Clay Brick Sector Energy Efficiency Finance Guide
Preface

This Clay Brick Manufacturing Sector Energy Efficiency Finance Guide, funded by Swisscontact and developed jointly by the Carbon Trust and Cova Advisory and Associates, has been developed as part of the Energy Efficient Clay Brick Project (EECB), whose aim it is to reduce energy use across the South African clay brick sector.

Through the Energy Efficient Clay Brick Project, which is funded by the Swiss Agency for Development and Cooperation (SDC), Swisscontact has been working with the clay brick sector in South Africa since 2009, with the aim of reducing energy use across approximately 100 industrial clay brick manufacturing plants in South Africa. As part of this work, Swisscontact has developed an Energy Efficiency Guide as a reference tool for operators in the industry. In addition to this, the Private Sector Energy Efficiency (PSEE) Programme developed an Energy Finance Guide to assist operators in financing these projects and overcoming the financial barriers to implementing energy efficiency projects.

This Energy Efficiency Finance Guide aims to inform the South African clay brick sector of the different financial mechanisms available to support the implementation of energy saving projects, as well as specific business case examples and applicable sources of finance. In addition, the guide includes information on how to build a business case to substantiate your application for finance. It is recommended that this finance guide be used in combination with the Energy Efficiency Guideline, which identifies best practices for clay brick manufacturers.
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The brick sector is a key player in the South African industrial landscape. The 100 or so industrial brick companies produce some 3.5 billion bricks annually. However, with rising energy costs for both electricity and fuel, energy efficiency represents a significant opportunity for cost reduction. Swisscontact, together with the Carbon Trust, recently developed “The South African Clay Brick Sector Energy Efficiency Guidelines” which details best practice energy efficiency interventions for the clay brick sector. However, one of the major challenges in pursuing such projects is understanding where to find finance to help with funding. This guide has therefore been developed as a complement, to provide clear and useful information about the financial support available to implement these energy saving projects.

This guide explores the many different types of finance available to clay brick manufacturers: (1) Loans; (2) Development Finance; (3) Energy Service Companies and Original Equipment Suppliers; (4) Cash Grants; (5) Tax Deductions; (6) Research and Development Finance; (7) Carbon Credits. There are many different financial options available, however there are also some important qualifying criteria such as Broad-Based Black Economic Empowerment Black (B-BBEE) rating, company size, project size, and how much tax your company is paying. Many brick manufacturers are small, family-run businesses which may not meet the required B-BBEE rating and so have faced difficulty in sourcing funding for energy efficiency projects in the past. Many companies are also unaware that there is funding available for projects with a research and development component, as well as for pilot projects. This guide has therefore been developed to help brick companies understand which financial mechanisms are applicable to them and the project that they are trying to implement; and to also help technology suppliers better understand how they can be of service to their clients in helping them overcome these financial barriers.

In line with the Energy Efficiency Guidelines, this guide has taken the top 10 best practice business cases developed in the SA Clay Brick Sector Energy Efficiency Guide, and provided a detailed review of the possible sources of funding. Each business case includes information on ease of access to each financial option, qualification criteria and applicability to the project and company. The guide then provides an in-depth review of all financial options available to the clay brick sector, detailing the benefits, requirements and relevant contact details for each. Finally, the guide presents information on how to build a business case to substantiate applications for funding. The objective is to provide brick manufacturers with the confidence and understanding to successfully apply for funding for their energy efficiency projects.
Introduction

With rising energy costs of both electricity and fuels, energy efficiency represents a significant opportunity for cost reduction in many industries, not least of all in the manufacture of clay bricks, where energy can represent between 40% and 60% of production costs. In order to assist manufacturers with the identification and development of projects, Swisscontact has recently developed “The South African Clay Brick Sector Energy Efficiency Guidelines” which details best practice energy efficiency interventions. However, one of the major challenges in pursuing energy efficiency projects is understanding where to find finance to help with the funding of projects. This guide has therefore been developed as a complement, to provide clear and useful information about the financial support available to implement these energy saving projects.

Many clay brick manufacturers are interested in increasing their production capacity and are specifically looking at solutions for automation as well as seeking opportunities to reduce their carbon emissions, energy consumption and costs. Companies which optimise their use of fuel and coal will enjoy significant cost savings and alleviate energy demand on the grid. Furthermore, reductions in the use of energy generated from fossil fuels such as coal will reduce a company’s carbon emissions. As detailed in the Clay Brick Sector Energy Efficiency Guidelines, there are a number of energy efficiency opportunities available for clay brick manufacturers which can have significant potential, ranging from the installation of energy-efficient lighting to the construction of a fully automated manufacturing plant.

However, at present the clay brick sector faces significant challenges with financing energy efficiency projects. The industry is closely tied to the construction sector which experiences market volatility, meaning a reluctance from financing institutions who associate the sector with high risk. Additionally, many clay brick operators are small, family-run businesses facing numerous hurdles when attempting to access finance. These may include Broad-Based Black Economic Empowerment Black (B-BBEE) requirements, qualification criteria based on company or project size, and a need for high capital investment.

Specifically, this guide aims to help clay brick companies better understand the financial options available to them. It provides specific business case examples and includes information on how to build a business case to substantiate applications for finance to cover or reduce the cost of energy efficiency projects.

What is Energy Efficiency?

Efficient energy use, or energy efficiency, refers to using less energy for the same or greater levels of output. In the case of bricks, it means producing the same number of bricks while using less input fuel and electricity.

Energy efficiency should always be tackled by first looking at behaviour, or the way you use energy. Often, simple changes can yield real benefit. Only then should you look down the path of finding ways to optimise your process of energy consumption, including looking at technology replacement by using more efficient versions of existing technology, or through wholesale changes of technology.

The South Africa Clay Brick Sector Energy Efficiency Guideline outlines the best practices for clay brick manufacturing and provides the guidance in order to deploy energy efficiency projects.

“Energy efficiency offers a powerful and cost-effective tool for achieving a sustainable energy future. Improvements in energy efficiency can reduce the need for investment in energy infrastructure, cut energy bills, improve health, increase competitiveness and improve consumer welfare.”

- The International Energy Agency
We follow the generally accepted company definitions:

**COMPANY SIZE**

**Small:** Annual turnover of up to R50 million (less than ±50 million bricks per annum)

**Medium:** Annual turnover of between R50 million and R200 million (between ±50 million to 200 million bricks per annum)

**Large:** Annual turnover of over R200 million (more than ±200 million bricks per annum)

**PROJECT SIZE**

**Small:** Up to R1 million

**Medium:** R1 million to R10 million

**Large:** Above R10 million

**EASE OF ACCESS**

**EASY:** A company should be able to complete and submit an application without seeking help.

**MEDIUM:** It is possible to complete and submit an application without a consultant, but the process is complicated or drawn out.

**DIFFICULT:** In the absence of in-house expertise or experience, you may need external expert help in preparing and submitting an application. This is useful for companies in the long run to grow their internal capacity for managing energy efficiency financing.

This guide aims to help direct you to the right sort of funding, based on the size of your company and the size of the project you are undertaking.

One thing to consider is whether you wish to use a consultant to help you with identifying and pursuing finance options.

Consultants who deal with investment incentives can be expected to offer advice on your eligibility for each incentive, the range of help which is on offer, the ease of application and how best to complete applications to ensure the best chance of success. An effective consultant will help you to secure financing, but will also be able to advise if you are wasting your time.

There are consultants who specialise in assisting firms to obtain finance from the private and government bodies which support energy efficiency, and you may be unsure whether or not to consider employing one to assist you.

You should be able to go through the application process on your own for all of the schemes which we discuss in this guide, although some are easier than others. However, these can be complicated procedures to undertake without any outside help, particularly if the scheme is new to you.

You would therefore need to weigh up the cost of outside help against the benefits you would be likely to gain from a successful application. You should bear in mind that the consultant may know the ropes and be able to point out where an application can be changed to give it a greater chance of success.

Do also bear in mind that there can be benefits from a longer-term relationship with a consultant, who should be expected to spot new opportunities and alert you to them.

