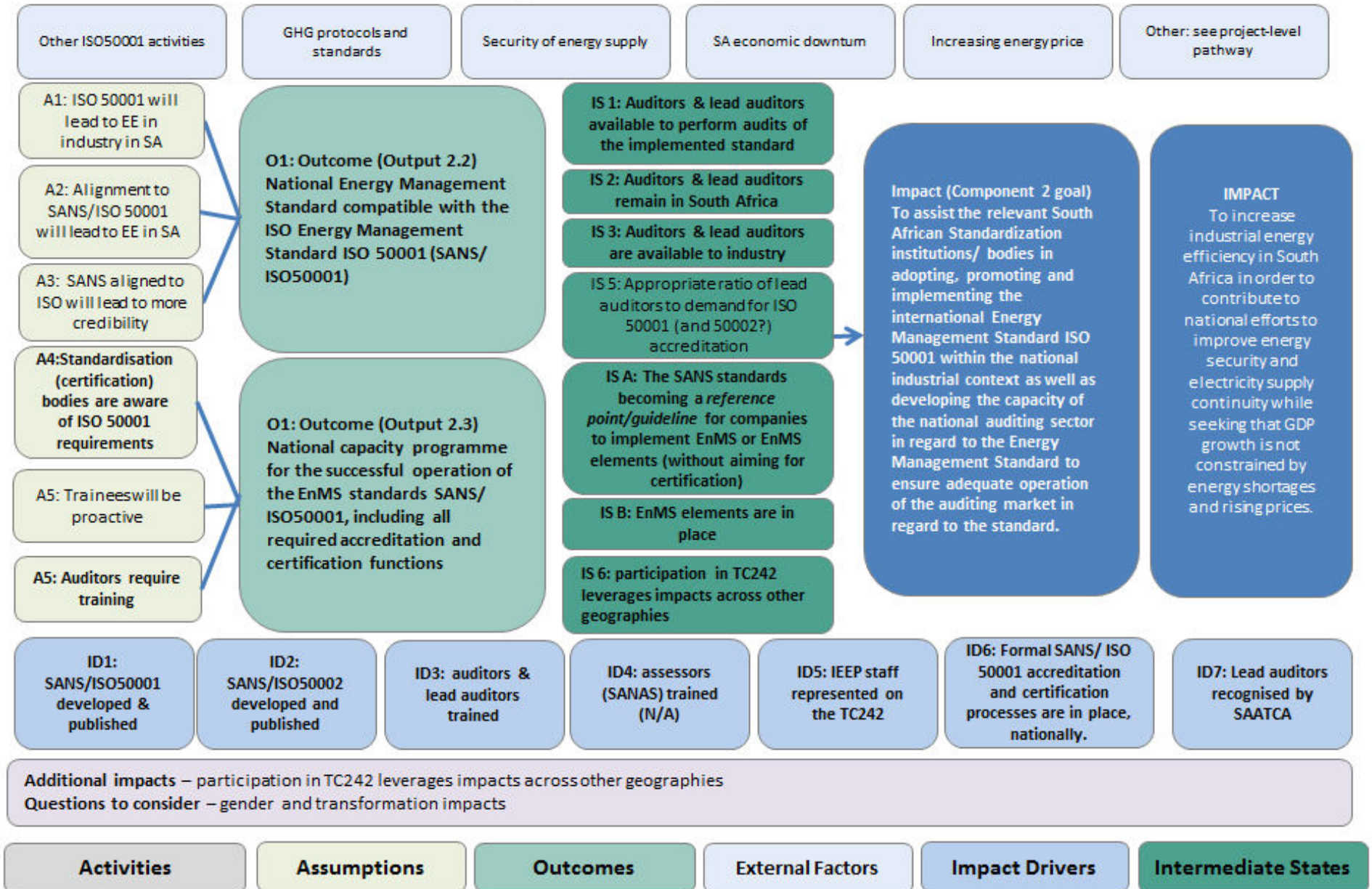




# Pathway: Output 2.1, 2.4 & 2.5.

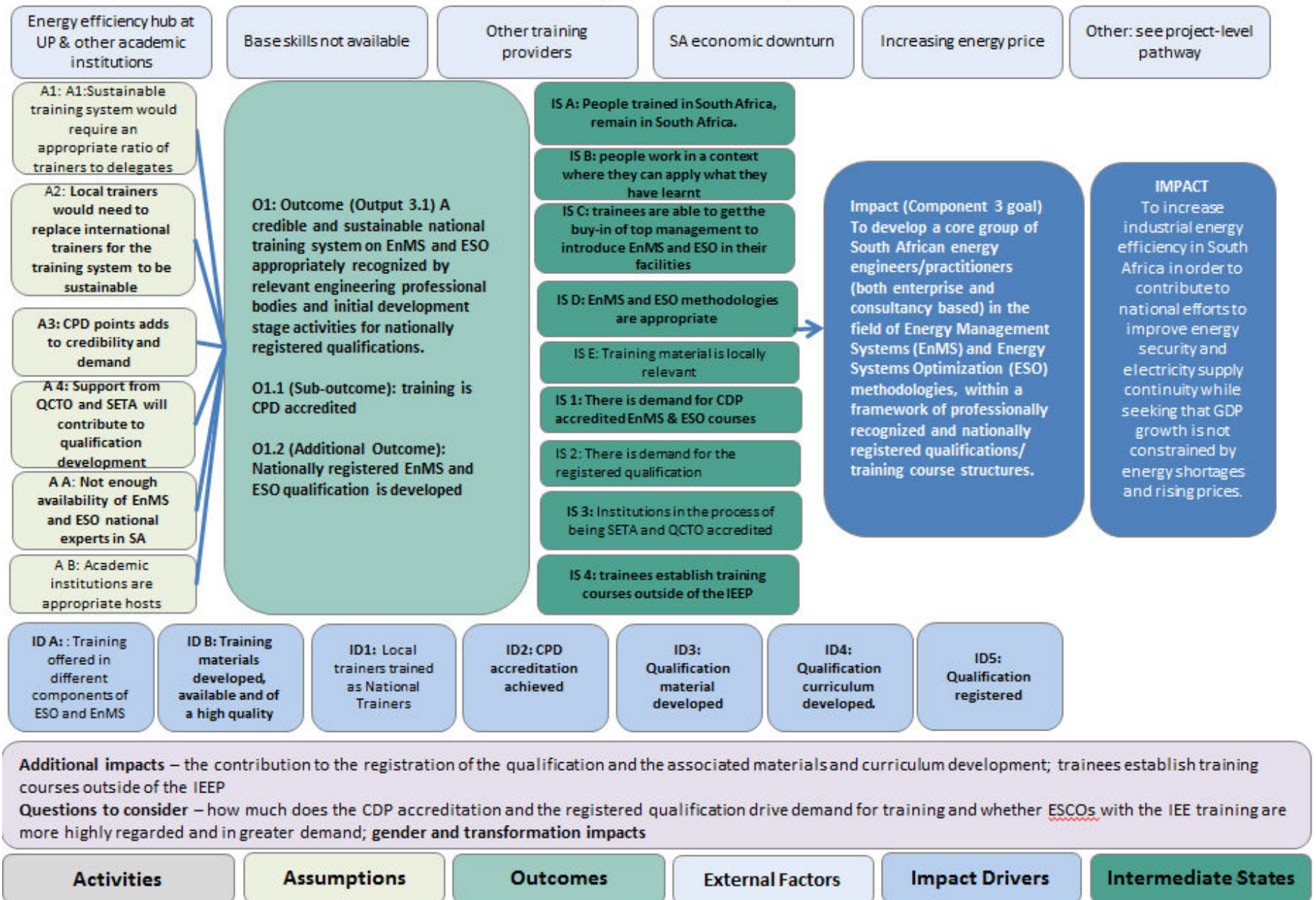


# Pathway: Output 2.2 & 2.3.

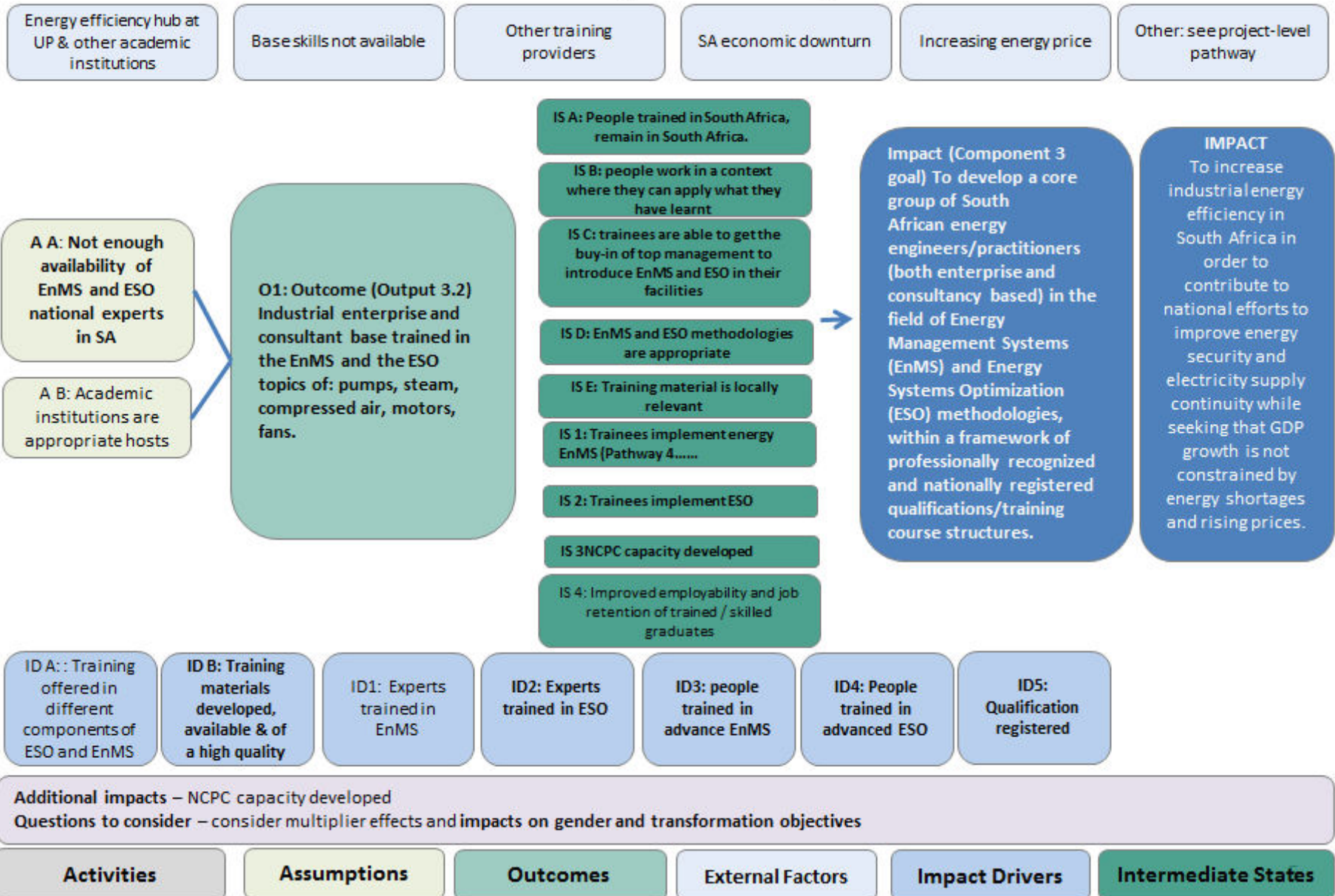




# Pathway: Output 3.1

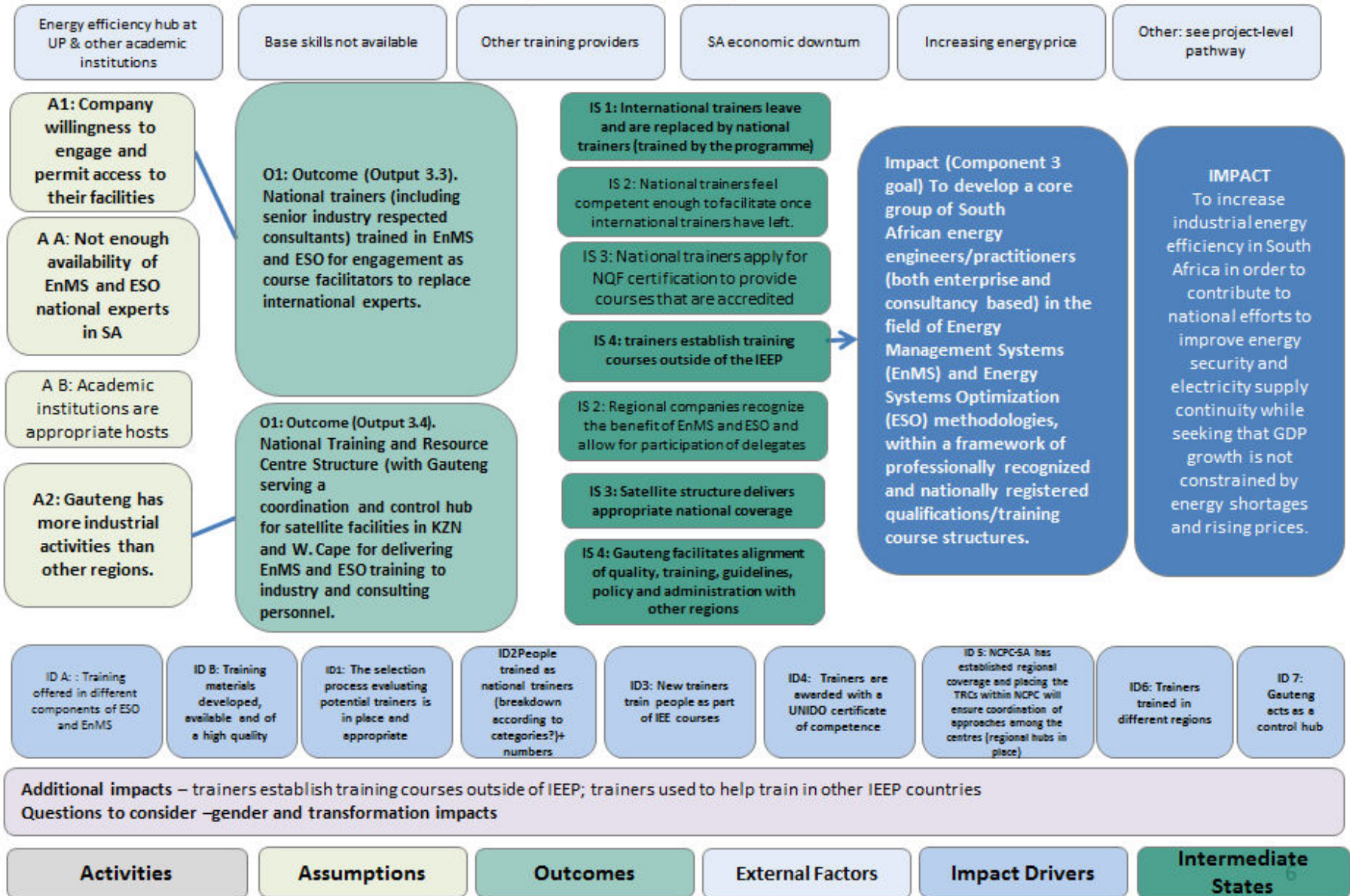


# Pathway: Output 3.2

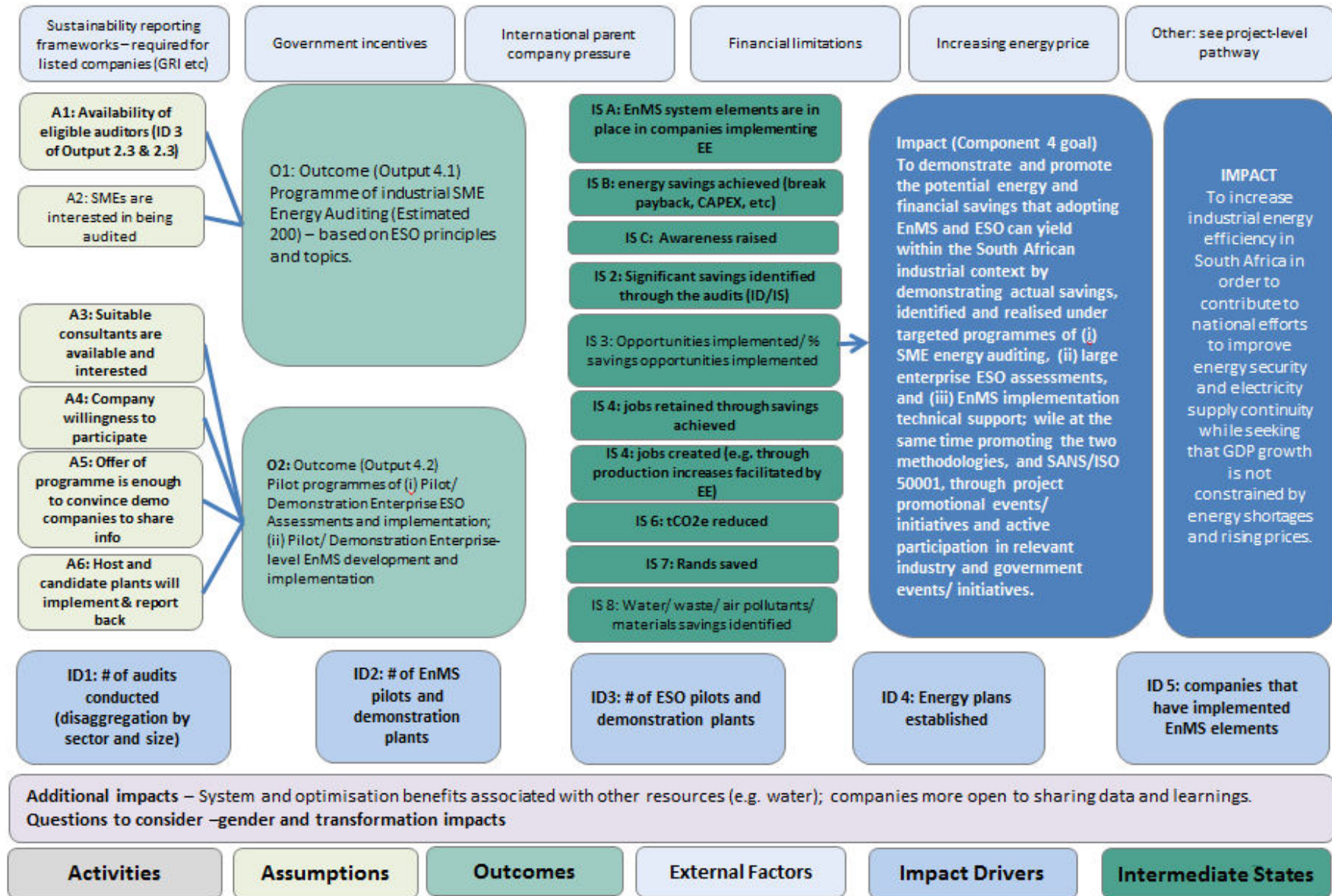