As a final point, some incentive require sign off by measurement and verification (M&V) professionals. It is advisable to identify your M&V professional as early in the process as possible.

Do you Need a Consultant?

A consultant is an expert or team of experts, with day-to-day experience of dealing with government departments, agencies, and banks – on behalf of firms who are seeking financial support.
The purpose of this guide is to help the clay brick sector better understand the best practice energy efficiency finance opportunities available, and where they can source finance to help implement them within their businesses.

While the guide provides a high level of detail, it is applicable to organisations of all sizes. There are a number of sources of financing for energy efficiency projects, such as:

- **Green Products from Commercial Banks**, some of which offer or are conduits for special loans to fund energy efficiency and green costs, such as the money spent on equipment and other elements for a business to be more energy efficient and green focused. In many cases, funds for these products come from government agencies or international development agencies.
- **Corporate Development Funds**, provided by companies who offer grants and loans to their supply chain in order to increase production capacity and efficiency.
- **Suppliers of energy efficient equipment**, who offer funding through financial institutions, similar to the financing used when buying a car.
- **Cash grants**, which reduce the overall cost of the energy efficiency project. These are mostly from government departments.
- **Tax incentives**, which reduce the tax paid by a company implementing an energy efficiency project.
- **Carbon credits/offsets**, which can be sold on the market and represent a certain amount of carbon reduction through a carbon emission reduction or energy efficiency project.

This guide has sections which cover all these sources of finance.

You also need to understand what type of finance is applicable. There are three main types of energy efficiency costs:

- **Capital costs** on an energy efficiency project, such as new energy efficient equipment.
- **Operational costs** on energy efficiency, such as energy audits and compliance costs.
- **Research and development on energy efficiency**, to develop new products or make current processes more energy efficient.

Most of the finance available for energy efficient projects is for capital costs. Throughout this guide, we will highlight which of these three categories is covered by the finance, incentives or grants we are discussing. We will also aim to advise on which schemes best suit small, medium and large firms, and the ease with which each type of funding can be accessed.
The overall list of the SA Clay Brick Sector Energy Efficiency Guideline contains 70 energy saving opportunities. These were selected from a long list of about 150 opportunities from various sources, including energy audits conducted at South African brick yards, manufacturers, suppliers and the Carbon Trust. All opportunities were rated for production, improvement, energy saving, ease of implementation, cost of implementation, replicability and payback. Based on this rating method and their relevance to the South African market, the top 10 best practices have been chosen for detailed business cases.

The list of opportunities has been produced to assist brick manufacturers to determine the most appropriate recommendations to improve their brick making process. For further details, please refer to the SA Clay Brick Sector Energy Efficiency Guideline.

10 Business Case Examples

1. Replace the current Clamp Kiln with a fixed kiln (e.g. Vertical Shaft Brick Kiln (VSBK), Tunnel Kiln)
2. Addition of waste products (e.g. sewage sludge, paper pulp)
3. Controlled and efficient combustion of fuel
4. Use of recent model mobile plant and movement optimisation
5. Increase perforation size of extruded bricks
6. Reduce thermal mass of kiln car decks using lightweight refractory or fibre
7. Waste heat recovery
8. Variable speed/frequency drives
9. Energy management
10. Optimisation of air compressors

The purpose of the next few slides is to take you through examples of possible finance options for the specific business cases. There may potentially be more than one option, but these are colour coded to indicate the level of difficulty in accessing the finance options. In addition, the business case examples are indicative of costs. Practically, there may be significant variability in the actual costs, but hopefully this guidance will be able to point you in the right direction around which option to explore further and how to build a business case to substantiate your application for finance.
The SA Clay Brick Sector Energy Efficiency Guidelines includes a list of approximately 70 best practice energy efficiency options. In this guide, we have taken each of these solutions and evaluated it for its eligibility for a grant, incentive or other potential finance option. This has been developed as a matrix, which is illustrated below and shows the eligibility and ease of access for each option. In this guide, the top ten business cases as identified in the other guideline from page 48 are discussed in detail and this evaluation is presented in the next slides. The full evaluation on the rest of the energy efficiency options is included in the Annexure to this guide. Detailed information on each finance option is provided in the section following the business case examples.

### Business Case Matrix

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving (kWh/yr)</th>
<th>Ton CO2 Saving</th>
<th>Payback (Yrs)</th>
<th>Finance</th>
<th>Grants</th>
<th>Tax Deduction</th>
<th>R&amp;D</th>
<th>Carbon Offsets</th>
<th>Loans</th>
<th>Development</th>
<th>Other Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>Replace the current clamp kiln with a fixed kiln (e.g. VSBK, tunnel kiln, etc.)</td>
<td>18 000 000</td>
<td>744 000</td>
<td>240 000</td>
<td>3.7</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td></td>
</tr>
<tr>
<td>Fixed and Clamp</td>
<td>Addition of waste products (e.g. sewage sludge or paper pulp)</td>
<td>500 000</td>
<td>541 679</td>
<td>529</td>
<td>2.5</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td></td>
</tr>
<tr>
<td>Fixed</td>
<td>Controlled and efficient combustion of fuel: installation of PLC &amp; PID controllers for steady rise in temperature</td>
<td>1 000 000</td>
<td>3 333 336</td>
<td>3 433</td>
<td>0.7</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td></td>
</tr>
<tr>
<td>Fixed and Clamp</td>
<td>Use of recent model mobile plant and moving machinery: two old machines replaced by one new machine</td>
<td>920 000</td>
<td>435 000</td>
<td>438</td>
<td>0.3</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td></td>
</tr>
<tr>
<td>Fixed and Clamp</td>
<td>Increased perforation size of extruded bricks to 10%</td>
<td>1 000 000</td>
<td>833 340</td>
<td>386</td>
<td>2.5</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td>ü ü ü ü ü</td>
<td></td>
</tr>
</tbody>
</table>

### Business Case

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Business Case 1: Replace Current Clamp Kiln with a Fixed Kiln

Project Details

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capes (Rand)</th>
<th>Energy Saving (kWh/annum)</th>
<th>CO2 Savings (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>Replace current clamp kiln with fixed kiln type (e.g. VSBK, zig-zag, TVA or tunnel kiln etc.)</td>
<td>Difficult</td>
<td>R18 000 000</td>
<td>70 000 056</td>
<td>24 700</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Description

Clamp kilns are by a large margin the most energy inefficient brick kilns. A significant energy saving can be realised by replacing the current clamp kiln with a fixed kiln of some kind (e.g. Vertical Shaft Brick Kiln (VSBK), Habla Zig-Zag, Transverse Arch (TVA) Kiln, Tunnel Kiln etc.).

In this specific example, the choice of kiln was a VSBK kiln. The total capital expenditure on the project is R18 million, which results in a total energy saving of 70 000 MWh per annum. The project also results in a reduction of carbon emissions to a total of 24 700 tonnes CO2 per annum.

For projects with high capital investment values of greater than R30 million, there are more options available in terms of government grants. As the project also results in significant energy and carbon savings, it may also qualify for tax allowances and carbon offset projects.

The capital investment for this type of project may vary significantly depending on the type of installation.

Due to the significant capital investment and enormous benefits of the project, there are numerous finance options available which will be explored in more detail.

For a project of this nature, it is recommended that a detailed feasibility assessment of the various incentive options available be undertaken through an expert incentive consultant.

In this specific example, the capital investment for this type of project was a VSBK kiln. The total capital expenditure on the project is R18 million, which results in a total energy saving of 70 000 MWh per annum. The project also results in a reduction of carbon emissions to a total of 24 700 tonnes CO2 per annum.

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Business Case Example 1

The project may qualify for development finance, subject to meeting the criteria regarding the institution. Note that these vary according to institution but can include requirements such as being an SME, or having >50% Black/women ownership. Another element to consider is that in order to be eligible, your company should be part of the supply chain of the company whose funds you’re applying to.

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Business Case 2: Addition of Waste Products to Feed Material

**Kiln Type**

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capes (Rand)</th>
<th>Energy Saving (kWh/annum)</th>
<th>CO2 Saving (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>Addition of waste products (e.g., sewerage sludge, paper pulp)</td>
<td>Moderate/Difficult</td>
<td>R500,000</td>
<td>1,541,679</td>
<td>27</td>
<td>1.3</td>
</tr>
</tbody>
</table>

**Description**

The addition of waste products (e.g., sludge from a sewage treatment work, paper pulp etc.) can offer a multitude of benefits to clay brick manufacturers. Often, these benefits can be obtained at low rates or, in some cases, brick manufacturers can receive waste streams for nothing, or even be paid to accept them.

The potential benefits include:

- **Dematerialisation**, i.e., lower raw material usage. Waste addition can replace up to 15% of regular raw materials.
- **Reduction in requirement for process water** (many waste contains significant amounts of water).
- **Improvement in workability or extrudability of the column**, thus requiring lower energy for the extrusion process and sometimes obviating the need for additional de-lubrication.
- **Fuelling benefits**.
- **Production of lighter bricks**.

This type of project requires some research and development trials, and, depending on the type of waste material used, the kiln may require process-related modifications. In some cases it may even require an environmental impact assessment.

**Grant or Incentive Application to Business Case 2: Addition of Waste Products to Feed Material**

**Loans**

As previously written, a number of financial institutions offer finance for energy efficiency projects, and should therefore be investigated generally. Although this particular project may potentially include a number of risks which may reduce the appeal to the banks, it may still be possible to qualify for a loan. Please see the detailed slides on finance through loans.

**Corporate Development Funds**

Again, this project may qualify for development finance subject to meeting the criteria required by the institution, such as being an SMME and/or >50% black/women ownership. Please see detailed slides on development finance.

**ESCo or OEMs**

OEM Adding waste material to a kiln may require some kiln modifications which will require the expertise of OEMs. OEMs may offer finance to companies as well as energy performance-based contracts.

**ESCos**

Under this project, the capital investment may be too low for the ESCo grant in addition, this grant requires a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible for this project to meet the criteria.

**Government Grants**

- MCEP: Under this project, the capital investment may be too low for the MCEP grant. In addition, this grant requires a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible for this project to meet the criteria.
- CIP: The capital investment is too low to qualify under this programme.

**Tax Incentives**

- 12I: The capital investment is too low to qualify under this programme.
- 12L: The project results in energy savings and would qualify under section 12L. The potential tax saving from this project is about R400,000. For more information please refer to the detailed slides on S12L, for the requirements to qualify.

**Research and Development**

- SRA: It is likely that the project requires trials and testing and therefore may possibly qualify for RD&D. Please refer to the detailed slides on finance through research and development.
- S12D: It is likely that the project requires trials and testing and therefore it may possibly qualify for RD&D. Please see detailed slides on S12D.

**Carbon Offsets**

It would be possible to develop a carbon offset project, however, the benefit from carbon offsets is expected to be too low to pursue this option.
**Business Case 3: Controlled and Efficient Combustion of Fuel**

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capex (Rand)</th>
<th>Energy Saving (KWh/annum)</th>
<th>CO2 Saving (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>Controlled and efficient combustion of fuel</td>
<td>Easy</td>
<td>R1 000 000</td>
<td>3 333 336</td>
<td>1 143</td>
<td>7 months</td>
</tr>
</tbody>
</table>

**Description**

Energy savings can be achieved through the optimisation of the temperature profile in the kiln and the effective utilisation of firing fuel. Best practice demands a steady rise in temperature through clean and efficient combustion of fuel, and for this reason, automated fuelling through proprietary burner systems is preferable to manual fuel feeding. Even when basic automation is already installed, more advanced firing control through programmable logic controllers (PLCs) and proportional integral derivative (PID) controllers can still achieve significant gains in efficiency.

For this example, it is assumed that the kiln is fired with coal and the cost to deploy the project is R1 million. The total energy savings achieved is 3 333 MWh per annum and the payback period of the project is 7 months (assuming the site is located inland).

The project results in carbon savings of 1 433 tonnes CO2 per annum. This example was chosen as most kilns in South Africa are fired with coal.

The capital investment on this type of project can vary significantly depending on the level of existing automation.

The project therefore includes the installation of more advanced process control equipment in kilns. This type of project may typically be too complex for Energy Service Companies, but may potentially be financed through Original Equipment Suppliers.

**Grant or Incentive Application to Business Case 3: Controlled and Efficient Combustion of Fuel**

- **Loans**
  - While finance may be difficult to access from banks if the project is considered to entail a level of risk, this one may be of interest as it has a very short payback period.
  - If the capital investment is higher than R1 million, it may also potentially qualify for the Green Energy Efficiency Fund. Please see the detailed slides on finance through loans.

- **Corporate Development Funds**
  - This project may qualify for development finance, subject to meeting the criteria regarding the industries which may include being an SME and/or 100% black/ women ownership. In addition, the company must form part of the supply chain of the company. Please see detailed slides on development finance.

- **OEM or ISMs**
  - This type of project would most likely require the expertise of the Original Equipment Manufacturers of the automated equipment. OEMs may offer finance to companies as well as energy performance-based contracts.

- **ESCo**
  - As this is a process modification, it is unlikely for an ESCo to be involved in this type of project.

- **Government Grants**
  - Under this project, the capital investment may be too low for the MCEP and CPI grants. In addition, these grants require a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible to qualify if it meets this criteria.

- **Tax Incentives**
  - The capital investment is too low to qualify under this programme.

- **Research and Development**
  - The project does not include research and development.

- **Carbon Offsets**
  - It would be possible to develop a carbon offset project, however it may be complex process. The potential carbon revenue over 10 years is R350 000, which may be too low to outweigh the costs to develop a carbon offset project.
Business Case 4: Use of Recent Model Mobile Plant

**Project Details**

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capes (Rand)</th>
<th>Energy Saving (kWh/annum)</th>
<th>CO₂ Saving (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>One new machine replaced two old machines</td>
<td>Moderate</td>
<td>R920 000</td>
<td>425 000</td>
<td>438</td>
<td>1.7</td>
</tr>
</tbody>
</table>

**Description**

Current generation mobile equipment or plant (more specifically forklifts or front end loaders and other earth moving machinery) can use as little as 50% of the fuel needed by older generation plants. Additionally, the capacity of new machines means that even with a similar footprint to an old machine they are now capable of doing almost twice the duty. For example, a new 5 ton rough terrain forklift can fulfill the duty of two old generation rough terrain forklifts, each with a lifting capacity of around three tons.

*This example is slightly different to the 6.3.4 in the SA Clay Brick Energy Efficiency Guideline. We have chosen the total capital investment cost of R920 000 for this example.*

**Typical costs for equipment:**

- 5 ton rough terrain forklift: R920 000. Hire purchase cost is R22 000 per month over 60 months, with additional maintenance costs of R12 612 per month.

- Front end loader with a standard 2.3m³ bucket and 95KN breakout force: R1.68 million.

This type of project can typically be financed through an asset-based loan from a financial institution.

**Business Case Example 4**

**Grant or Incentive Application to Business Case 4: Use of Recent Model Mobile Plant**

- Easy to access, no qualifying criteria
- Subject to meeting specific criteria
- Not applicable to this project

**Business Case 4: Use of Recent Model Mobile Plant**

**Grants**

- This type of equipment is generally financed through asset-based finance by a financial institution. Please see the detailed slides on finance through loans.

**Corporate Development Funds**

- This project may qualify for development finance subject to meeting the criteria required by the institution, which may include being an SME and >50% black/women ownership. In addition, the company must form part of the supply chain of the company. Please see dedicated slides on development finance.

**MCoE or OEMs**

- Rent is available to finance the equipment from Original Equipment Manufacturers.

**Government Grants**

- MCEP: Under this project, it may be possible to qualify for a MCEP grant. This grant requires a minimum Level 4 B-BBEE status if the project is grouped with numerous other projects it may be possible to qualify if it meets the criteria.

**Tax Incentives**

- T12: If the project investment is larger than R30 million it may be possible to qualify.

- T12: The project results in energy savings and would potentially qualify under section 12L. However, the volume of energy savings for this example is too low to substantiate pursuing this option.

**Research and Development**

- SPI: There is no research and development undertaken in this project.