# Pathway: Output 3.3 & 3.4

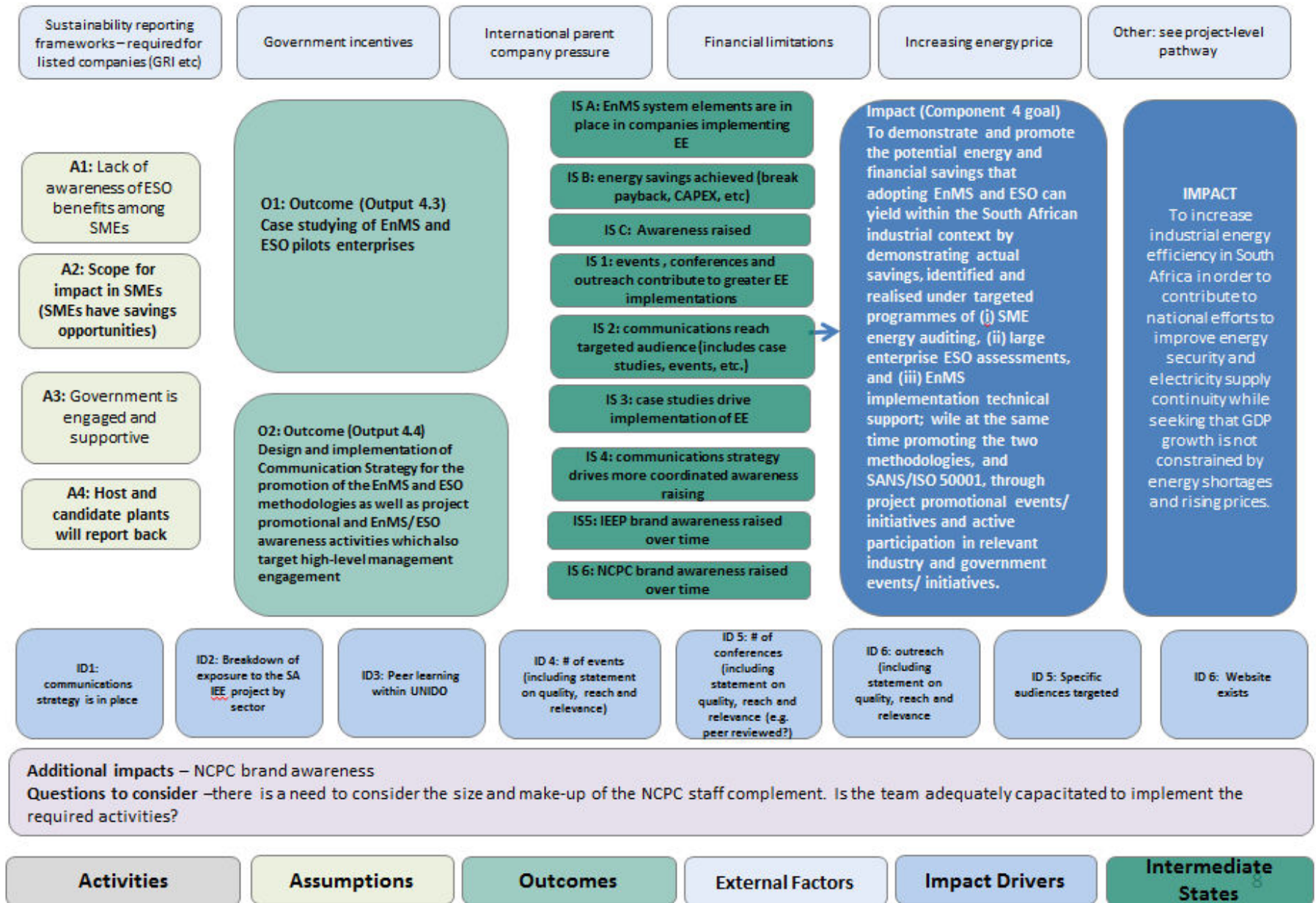


# Pathway: Output 4.1 & 4.2





# Pathway: Output 4.3 & 4.4



Annex C

## Evidence to Support the Findings in Section 4

Figure 8.1 Survey respondent opinions of their exposure to the SANS ISO 50001 standard (n = 9)

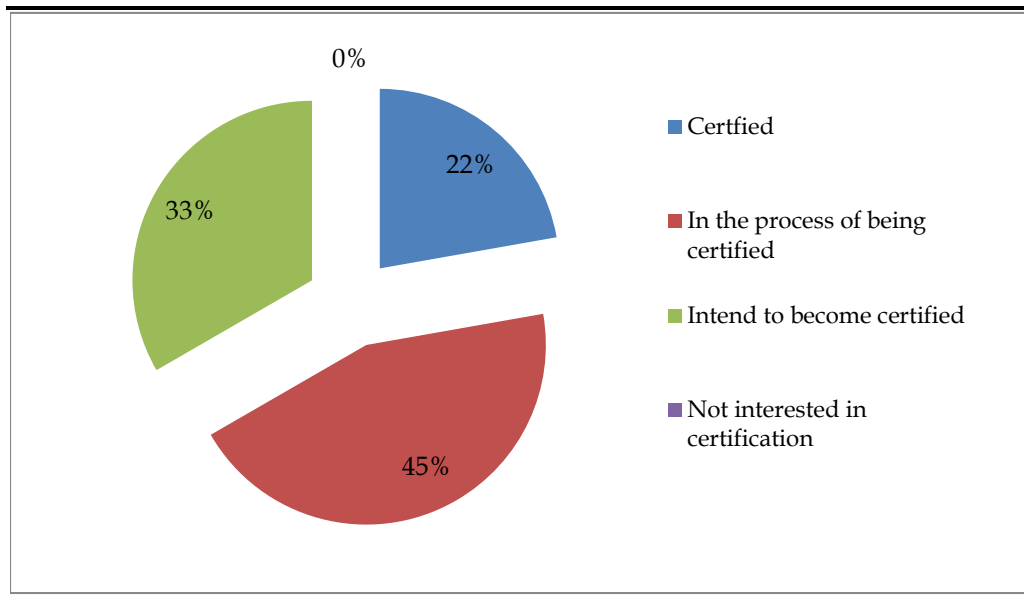