**Carbon Offsets**

- It would be possible to develop a carbon offset project, although it may not be considered worthwhile to undertake this as the costs to access the incentive may be more than the benefit received from it.
Business Case 5: Increase Perforation Size of Extruded Bricks

### Project Details

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capex (Rand)</th>
<th>Energy Saving (kWh/annum)</th>
<th>CO2 Saving (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>Increase perforation size of extruded bricks from 25% to 40%</td>
<td>Difficult</td>
<td>R1 000 000 *</td>
<td>833 340</td>
<td>286</td>
<td>3.3</td>
</tr>
</tbody>
</table>

### Description

In the clay brick manufacturing process, perforated bricks use less raw material, meaning that the mine life is extended and raw material costs are reduced, and require less fuel to fire.

The potential to use 25% less raw material with commensurate savings in energy is appealing, but nonetheless it is estimated that more than 60% of South Africa’s clay bricks are made without any perforations.

- In order to increase the perforation size of extruded bricks, new extruder machines would need to be purchased.
- This example includes the purchase of two extruders costing R500 000 each. This is expected to result in energy savings of 833 340 kWh per annum and a carbon emission saving of 286 tonnes per year.

*This example is slightly different to the 6.3.5 in the SA Clay Brick Energy Efficiency Guideline. We have chosen the total capital investment cost of R1 000 000 for this example.*

### Business Case Example 5: Increase Perforation Size of Extruded Bricks

#### Grant or Incentive

**Application to Business Case 5: Increase Perforation Size of Extruded Bricks**

- **Corporate Development Funds**: This project may qualify for development finance subject to meeting the criteria required by the institution, which may include being an SME and >50% black/women ownership. In addition, the company must form part of the supply chain of the company. Please see detailed slides on development finance.
- **ESCos or OEMs**: It may be possible for the suppliers of extruders to offer finance, but this would be dependent on the manufacturer.
- **Government Grants**: This project does not qualify under section 12L. The project results in energy savings and would qualify under section 12L. The potential tax deduction benefit is around R220 000, and therefore may be worthwhile pursuing. Please see the detailed slides on page for the requirements for S12L.
- **Tax Incentives**: It is unlikely that the project would require research and development as it includes the purchase of the machines only.
- **Carbon Offsets**: It would be possible to develop a carbon offset project, however it is expected to be a complex process and may not be worthwhile if the carbon offsets are not large enough. In this case, the carbon offsets potential is 280 tonnes per annum, which is too low.

**Research and Development**

- **MCEP**: Under this project, it may be possible to qualify for an MCEP grant. This grants require a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible to qualify if it meets the criteria.
- **CIP**: This project does not include the installation of critical infrastructure.
- **BI**: The capital investment is too low to qualify under this programme.
- **T1/S**: The capital investment is too low to qualify under this programme.
- **T9**: The project results in energy savings and would qualify under section 12L. The potential tax deduction benefit is around R220 000, and therefore may be worthwhile pursuing. Please see the detailed slides on page for the requirements for S12L.

**Not applicable to this project**

**Subject to meeting specific criteria**

**Easy to access, no qualifying criteria**
Business Case 6: Reduction of the Thermal Mass of Kiln Car Decks using Lightweight Refractory or Fibre

### Description
Tunnel kiln energy balances show that a considerable amount of heat is lost through the base of the kiln cars. These losses come about due to conduction of heat through the kiln car structure and are exacerbated by kiln cars of high thermal mass. High thermal mass is problematic as it is difficult to recover all the heat energy from a kiln car of high thermal mass within the kiln. Hot kiln car decks emerging from the kiln normally cool slowly in the factory building, thereby wasting the heat held in the kiln car decks.

#### Business Case Example 6

- **Project Details**
  - **Kiln Type**: Fixed
  - **Energy Saving Opportunity**: Refurbishment of 91 cars at R57,000 per kiln car
  - **Ease of Implementation**: Moderate
  - **Capes (Rand)**: R 160,000
  - **Energy Saving (kWh/annum)**: 4,166,670
  - **CO2 Saving (t/yr)**: 1,100
  - **Payback (Years)**: 3.7

- **Description**
  - Redesigned kiln car decks will be significantly cooler on leaving the kiln, translating into additional energy retained in the kiln system and a saving on fuel with a commensurate cost benefit.
  - For this project example, it has been assumed that a typical plant has a total fleet of 91 kiln cars. If all the kiln cars are refurbished, it would cost approximately R5.16 million and would result in energy savings of 4,166 MWh per annum and a carbon emission saving of 1,100 tonnes per annum.

- **Business Case Example 6**
  - **Grant or Incentive**
    - **Application to Business Case 6**
      - **Loans**: This project includes a high capital investment (>R5 million) with a payback period of over three years, and therefore should be of interest to the banks, although they may be reluctant to finance if they foresee too much risk associated with the project (e.g. risk to payback depending on the assumptions made in the calculations). Note also that while the spending is based on the purchase of assets, these are also highly specialised, which reduces their appeal to the bank as collateral.
      - **Corporate Development Funds**: This project may qualify for development finance subject to meeting the criteria required by the institution, which may include being an SMME and/or >50% black/ women ownership. In addition, the company must form part of the supply chain of the company. Please see detailed slides on development finance.
      - **Government Grants**: This project may qualify for the Green Energy Efficiency Fund.
      - **ESCos or OEMs**: The supplier of the kiln cars may be able to offer some sort of finance.
      - **Government Grants**: This project may qualify for the MCEP grant. This grant requires a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible to qualify if it meets the criteria.
      - **12L**: The project results in significant energy savings and would qualify under section 12L. It is estimated that the after-tax benefit would be in the region of R1.1 million, and is therefore worth investigating. Please see the detailed slides on page for the requirements for Section 12L.
      - **Research and Development**: If the project is a pilot project or requires trials and testing (e.g. new types of materials) it may be possible to qualify, but requires min Level 4 B-BBEE. Please see the detailed slides on R&D for the requirements for R&D.
      - **Carbon Offsets**: It would be possible to develop a carbon offset project, however the benefit of the carbon revenues are low and not worthwhile pursuing.
There are two ways to recover the waste heat from exhausts:

i. **Use it directly as a source of heat**

ii. **Use a heat exchanger to recover heat from exhausts**

In this specific example, it is assumed that vented hot air is used to preheat combustion air. The project includes a process modification which results in an energy saving of approximately 555 MWh per annum.

**Waste Heat Recovery projects can vary significantly depending on the type of application and may depend on the temperatures, distances between equipment and the type of burners used. Project costs for the installation of heat exchangers are significantly higher and require modification of ductwork, burners and exhaust stacks.**

In the example, specifically referring to Section 6.3.7 in the SA Clay Brick Energy Efficiency Guidelines, we have chosen the vented hot clean air example and the total capital investment cost of R500 000.
Variable Speed Drives (VSDs) are used to control the flow or pressure of a fluid to meet demand. In kiln operation they represent one of the most effective energy efficiency investments brick manufacturers can make. Not only do they reduce power consumption by reducing the speed of the motor, the increased control of airflow and kiln pressure can give additional saving in fuel.

Where fans are used to control air flow or pressure within a kiln they traditionally use a simple in-line damper to restrict the flow when required.

*Due to the significant variability in this type of project, we have chosen the energy savings in line with the Energy Saving Opportunities listed in the SA Clay Brick Energy Efficiency Guidelines (Page 40).

The control of flow is not very precise and there is only a small reduction in power consumption due to the increase in resistance to flow that the damper has introduced. Replacing the damper with a VSD enables the speed of the motor and fan impeller to be precisely controlled and as no damper is used, the power savings are much larger.

A reduction in fan speed of 10% using a damper might reduce power consumption by 5%; using a VSD will reduce it by 25%.

This type of project could be undertaken by an Energy Service Company and financed through an Energy Performance Contract Agreement.

The installation of VSDs reduce the electricity consumption of motors and fans. The carbon emission savings are a result of the avoided use of purchased electricity from the national grid.