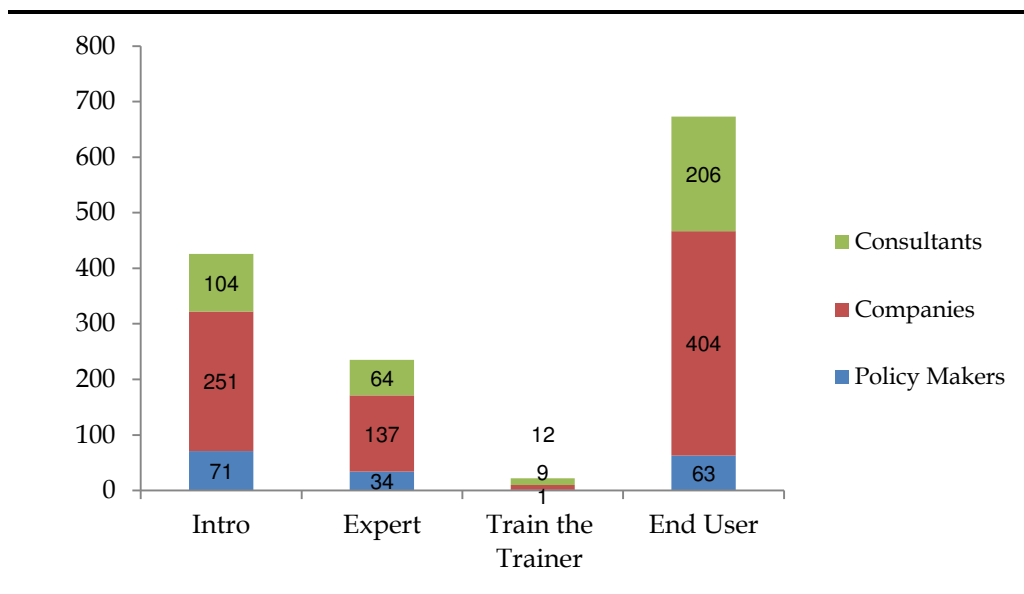


Table 8.1 Breakdown of ESO course uptake per course type and target audience

	Intro	Expert	Train the trainer	End user
Policy makers		71	34	1
Companies		251	137	9
Consultants		104	64	12

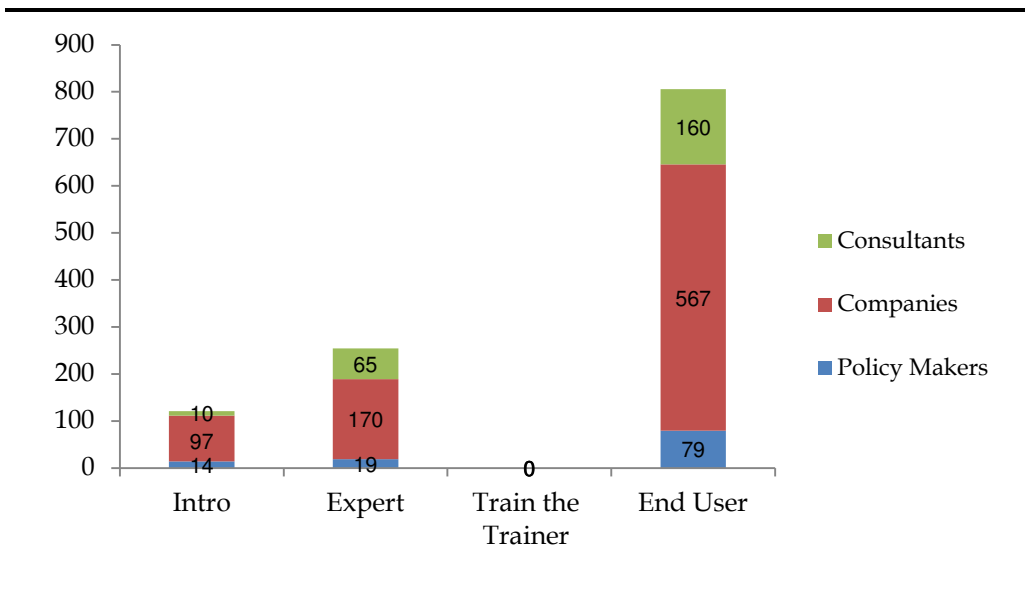
Figure 8.2 Breakdown of ESO course uptake per course type and target audience