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capex (Rand)</th>
<th>Energy Saving (kWh/annum)</th>
<th>CO2 Saving (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>Convert air movement fan motors to VSDs or fit separate VSDs</td>
<td>Easy</td>
<td>50kW = R140,000</td>
<td>100kW = R300,000</td>
<td>200kW = R600,000</td>
<td>555,556</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.5</td>
</tr>
</tbody>
</table>

**Note:**

- **Variable Speed Drives** are used to control the flow or pressure of a fluid to meet demand. In kiln operation they represent one of the most effective energy efficiency investments brick manufacturers can make. Not only do they reduce power consumption by reducing the speed of the motor, the increased control of airflow and kiln pressure can give additional saving in fuel.
- Where fans are used to control air flow or pressure within a kiln they traditionally use a simple in-line damper to restrict the flow when required.
- The control of flow is not very precise and there is only a small reduction in power consumption due to the increase in resistance to flow that the damper has introduced. Replacing the damper with a VSD enables the speed of the motor and fan impeller to be precisely controlled and as no damper is used, the power savings are much larger.
- A reduction in fan speed of 10% using a damper might reduce power consumption by 5%; using a VSD will reduce it by 25%.
- This type of project could be undertaken by an Energy Service Company and financed through an Energy Performance Contract Agreement.
- The installation of VSDs reduces the electricity consumption of motors and fans. The carbon emission savings are a result of the avoided use of purchased electricity from the national grid.
Business Case 9: Implementation of an Energy Management System

The international standard ISO 50001 offers excellent guidance on adopting energy management and at its heart is the continuous improvement concept of understanding use, identifying energy waste or poor performance, planning & implementing improvements and verifying the savings achieved.

The implementation of an Energy Management Plan includes:
- Developing a company energy policy
- Managing energy consumption through measurement and reporting
- Identification and implementation of opportunities to reduce energy consumption
- Undertaking continuous improvement

The energy savings are achieved as a result of the opportunities identified and implemented correctly.

The implementation of an Energy Management System can either be done in-house or by an external consultant. There are tools and guidelines available to assist companies in developing Energy Management.

It is unlikely that the implementation of such a system will be financed through external finance. Any equipment which may be installed however can be financed through an Energy Services Company via an Energy Performance Contract Agreement.

Grant or Incentive Application to Business Case 9: Implementation of an Energy Management System

- Loans: Not applicable to this project
- Corporate Development Funds: Not applicable to this project
- EDCs or OEMs: This project does not include the services of original equipment manufacturers.
- ESCos or OEMs: This type of project will typically be done by an Energy Services type of company, but it would not be possible to finance this project through an energy performance based agreement.
- Government Grants:
  - CIP: The project would only identify the energy saving measures to be implemented and it may be difficult to prove energy savings as a direct result of the energy management system.
  - CP: The project would not qualify for a grant.
- Tax Incentives:
  - BI: The capital investment is too low to qualify under this programme.
  - LR: This project would only identify the energy saving measures to be implemented and it may be difficult to prove energy savings as a direct result of the energy management system.
- Research and Development:
  - RD: The project does not include research and development.
- Carbon Offsets: This type of project would not qualify for carbon offsets directly.

Business Case Example 9

- Easy to access, no qualifying criteria
- Subject to meeting specific criteria
- Not applicable to this project
### Business Case 10: Optimisation of Air Compressors

#### Project Details

<table>
<thead>
<tr>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>Ease of Implementation</th>
<th>Capex (Rand)</th>
<th>Energy Saving (kWh/annum)</th>
<th>CO2 Saving (t/yr)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and Clamp</td>
<td>2 x 100 kW compressors after system optimisation</td>
<td>Easy</td>
<td>R522 000*</td>
<td>566 116</td>
<td>510</td>
<td>0.2</td>
</tr>
</tbody>
</table>

#### Description

Compressed air is an essential utility in many brickworks, but is very expensive to produce. In fact, nearly 90% of the energy required to compress air is turned into waste heat, and as a result compressed air at the point of use costs around R7 per kWh.

High efficiency screw compressors are available with variable speed drives so that output is continually varied to match demand, delivering more efficient operation when demand is below the design duty.

If the energy savings from this project are high enough it would be possible to qualify for the 12L energy efficiency incentive.

This type of project could be undertaken by an Energy Service Company and financed through an Energy Performance Contract Agreement.

The optimisation of air compressors generally reduces the electricity consumption of the compressors. The carbon emission savings are a result of the avoided use of purchased electricity from the national grid.

*Due to the significant variability in this type of project, we have chosen the energy savings in line with the Energy Saving Opportunities listed in the SA Clay Brick Energy Efficiency Guidelines (Page 40).

---

**Grant or Incentive**

- **Easy to access, no qualifying criteria**
- **Subject to meeting specific criteria**
- **Not applicable to this project**

### Business Case Example 10

**Grant or Incentive**

- **Easy to access, no qualifying criteria**
- **Subject to meeting specific criteria**
- **Not applicable to this project**

---

*Grant or Incentive Application to Business Case 10*

- **Loans**
  - This type of project does not include significant risk and has a very low payback period of only two months. It may therefore be possible to finance the project through a loan. Please see the detailed slides on finance through loans.

- **Corporate Development Funds**
  - This project may qualify for development finance subject to meeting the criteria required by the institution, which may include being an SME and/or >50% black/women ownership. In addition, the company must form part of the supply chain of the company. Please see detailed slides on development finance.

- **ESCo or OEMs**
  - If the VSDs are purchased directly from Original Equipment Manufactures, they may offer finance to companies as well as energy performance based contracts.
  - ESCOs could be contracted to implement this type of project and these projects are financed through Energy Performance Contract Agreements, although the project is very small at this stage (and therefore unlikely to be attractive enough for the ESCO).
  - Under this project, the capital investment may be too low for the MCEP grant. In addition, this grant requires a minimum Level 4 B-BBEE status, if the project is grouped with numerous other projects it may be possible to qualify if it meets the criteria.
  - The capital investment is too low to qualify under this programme.
  - Depending on the volume of energy savings, the project may qualify for S12L. For this specific example the potential benefit is R150 000, which is below the level considered worthwhile phasing.
  - The project does not include research and development.
  - The capital investment is too low to qualify under this programme.

- **Government Grants**
  - MCEP Under this project, the capital investment may be too low for the MCEP grant. In addition, this grant requires a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible to qualify if it meets the criteria.

- **Research and Development**
  - The capital investment is too low to qualify under this programme.

- **Carbon Offsets**
  - It would be possible to develop a carbon offset project, however the amount of carbon reduced by the project is not worthwhile for it to be developed as a carbon offset project.

---

### Business Case Example 10

**Grant or Incentive Application to Business Case 10**

- **Loans**
  - This type of project does not include significant risk and has a very low payback period of only two months. It may therefore be possible to finance the project through a loan. Please see the detailed slides on finance through loans.

- **Corporate Development Funds**
  - This project may qualify for development finance subject to meeting the criteria required by the institution, which may include being an SME and/or >50% black/women ownership. In addition, the company must form part of the supply chain of the company. Please see detailed slides on development finance.

- **ESCo or OEMs**
  - If the VSDs are purchased directly from Original Equipment Manufactures, they may offer finance to companies as well as energy performance based contracts.
  - ESCOs could be contracted to implement this type of project and these projects are financed through Energy Performance Contract Agreements, although the project is very small at this stage (and therefore unlikely to be attractive enough for the ESCO).

- **Government Grants**
  - MCEP Under this project, the capital investment may be too low for the MCEP grant. In addition, this grant requires a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible to qualify if it meets the criteria.

- **Research and Development**
  - The capital investment is too low to qualify under this programme.

- **Carbon Offsets**
  - It would be possible to develop a carbon offset project, however the amount of carbon reduced by the project is not worthwhile for it to be developed as a carbon offset project.
### List of Available Funding

#### Funding through Cash Grants

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Competitiveness Enhancement Programme (MECP)</td>
<td>Manufacturers, engineering companies and conformity assessment companies</td>
<td>Higher hurdles for other industries such as paper and pulp, petroleum refineries, nuclear fuel, iron and steel and aluminium manufacturers.</td>
<td>All</td>
<td>Medium and Large</td>
</tr>
<tr>
<td>Critical Infrastructure Programme (CIP)</td>
<td>Manufacturing and Mining</td>
<td>Retail and Housing</td>
<td>Large</td>
<td>Large</td>
</tr>
<tr>
<td>Black Industrialisation Initiative (BIS)</td>
<td>Manufacturing</td>
<td></td>
<td>Medium &amp; Large</td>
<td>Medium &amp; Large</td>
</tr>
<tr>
<td>Eskom Integrated Demand Management (IDM)</td>
<td>All</td>
<td></td>
<td>Medium &amp; Large</td>
<td>Medium &amp; Large</td>
</tr>
<tr>
<td>Renewable Energy and Energy Efficiency Partnership (REEEP)</td>
<td>Varies depending on funding window</td>
<td>This focuses on cutting edge technology</td>
<td>Medium &amp; Large</td>
<td>Medium &amp; Large</td>
</tr>
<tr>
<td>The Green Fund</td>
<td>Varies depending on funding window</td>
<td>Varies depending on funding window</td>
<td>Large</td>
<td>Large</td>
</tr>
</tbody>
</table>

#### Funding through Tax Deductions

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>12L of Income Tax Act (Section 12L)</td>
<td>Most companies</td>
<td>Energy generated from renewable sources and cogeneration other than waste heat recovery - minimum size for captive power plants.</td>
<td>Large</td>
<td>Large</td>
</tr>
<tr>
<td>12I of Income Tax Act (Section 12I)</td>
<td>Manufacturers</td>
<td>Alcohol, tobacco, arms and ammunition, if it impacts food security.</td>
<td>Large</td>
<td>Large</td>
</tr>
</tbody>
</table>

#### Funding through Research and Development

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>11D of the Income Tax Act (Section 11D)</td>
<td>All Industries</td>
<td>Oil &amp; gas exploration, financial instruments and products.</td>
<td>Medium &amp; Large</td>
<td>Medium &amp; Large</td>
</tr>
<tr>
<td>Fundings Through Carbon Credits</td>
<td>Carpet Credits</td>
<td>Industries which don’t have a methodology</td>
<td>Large</td>
<td>Large</td>
</tr>
</tbody>
</table>

#### Funding through Corporate Development Funds

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglo American Green Fund</td>
<td>All</td>
<td>All</td>
<td>Large</td>
<td>Medium &amp; Large</td>
</tr>
<tr>
<td>Evolution One Fund</td>
<td>All</td>
<td>All</td>
<td>Large</td>
<td>Medium &amp; Large</td>
</tr>
<tr>
<td>SCL Capital Solutions</td>
<td>All</td>
<td>All</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
<tr>
<td>Massmart Supplier Development Fund</td>
<td>All</td>
<td>All</td>
<td>Large</td>
<td>Medium &amp; Large</td>
</tr>
</tbody>
</table>

#### Funding through Energy Service Companies or Original Equipment Manufacturers

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eskom</td>
<td>All</td>
<td>All</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
<tr>
<td>OEM</td>
<td>All</td>
<td>All</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
</tbody>
</table>

### List of Available Funding

#### Funding through Loans

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Energy Efficiency Fund</td>
<td>All</td>
<td>None</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
<tr>
<td>Sasfin</td>
<td>All</td>
<td>None</td>
<td>Small and Medium</td>
<td>Small and Median</td>
</tr>
<tr>
<td>Mercantile Bank</td>
<td>Activities which harm the environment or are uncontrolled with such as tobacco and alcohol</td>
<td>All</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>Investec</td>
<td>All</td>
<td>None</td>
<td>Medium and Large</td>
<td>All</td>
</tr>
<tr>
<td>Nedbank</td>
<td>All</td>
<td>None</td>
<td>All</td>
<td>All</td>
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<tr>
<td>Alia/Barclays Bank</td>
<td>All</td>
<td>None</td>
<td>All</td>
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<tr>
<td>First National Bank</td>
<td>All</td>
<td>None</td>
<td>All</td>
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<tr>
<td>Standard Bank</td>
<td>All</td>
<td>None</td>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>

#### Funding through Corporate Development Funds

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglo American Green Fund</td>
<td>All</td>
<td>None</td>
<td>Small and Medium</td>
<td>Small and Medium</td>
</tr>
<tr>
<td>Evolution One Fund</td>
<td>All</td>
<td>None</td>
<td>Small and Medium</td>
<td>Large</td>
</tr>
<tr>
<td>SCL Capital Solutions</td>
<td>All</td>
<td>None</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
<tr>
<td>Massmart Supplier Development Fund</td>
<td>All</td>
<td>None</td>
<td>Small and Medium</td>
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</table>

#### Funding through Energy Service Companies or Original Equipment Manufacturers

<table>
<thead>
<tr>
<th>Funding Option</th>
<th>Included Sectors</th>
<th>Excluded Sectors</th>
<th>Company Size</th>
<th>Project Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eskom</td>
<td>All</td>
<td>None</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
<tr>
<td>OEM</td>
<td>All</td>
<td>None</td>
<td>Medium and Large</td>
<td>Medium and Large</td>
</tr>
</tbody>
</table>
A common way to finance energy efficiency is through loans, often through banks, or through equipment suppliers themselves. In the case of equipment suppliers, these will have relationships with specific banks.

Once you have decided on the energy efficiency equipment you need, you should ask the supplier for details of their finance packages, and the details of the bank or banks which have financed their equipment before. The finance offerings linked to this equipment could be quite attractive, and you may need to look no further, although you should compare these to other options, such as a direct loan from your bank.

In terms of financing the opportunity through a bank, there are a number of considerations. The first step is always to speak to your own bank, and to your relationship manager, to understand what they can offer you.

Brick makers’ experiences with loan applications
- From interactions with clay brick makers, it is clear that a number of them have experienced difficulties in applying for finance from banks. This is predominantly due to the way that banks assess affordability and projects.
- It is important to remember a number of elements when dealing with banks for loans:
  - Firstly, banks are bound by the National Credit Act No. 34 of 2005 which came into affect in 2006 and which places requirements on banks to ensure they don’t overburden companies with debt. Companies will therefore be asked to provide full disclosure of past debt repayment history, existing financial means, prospects and obligations.
  - Funding from banks will therefore often be based on affordability, quite simply - can the business pay back the loan? This means that brick makers will be evaluated in terms of their liabilities and their cash flow. Be aware that this means that banks may well not look at the technical elements of the project you want to fund, as they don’t have the ability to assess its likelihood of success. Likewise, brick makers can’t guarantee the returns from energy efficiency projects to banks.
  - Banks will be much more comfortable with funding projects where machinery is involved, i.e. asset-based finance linked to equipment cost of machinery. In many cases, brick makers generally fund energy efficiency projects off balance sheet.
  - However, in order to maximise the chances of any loan application, it is important that a strong business case be put together. Please see the section at the back for advice on how to pull this together.

It is important to be aware that many of the banks in the South African market have been given credit lines by international development agencies, expressly for energy efficiency, and as such should be able to offer preferential products for your projects (i.e. they have lower than normal interest rates or other benefits).

These banks often have specialised teams who understand the technology available, and so are well placed to understand the risk profile of the applicant and to assess applications. In the subsequent pages, we have provided details of the specialised products that are on offer with the various banks. Where we have not given details on an individual bank, it is because we have been unable to find out if they indeed have specialist products.

This does not mean, however, that they do not have any specific schemes of their own to finance energy efficiency projects, and you should consider approaching them, especially if your business already has a relationship with them.

What it does mean is that you are unlikely to secure any special or additional terms or benefits because you are embarking on an energy efficiency project. However, as we suggested earlier, some of these banks do act as a channel for cheap funding from donor organisations, and therefore you should shop around for the best deal.

When applying for bank finance, it is vital to ensure that you first understand what the requirements are. It can be very frustrating if you do not properly research and prepare your application, as the bank may turn you down if it was given inadequate information.

Green finance, as with other loans, is subject to the National Credit Act rules and other banking regulations.
**Introduction**

The Green Energy Efficiency Fund (GEEF) is a R500 million fund that supports the introduction of energy efficiency and self-use renewable energy technologies. The focus is to encourage investments in energy efficiency and renewable energy projects, aimed at facilitating South Africa’s transition towards a low-carbon economy.