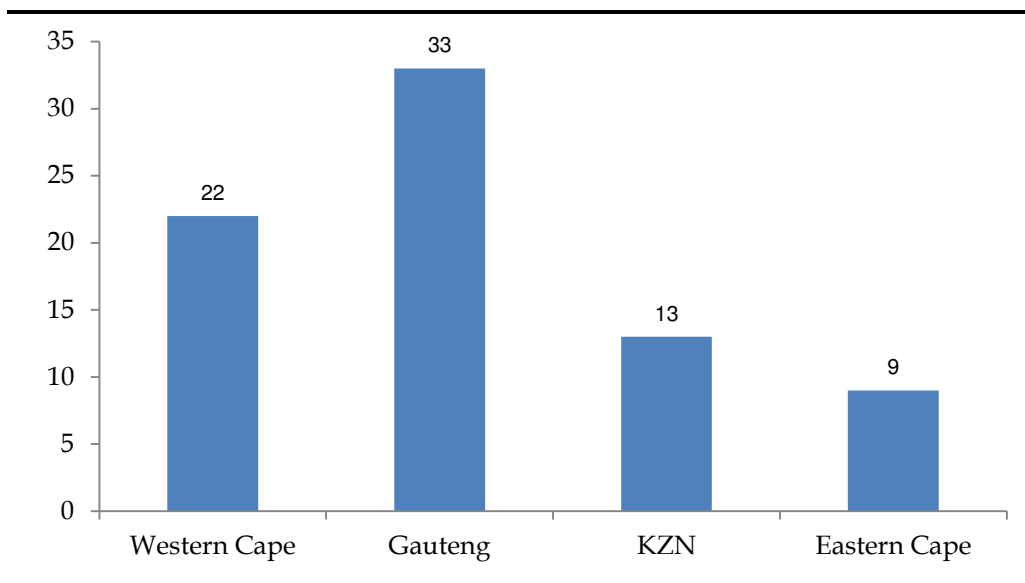
**Table 8.2** *Breakdown of EnMS course uptake per course type and target audience*

	Intro	Expert	Train the trainer	End user
Policy makers		14	19	0
Companies		97	170	0
Consultants		10	65	0

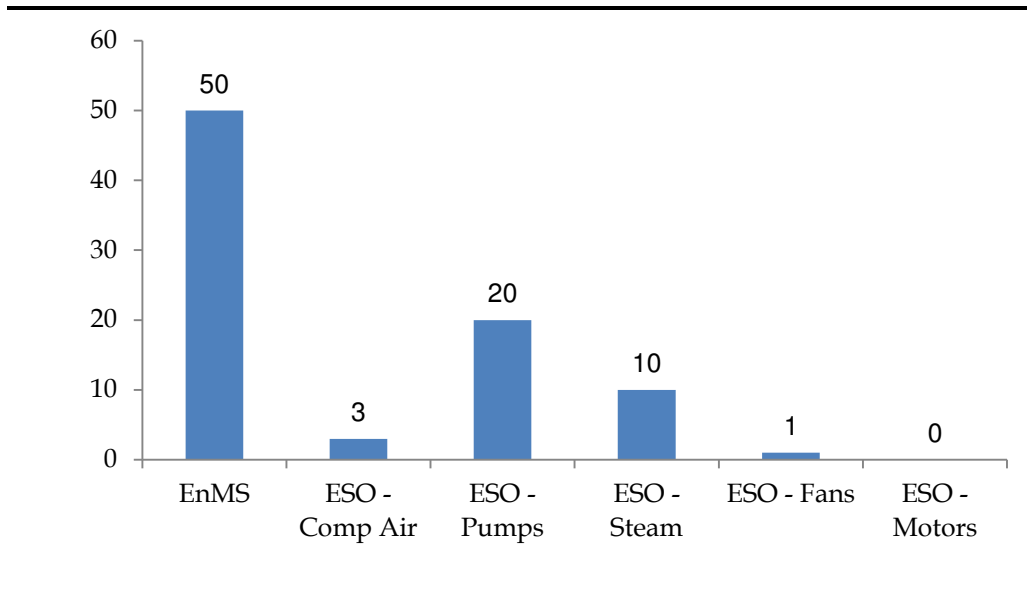
**Figure 8.3** *Breakdown of ESO course uptake per course type and target audience*