The GEEF was launched by the Industrial Development Corporation (IDC) and the German Development Bank (KfW). Funding is in the form of a loan from the IDC for the capital required for an energy efficiency project.

**Benefits**

Loans from a minimum of R1 million to a maximum of R50 million are available at an interest rate of prime less 2%. The term is up to 15 years, depending on the payback period of the investment. The fund aims to ensure that there are no out-of-pocket expenses for the applicant, and loan repayments are as far as possible aligned with the savings in operational expenses from reduced electricity consumption.

**Requirements**

Companies are eligible if they are planning to implement an energy efficiency project or projects that offset grid-connected electricity through self-use renewable energy. Priority will be given to companies based on various criteria including company size, local content of project, bundled projects or projects that can be replicated. Complete the GEEF application form online. Eligibility will be communicated within 10 business days. Eligible applicants will be requested to submit a detailed business plan to the IDC, accompanied by a financial model and historic, present and projected cash flow statements. These will serve as input to the due diligence and credit approval process.

Any energy efficiency project over R1 million may potentially qualify for this loan.

**Ease of Access:**

- Coverage: Small Medium Large
  - Company: X X
  - Project size: X X

**Cost to Access**

The cost of accessing this incentive is the cost of drawing up a business plan and financial model.

**Contact Details**

Industrial Development Corporation of SA Ltd
Email: info@idc.co.za
Website: www.idc.co.za/development-funds/geef

**Sasfin**

Sasfin Bank offers finance options for both energy efficiency and renewable energy projects.

In addition to the line of credit, IFC/SECO offered Sasfin and Mercantile clients an advisory service to facilitate technical and financial expertise to enable companies to implement the energy and cost saving projects.

**Projects eligible for funding include:**

- photovoltaics (PV) and thermal solar solutions;
- lighting;
- heating;
- ventilation and cooling air conditioners;
- refrigeration, chiller compressors;
- pumps;
- IT equipment, including servers, desktops, laptops, printers, scanners;
- water heating, including heat pumps, solar and gas;
- manufacturing equipment;
- materials handling equipment.

**Ease of Access:**

- Coverage: Small Medium Large
  - Company: X X

**Contact Details**

Candice Pretorius
Regional Manager
Tel: 011 809 7681, Tel: 011 809 7500,
candice.pretorius@sasfin.com

**Nedbank**

One of South Africa’s top four banks, Nedbank, has access to a credit line from the Agence Française de Développement (AFD - French Development Agency), allowing it to provide concessional financing for energy efficiency projects. The benefit is essentially a 7% rebate that can be used to reduce the principal loan amount or to reduce the interest rate payable. Energy efficiency and renewable energy projects are eligible with a maximum project size of R150 million. Clients of Nedbank can also approach their relationship banker with an energy efficiency project.

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- materials handling equipment.

**Ease of Access:**

- Coverage: Small Medium Large
  - Company: X X

**Contact Details**

Kevin Witfield
Head of African Treasuries, Carbon and Financial Products
Tel: 011 294 2268
Email: carbon@nedbank.co.za

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**Funding through loans**

**The Green Energy Efficiency Fund**

**Funding for Energy Efficiency Financial Institutions**

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Funding through loans

Mercantile Bank
Mercantile is a niche business and commercial bank. It has a credit facility for energy efficiency from the World Bank’s International Finance Corporation (IFC). Businesses banking with Mercantile should speak to their relationship manager. Excluded companies include those who harm the environment or are involved in sectors such as tobacco and casinos.

Contact Details
Sibonelo Ndlovu
Head: New Business
Tel: 087 354 3086
Email: sindlovu@mercantile.co.za
Tel: 011 302 0300

Investec
Investec is a business-focused bank which also caters for high net worth individuals. Investec does not have specific energy efficiency products developed, but businesses can approach their banker with an energy efficiency project. With the European Investment Bank (EIB) it has a €100 million renewable energy funding facility that aims to promote clean energy generation and energy efficiency initiatives in South Africa. Projects are funded over three years. The EIB also has a number of investment criteria which form part of the evaluation process.

Contact Details
Contact an Investec banker
Tel: 011 286 7000

Absa
Absa is one of South Africa’s top four banks. Together with the APF, Absa is providing funding for projects up to R100 million specifically aimed at driving energy efficiency or renewable energy. In addition, a 7% rebate of the total loan amount is available to qualifying projects. Loans are for a minimum of three years. The focus of the fund is retrofitting of existing installations, commercial energy efficiency in building, construction and design, and renewable energy investments, encompassing power generation for the applicant’s own consumption or for sale to the national grid.

Contact Details
E-mail: cebac@absa.co.za
Tel: 0860 040 302

Standard Bank
Standard Bank is one of South Africa’s top four banks, and funds renewable energy and energy efficiency projects using project or asset finance, structured deals and unsecured lending. Standard Bank also provides finance for renewable projects and energy efficiency initiatives across Africa.

Contact Details
Rentia van Tonder, CIB
Email: rentiavantonder@standardbank.co.za
Switchboard: 089 123 000 / 0860 123 108

FNB
FNB is another of the top 4 banks, and offers its business customers loans for energy efficiency, as long as they have an annual turnover of less than R40 million and intend to upgrade their premises with energy efficient technology. Loans are offered over a term of 1-6 years, up to a maximum of R1 million. Applicants may request a three month capital holiday at the start of the loan, to give time for the new equipment to start delivering business benefits. FNB also offers medium to long term amortising Solar Energy loans, repayable monthly, over a seven year period.

Contact Details
Samora Stofile
Tel: 011 632 0027
E-mail: samora.stofile@fnb.co.za
Business Service Desk: 087 575 9479

Ease of Access:

Energy efficiency projects which are typically over R200 000 in capital expenditure may qualify for a loan. For example, purchasing more recent model forklifts can be done through asset-based finance. It would also be possible to finance the replacement of a kiln through asset-based finance.
Funding through Corporate Development Funds - Introduction

In addition to regular loan funds for energy efficiency projects, there are also a number of so called ‘Enterprise Development Funds’ or ED Funds available in the market place. ED Funds are typically financed by large corporates and form part of their Corporate Social Responsibility commitments. The funds may be internally or externally managed, and are aimed at a wide range of social benefit areas, i.e. not all are targeted specifically at energy efficiency projects.

However, many of these funds do target the development of small and medium sized businesses as a way of targeting economic growth.

SCF Capital Solutions operates as a developmental finance company with specific focus on the Small and Medium Enterprise market and is appointed as the fund administrator for the sefa Botala Facility – a partnership between the DBSA Green Fund and sefa. The objective of the fund is to finance SMEs who are involved in supply chain transactions in the green economy. The finance is done using supply chain finance techniques, as opposed to balance sheet or collateral based lending. This fund is mainly relevant to service providers, but can also be used for simple upgrades by brick makers.

Pre-Qualifying Criteria

- The project must qualify as a ‘green project’ in line with their guidelines;
- There must be a contract issued by a counterparty in good credit standing;
- The contractor must be solvent;
- The contract must be short term, typically less than six months;
- The issuer of the contract and the contractor must agree to settle the contractor’s invoices into an account that is jointly controlled by SCF Capital Solutions;
- SCF must be satisfied with;
  - The contractor’s ability to successfully deliver on the contract;
  - The project plan;
  - Payment and collection arrangements;
  - Credibility of service providers;
  - The contract must be profitable;
  - B-BBEE status.

Definition of Green Project

- Renewable energy such as solar energy etc.
- Energy saving installations such as smart meters, energy saving lighting, refurbishments of HVAC systems
- Water saving projects

Contact Details

Tel: 011 513 3474
Email: info@scfcap.com
Website: www.scfcap.com

Ease of Access:

Coverage

<table>
<thead>
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<th>Company</th>
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</table>

Funding through Corporate Development Funds
Massmart Supplier Development Fund

The purpose of Massmart Supplier Development Fund is to assist Massmart's existing and new suppliers to enhance the quality of their products, thereby improving procurement and the supply chain.