**Figure 8.4** *Expert distribution per region*



**Figure 8.5** *Expert distribution per training component*



**Figure 8.6** *Facilitators trained filtered per component for the Western Cape*

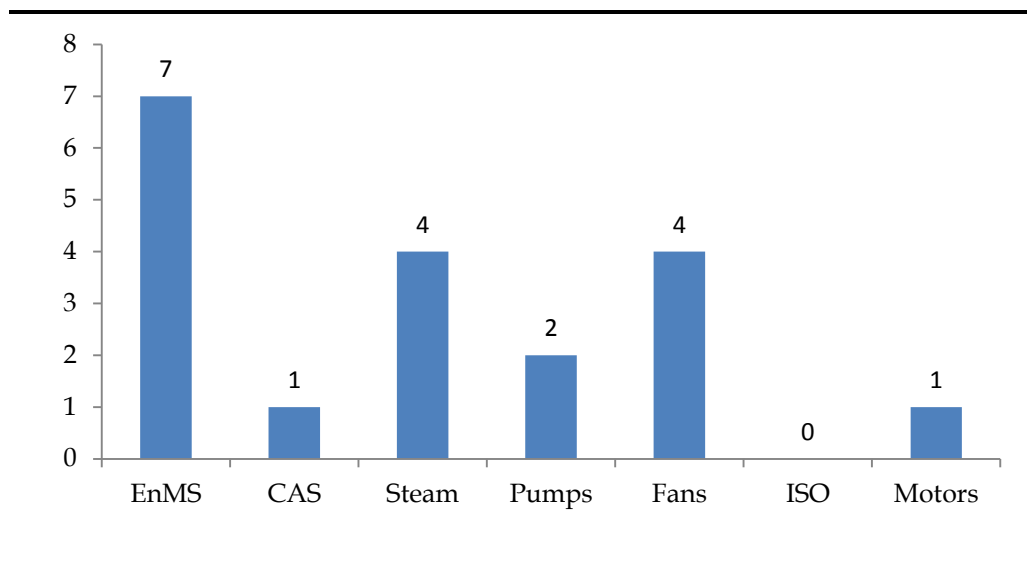


Figure 8.7 Facilitators trained filtered per component for Gauteng

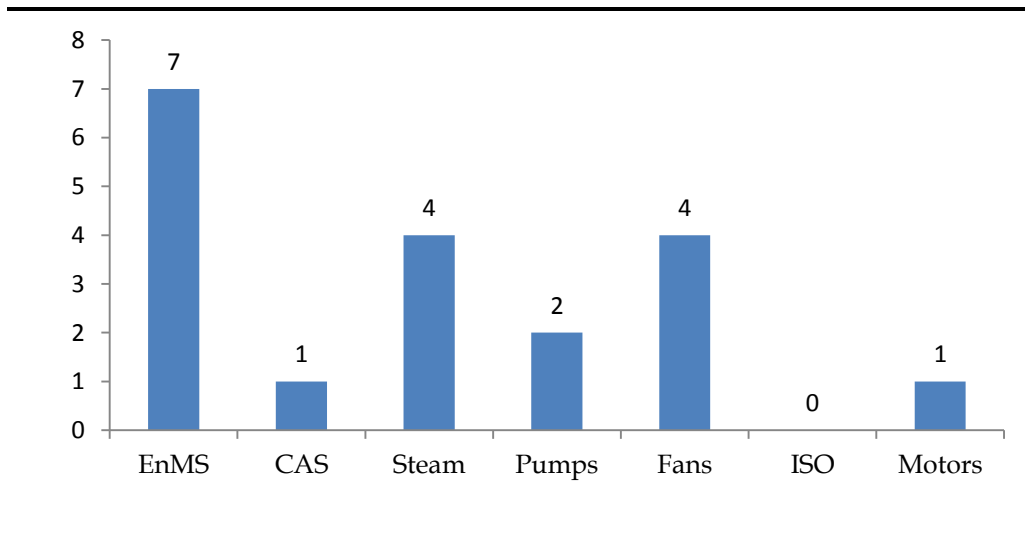


Figure 8.8 Facilitators trained filtered per component for KwaZulu-Natal

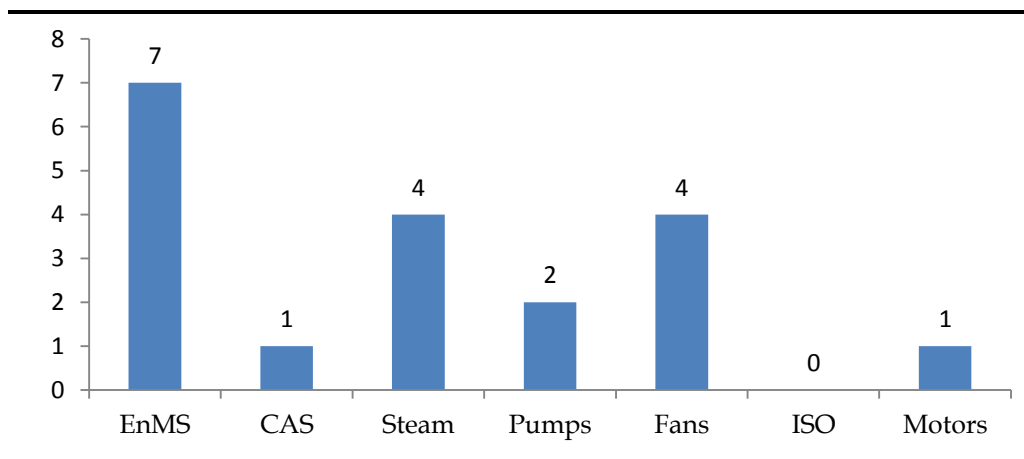


Figure 8.9 Facilitators trained filtered per component for the Eastern Cape

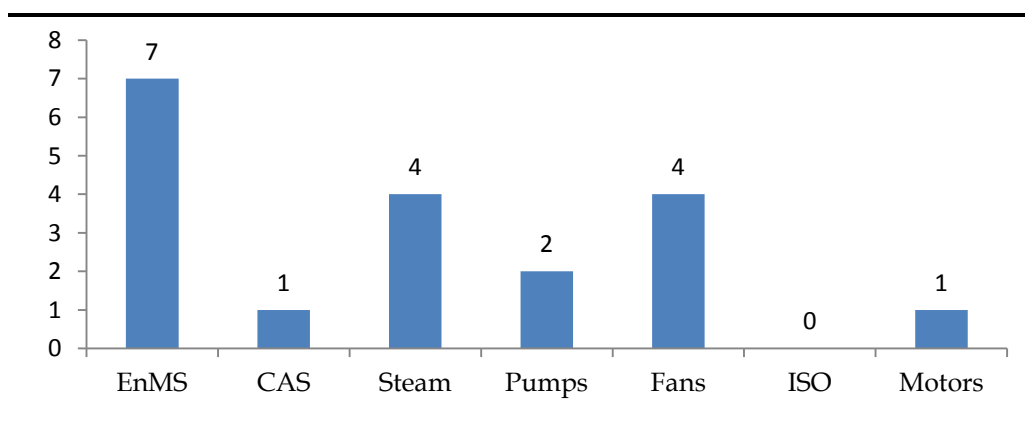


Figure 8.10 Expert Participation filtered per component for the Western Cape

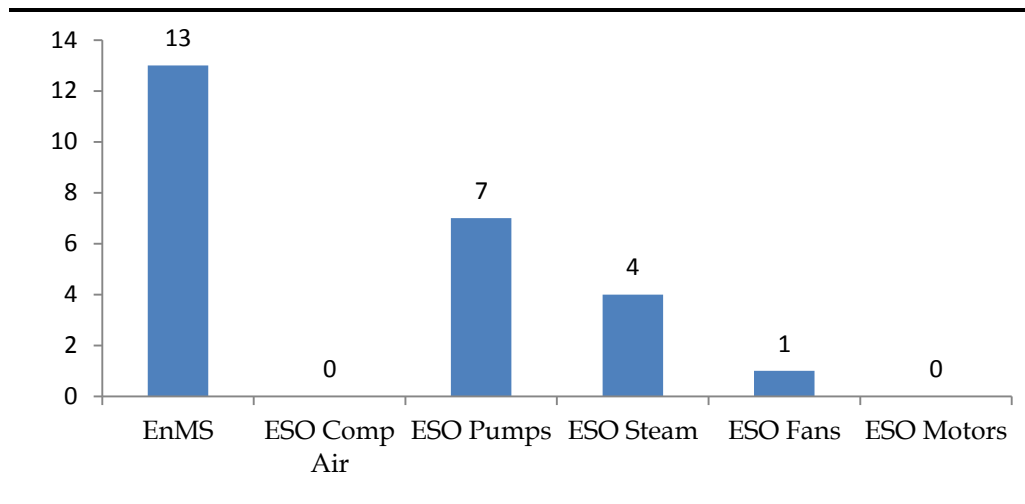


Figure 8.11 Expert Participation filtered per component for Gauteng

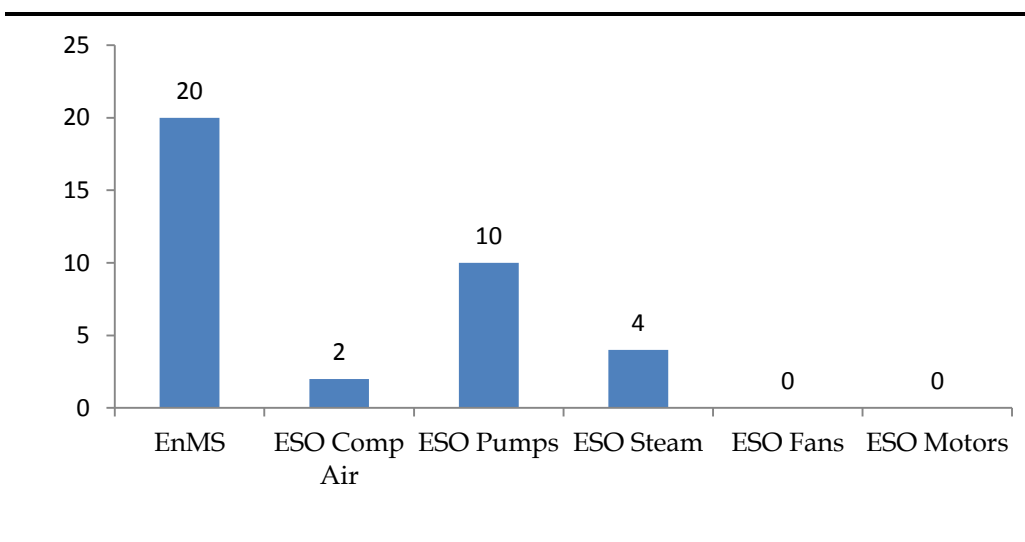
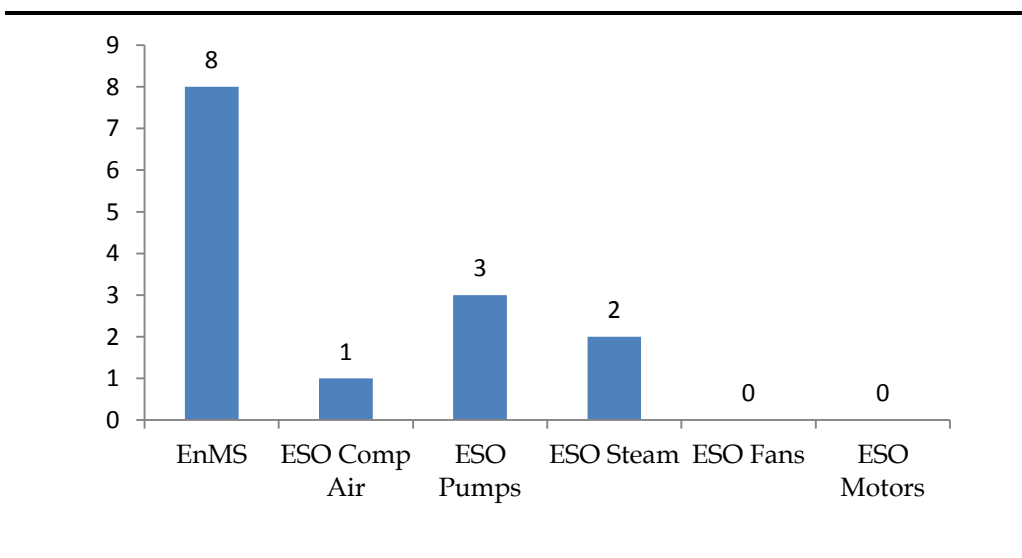
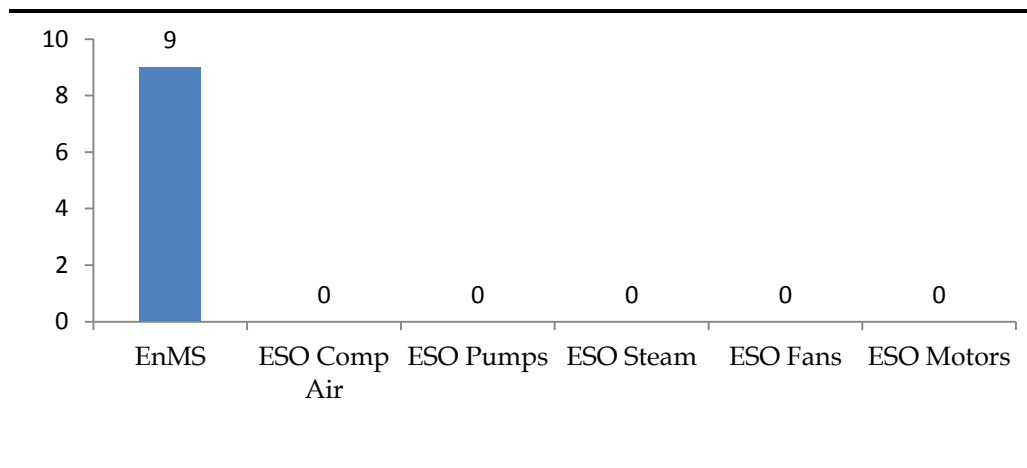


Figure 8.12 Expert Participation filtered per component for KwaZulu-Natal



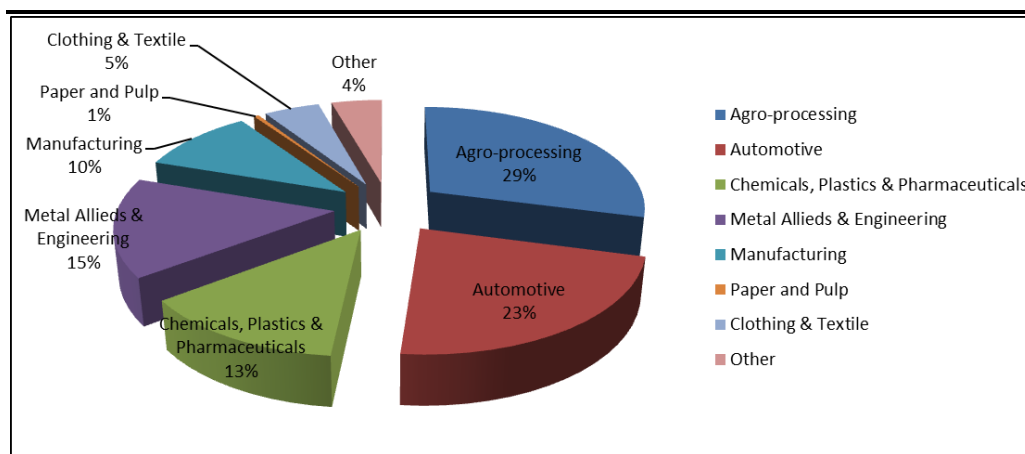
**Figure 8.13** Expert Participation filtered per component for the Eastern Cape



**Table 8.3** Percentage breakdown of SME Audits conducted per sector

Sector	No. of companies	Percentage (%)
Agro-processing	66	29
Automotive	51	22
Chemicals, Plastics & Pharmaceuticals	30	13
Metal Allieds & Engineering	35	15
Manufacturing	23	10
Paper and Pulp	1	0
Clothing & Textile	11	5
Other	10	4
<b>TOTAL</b>	<b>227</b>	<b>100</b>

**Figure 8.14** Percentage breakdown of SME Audits conducted per sector



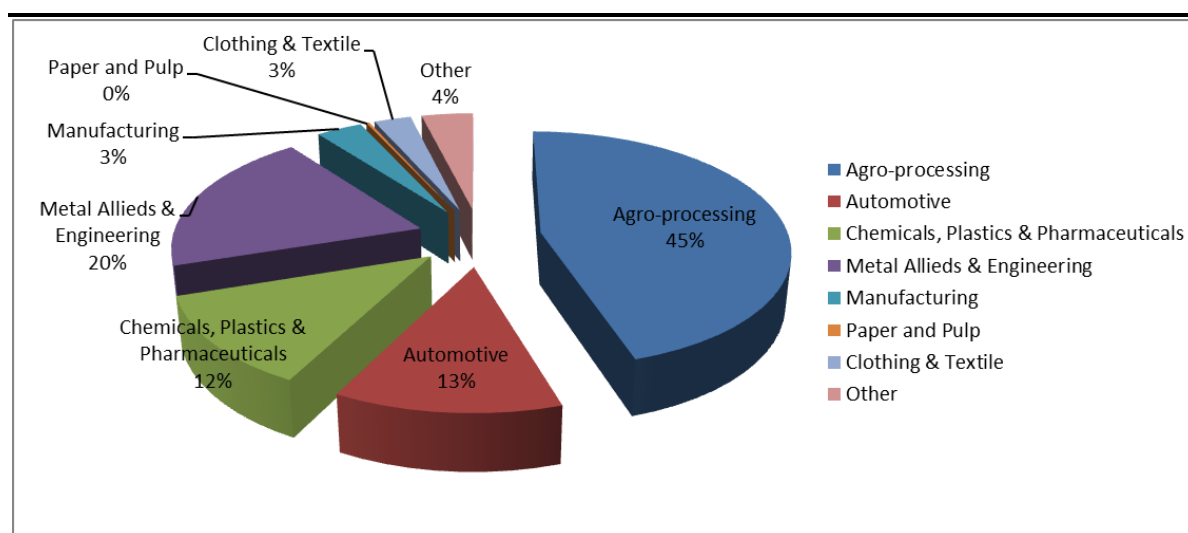


*Potential savings identified from SME Audits broken down per sector*

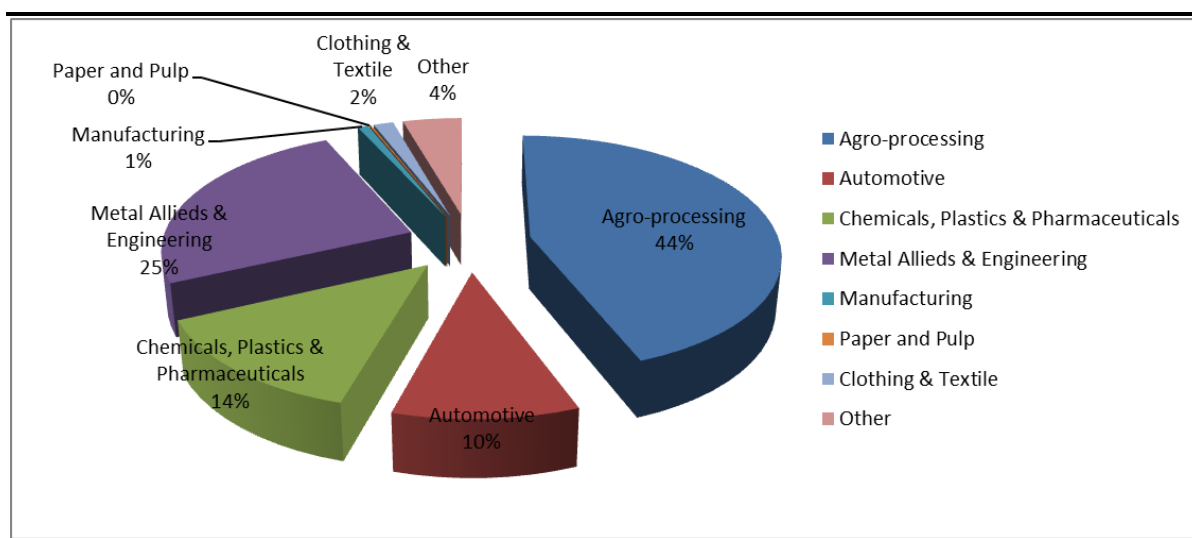
**Table 8.4** *Potential savings identified from SME Audits broken down per sector*

Sector	ZAR/Annum	% (ZAR/Annum)	kWh/Annum	% kWh/Annum
Agro-processing	50 394 755	45	48 106 764	44
Automotive	13 928 814	12	11 052 155	10
Chemicals, Plastics & Pharmaceuticals	13 727 194	12	14 906 851	14
Clothing & Textile	3 135 224	3	1 626 031	1
Manufacturing	3 877 385	3	875 581	1
Metal Allieds & Engineering	21 887 111	20	27 276 480	25
Other	4 354 973	4	4 847 573	4
Paper and Pulp	292 799	0	139 181	0
<b>TOTAL</b>	<b>111 598 255</b>	<b>100</b>	<b>108 830 617</b>	<b>100</b>

**Figure 8.15** *Percentage breakdown of Potential ZAR savings per annum per sector identified from SME Audits*



**Figure 8.16** *Percentage breakdown of Potential KWh savings per annum per sector identified from SME Audits*



**Table 8.5** *Potential t CO<sub>2</sub>e emission reduction savings identified from SME Audits broken down per sector*

Sector	CO <sub>2</sub> e Emission Reduction (tonnes)
Agro-processing	47 262
Automotive	10 832
Chemicals, Plastics & Pharmaceuticals	14 758
Clothing & Textile	1 619
Manufacturing	867
Metal Allied & Engineering	26 879
Other	4 799
Paper and Pulp	138
<b>TOTAL</b>	<b>107 154</b>

**Figure 8.17** *Percentage breakdown of Potential tCO<sub>2</sub>e per sector identified from SME Audits*

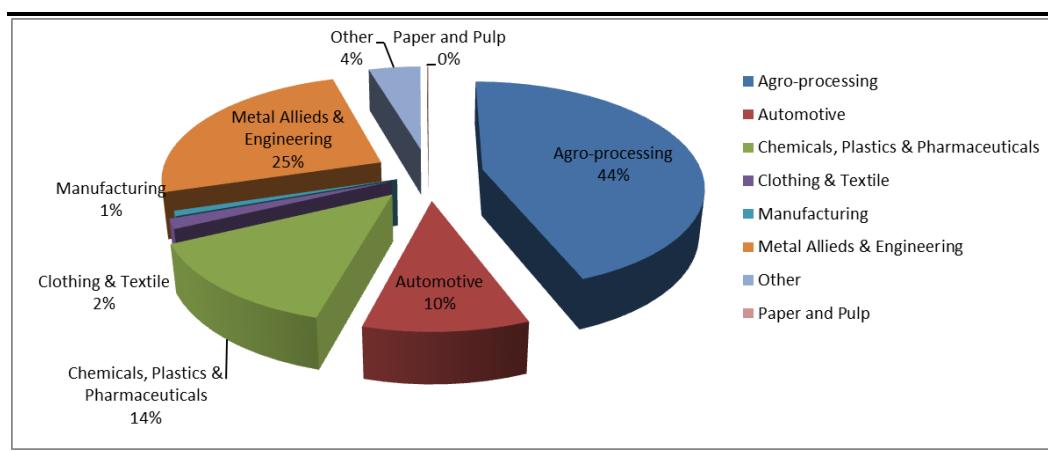


Figure 8.18 *Reported GWh saved by host candidate plants broken down per years implemented*

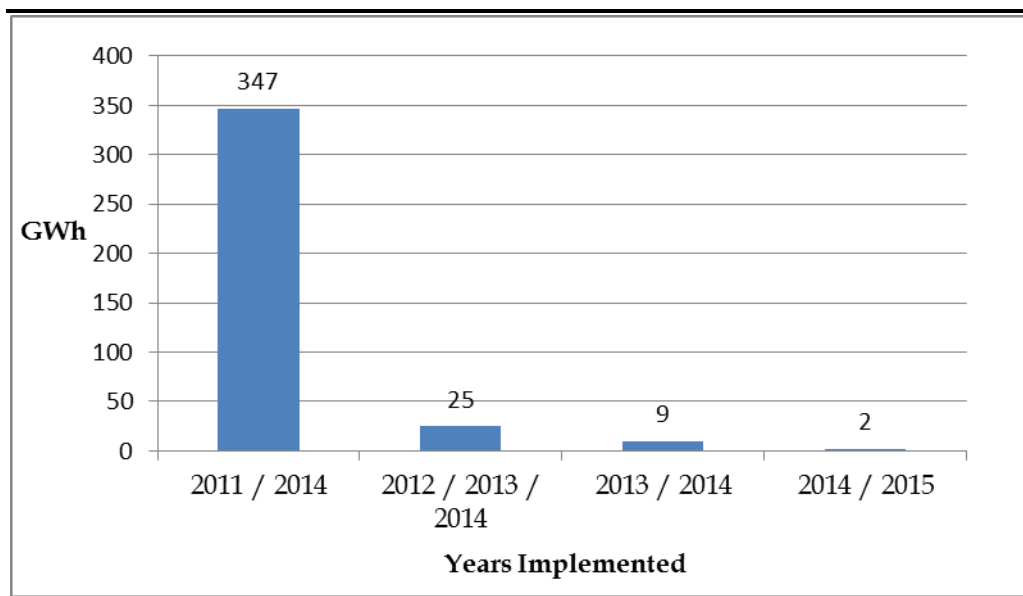


Figure 8.19 *Reported tonnes of CO<sub>2</sub>e emissions avoided by host candidate plants broken down per years implemented*

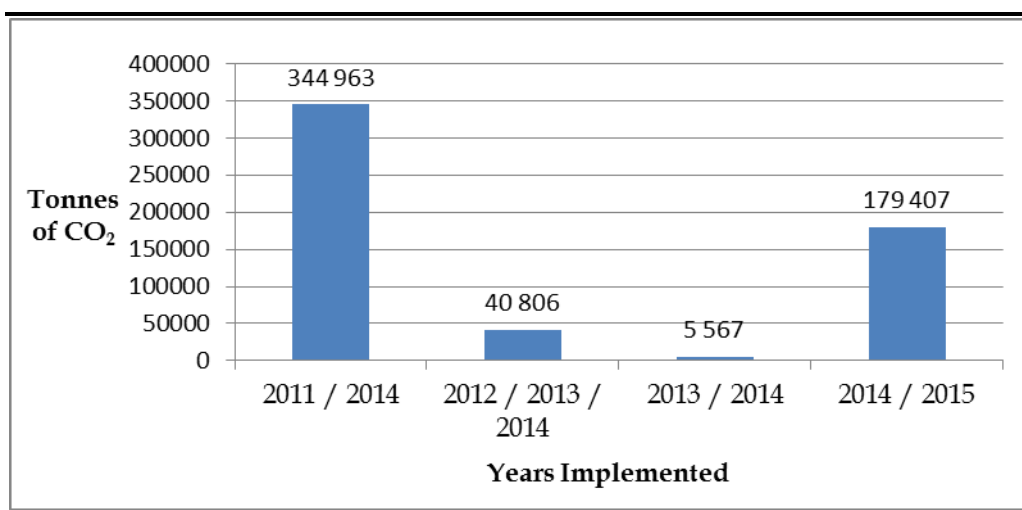


Figure 8.20 *Reported ZAR saved by host candidate plants broken down per years implemented*

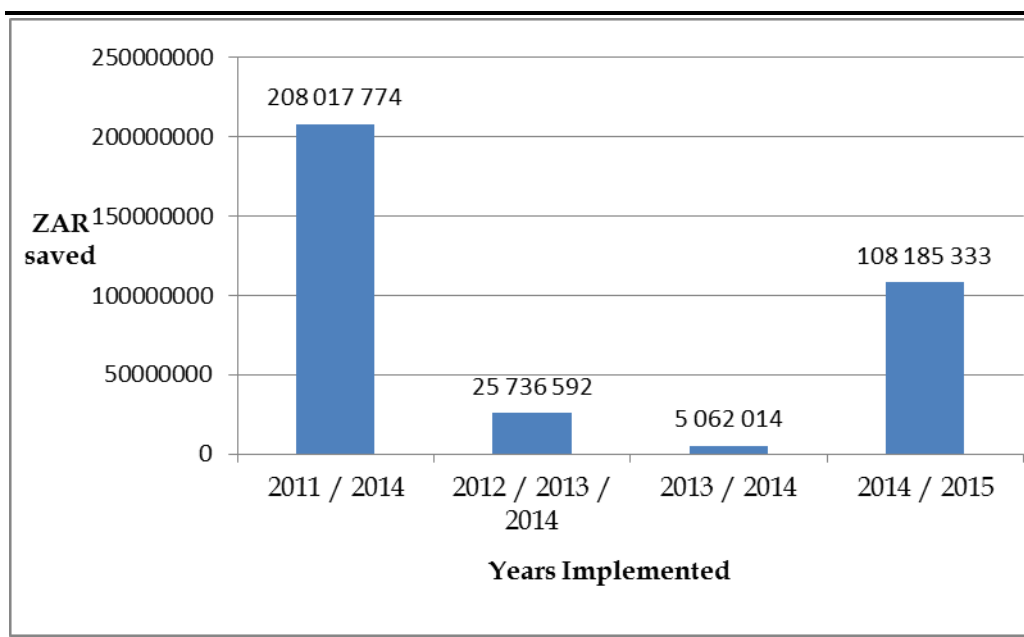


Figure 8.21 *Reported KWh saved by host candidate plants broken down per implementation type*

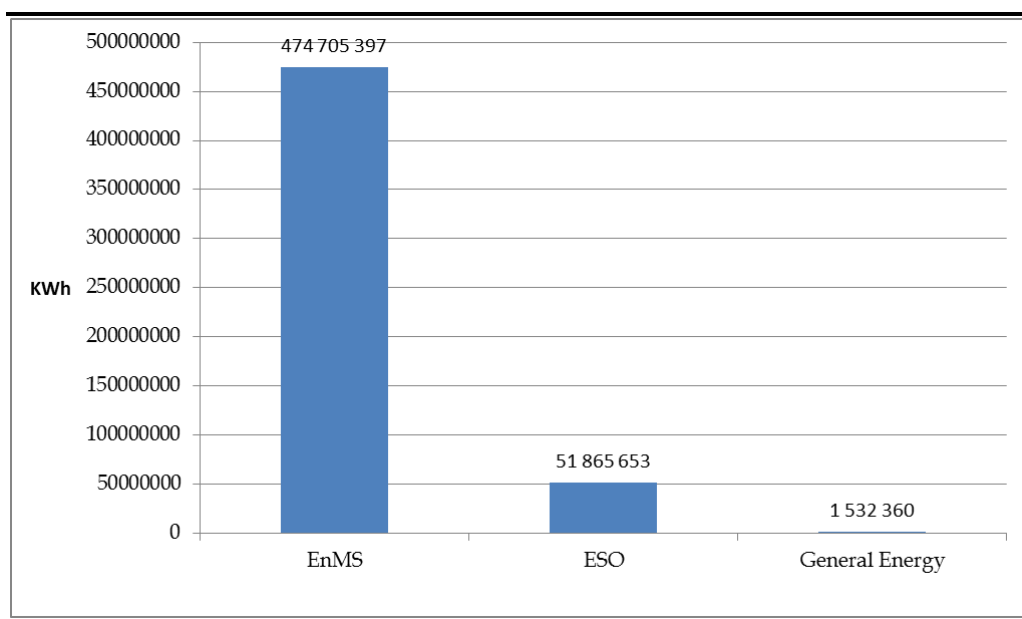


Figure 8.22 Reported tCO<sub>2</sub>e saved by host candidate plants broken down per implementation type

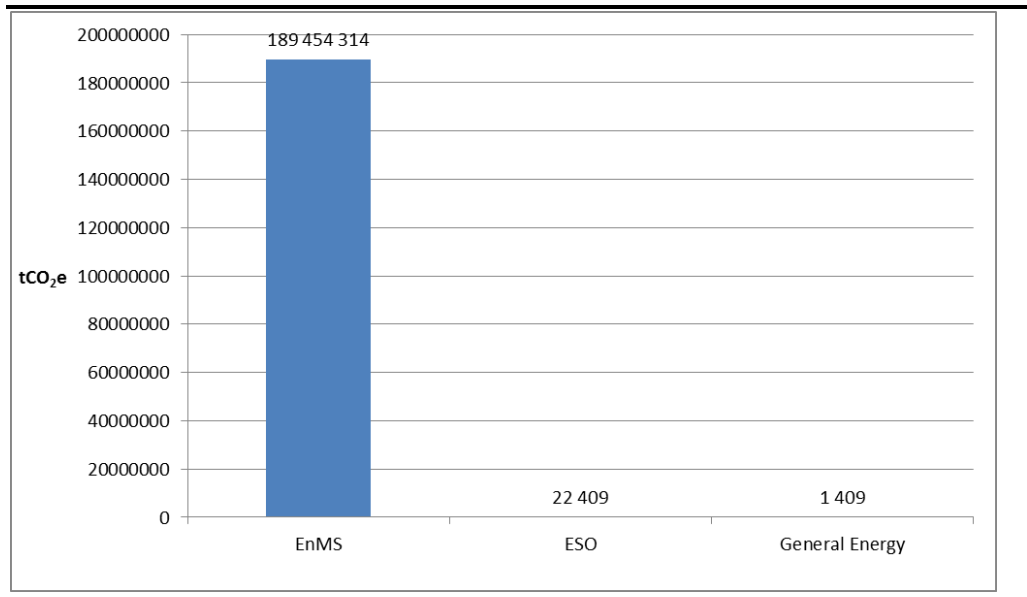


Figure 8.23 Reported ZAR saved by host candidate plants broken down per implementation type

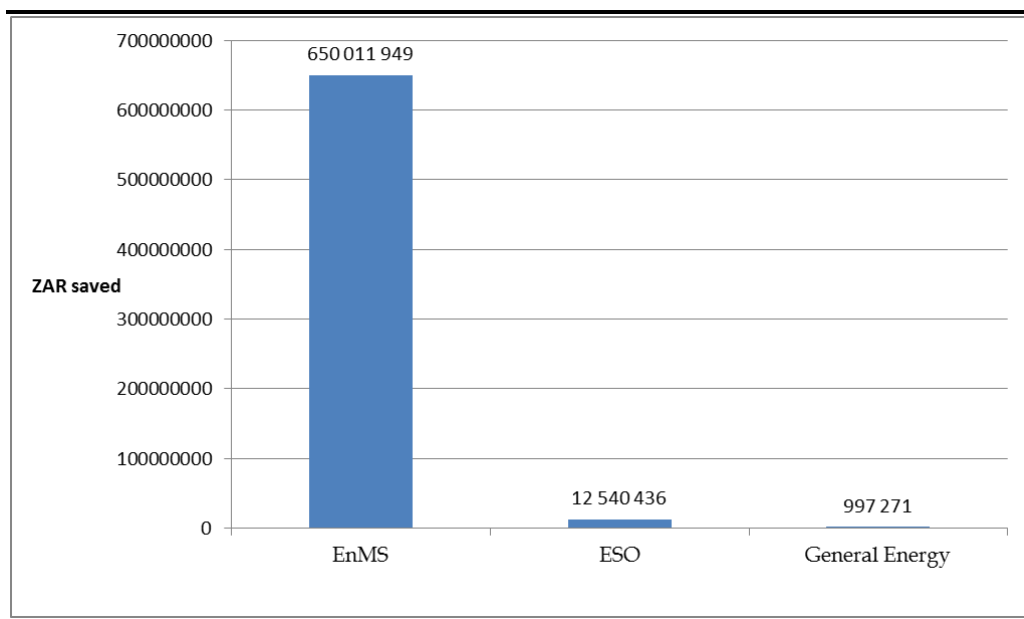


Figure 8.24 Reported KWh saved by host candidate plants broken down per sector

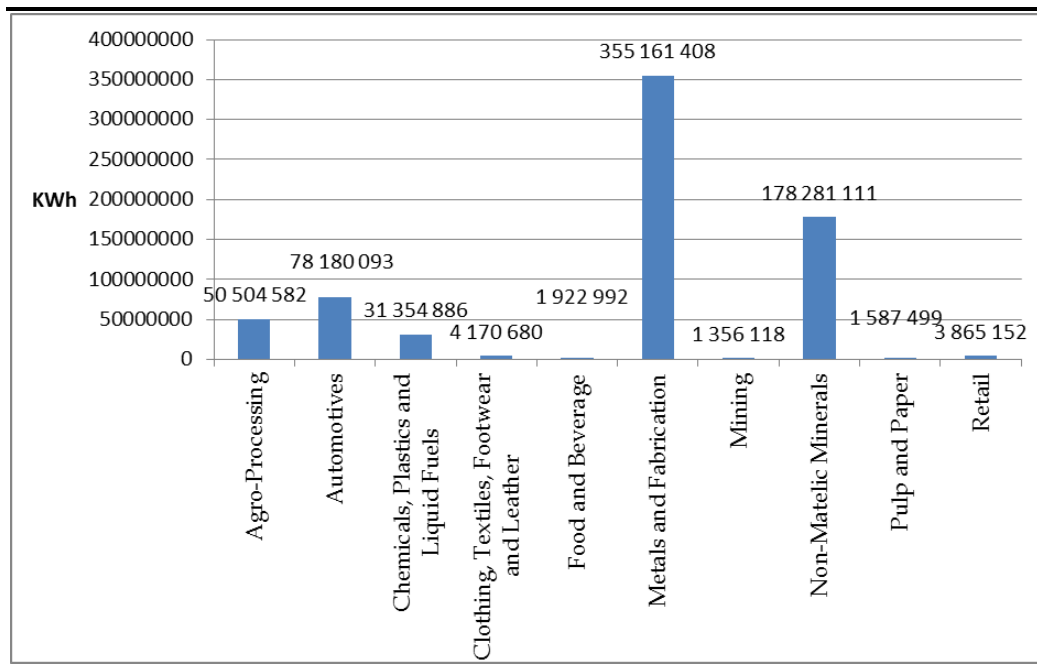


Figure 8.25 Reported tCO<sub>2</sub>e saved by host candidate plants broken down per sector

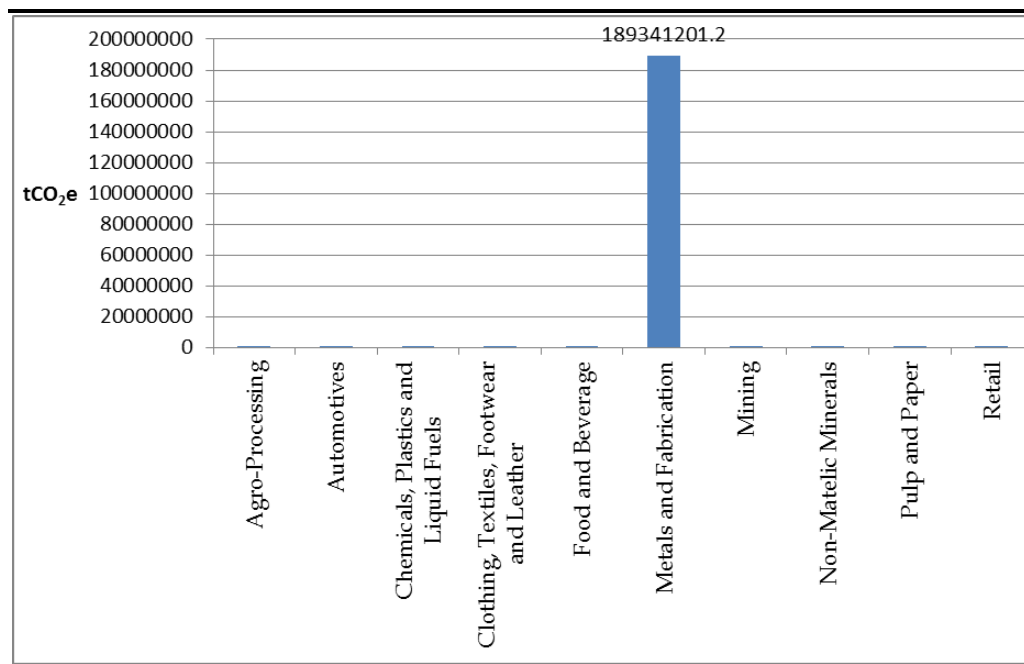


Figure 8.26 Reported ZAR saved by host candidate plants broken down per sector

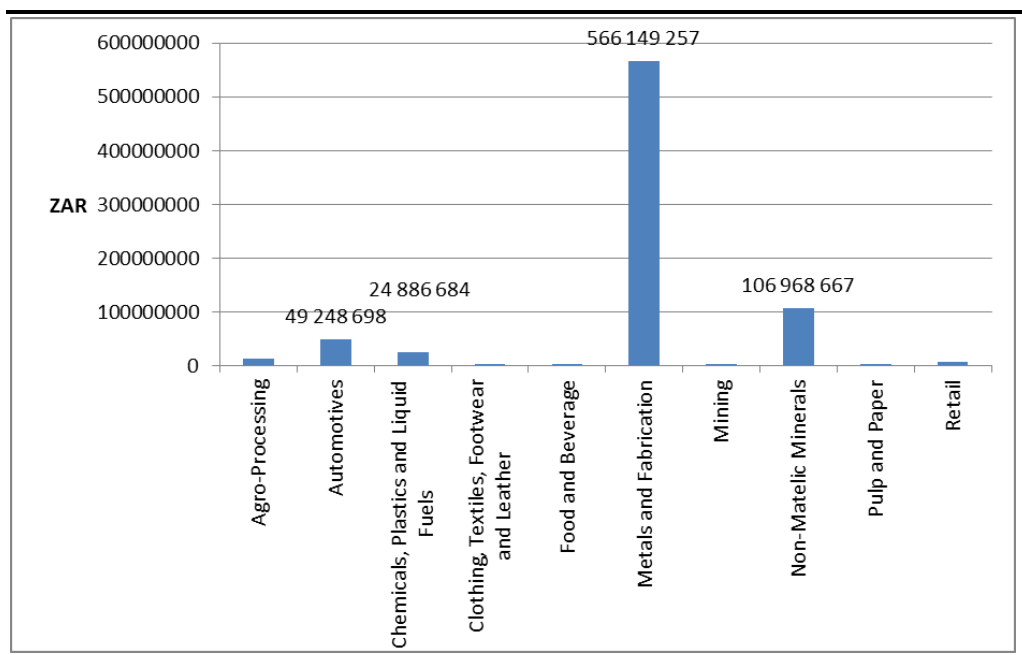


Table 8.6 Survey respondent opinion to the implementation of EnMS elements in exposed companies (n = 9)

EnMS Element	No. of Companies that have implemented system element
1. An energy policy is in place	7
2. An energy management team has been established	7
3. A management representative been appointed to drive EnMS	8
4. There is adequate competence in the organization to implement EnMS / ESO	6
5. An energy baseline has been conducted	9
6. Energy performance indicators have been defined	8
7. An energy management plan, including responsibilities, is in place and relevant individuals understand it	7
8. M&E systems are in place to measure and report energy consumption	9
9. Opportunities for improving energy performance are identified on an ongoing basis	8
10. Energy objectives / targets have been set	8
11. The organization's energy policy and performance is communicated internally / externally	6
12. Energy is considered in design activities	8
13. Energy is considered in procurement processes	7
14. Processes are in place to identify non-conformities and to take corrective and preventative action	7

Figure 8.27 Survey respondent opinions to the effect of energy efficiency on job retention (n = 9)