The objectives of the Supplier Development Programme include:

• Improving the quality of products
• Assisting local suppliers to expand their production capacity (existing and potential)
• Assist suppliers to reduce input costs
• Enable Massmart to increase and diversify its local sourcing capacity
• Provide a route to market to deserving products (locally and internationally)
• Establishing long-term supplier partnerships

Requirements

• South African domiciled companies
• Small, medium or micro enterprises
• Agreement of programme terms and conditions, including periodic audit of company operations under certain programmes
• Can be a manufacturer or service provider
• If a funding programme is requested, the applicant must have a reasonable likelihood of success determined by the Supplier Development Fund Management
• Priority and preference shall be given to manufacturers of products that are environmentally and socially sustainable
• Supplier operations that have no negative impact on the South African economy
• Encourage positive South African development effects
• Creates or maintains employment
• Women-owned, black-owned and black-empowered companies are encouraged to apply

Contact Details

Website: www.massmart.co.za
Tel: 011 517 0000

Coverage

<table>
<thead>
<tr>
<th>Company</th>
<th>Small</th>
<th>Medium</th>
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</table>

Ease of Access:

Funding through corporate development funds

Massmart Supplier Development Fund Success Stories for Brick Makers

(Massmart + Walmart, Supplier Development Fund Annual Report 2014)

• Apollo Bricks - funding was to increase the production capacity of the plant, the key driver was the creation of jobs.
• Nkuleko Bricks - the project increased the production capacity of the plant, which will assist Massmart in Reconstruction and Development Programme.
• Supertrade Bricks - provided finance to complete the construction of the plant, which increases job creation.
• Heidelberg Bricks small clamp kilns - project increased the production capacity through mining, extrusion and handling.
• COPESSA – provided working capital to reinstate the manufacturing plant, assisting with gaining product access to market and training of staff members.

Source: Massmart Supplier Development Fund Annual Report, 2014
Evolution One Fund

The Evolution One Fund is managed by Inspired Evolution. The focus of the Fund is on clean energy and resource efficiency. The Fund makes equity investments in early stage, expansion and development stage and later stage projects. The Fund has been set up to make 10 to 15 investments over a three to five year period.

The Fund's minimum equity investment size is R10 million and the maximum investment is limited to no more than 15% of the Fund's total capital commitments into any one enterprise at the time of investment. In terms of the return expectations, the Fund targets a return of three times the original investment within a period of four to seven years.

Contact Details
Tel: 082 496 0522
Email: chris@inspiredevolution.co.za

Funding through OEMs and ESCos

Original Equipment Suppliers

Original Equipment Supplier or Original Equipment Manufacturer is a broad term for companies that originally build a given product, which is then sold onto other companies for resale.

Original equipment suppliers develop solutions for clients based on their needs and requirements. This may include design of new processing/energy equipment or the modification or expansion of existing facilities.

The nature of energy efficiency projects available for clay brick manufacturers may include a variety of process optimisation changes or process related efficiencies. When implementing such changes, it may be necessary to approach an OES that would be able to make the necessary design changes to the processes.

In some cases, OES companies are able to offer finance through banks or potentially through performance-based contracts (as discussed under the ESCo finance model). This will depend on the type of energy efficiency project, as well as the equipment supplier.

Examples

For clay brick makers, a number of original equipment suppliers exists, for example:

- Keller HCW GmbH, who specialise in design of clay brick manufacturing facilities
- Beralmar Technologic SA, who specialise in engineering and machinery solutions for clay brick manufacturing
- VSD manufacturers, such as WEG

Contact your service provider about access/availability of funding opportunities.

Funding through Original Equipment Manufacturers

Contact Details
Tel: 0860 946 353
Fax: 011 638 5321
Email: zimele@angloamerican.com

Coverage Small Medium Large
Company X X X
Project size X X X

Ease of Access:

Companies such as Keller HCW GmbH would be able to offer finance through a German bank. The type of project may include replacement of a kiln or the installation of more advanced robotics for movement of bricks.

Anglo American Green Fund

Anglo American has a Green Fund which targets investment opportunities that have a positive impact on the environment and reduce environmental risks. Energy efficiency projects qualify under this Fund.

The Fund provides debt or a combination of loans and equity up to the value of R10 million. The Fund may take an equity stake in the project of between 10% and 49%. The support is offered to fund working capital and capital expenditure.

Contact Details
Tel: 0860 946 353
Fax: 011 638 5321
Email: zimele@angloamerican.com

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Energy Services Companies
Where you have a large number of energy saving opportunities available to you, especially in building-related technologies (e.g. lighting, HVAC, etc.), it may be interesting to finance the projects with what is known as an Energy Performance Contract (EPC), through an Energy Services Company (ESCo).

Energy performance contracts are essentially contracts which link the payments to contractors to the project’s energy savings, i.e. the cost of an investment in energy efficiency is paid back through the savings it generates. The projects must be sized in such a way that the savings offset the cost of financing, installing and operating that technology. By definition, the future savings must be greater than the sum of the costs.

In performance contracting, a third-party contractor designs, installs, finances and, if required, operates a new technology. The contractor is then paid according to the savings achieved. Their defining feature is their acceptance of an element of risk with the service provision, as opposed to an energy service provider or typical contractors who will not assume any ongoing performance risk. By virtue of this acceptance of risk, ESCos will usually retain an ongoing operational role in measuring and verifying savings.

The first ESCos in South Africa were introduced following Eskom’s Demand Side Management Programme (now called the IDM Programme). The ESCos implement energy-saving technologies for customers, and finance this implementation through incentives offered by Eskom.

Finance Benefits
The measures installed under performance contracts may be financed either by the business itself, or more often as a loan from a financial institution (bank) or by the performance contractor itself.

If the performance contractor provides the financing, it is termed ‘off balance sheet’, meaning that the business has no debt, and its only obligation is to pay the contractor a share of the savings during the contract period. If the business finances the investment, it will nevertheless have debt. In both cases however, the advantage of an EPC is that the contractor guarantees that the savings will provide enough cash flow to repay the loan as well as to cover fees and costs.

Note that in some cases the energy savings may exceed the contracted amount, and then the business will see benefit from day one.

Contact Details
There are a number of ESCos in South Africa and it is not possible to list them all in this guide. ESCos can be found on the South African Association of Energy Services Companies’ website: www.esco.org.za

Ease of Access:
Energy Service Companies would typically enter into an Energy Performance Contract Agreement for projects such as:
Installation of Variable Speed Drive projects, Maximum Demand Management, automated switching on and off of areas of the plant, rationalising transformers, HVAC control optimisation, domestic hot water optimisation.

These type of project typically include electrical efficiency projects and in the SA Clay Brick Section Energy Efficiency Guidelines this refers to the Power Energy Saving Options.
Funding through Cash Grants

Various government departments offer some form of grant to cover the costs involved in energy efficiency projects. It is vital for you to assess your project against the criteria of the grant programme before you start to run up costs.

Programmes have different rules about when a business needs to submit its application. For example, this may need to be 60 days before an asset which is being funded is to be used, or it might be 60 days before the asset is ordered.

Most of the grants are paid as a refund, which means that a business will need to pay for the costs upfront – and then put a claim into the government department to get the costs reimbursed.

Funding through Cash Grants

Manufacturing Competitiveness Enhancement Programme (MCEP)

The Manufacturing Competitiveness Enhancement Programme (MCEP), involves grants which are offered by the Department of Trade and Industry (dti). It has been a very successful programme, so it has been oversubscribed. This has resulted in approval delays and a tightening of eligibility criteria for future projects. It aims to make businesses more competitive and to preserve employment. Grants are paid based on a set of components, and applicants can apply for a grant on the basis of these.

*NB* MCEP is currently suspended, but is expected to reopen in the near future.

Energy efficiency projects can qualify under the following components:

**Capital Investment**
The objective of the Capital Investment Component is to support capital investment in upgrading and expanding equipment if it creates new jobs or retains existing jobs.

**Green Technology and Resource Efficiency Improvement**
This component covers projects that support the green economy – with green technology upgrades and business development activities and services that will lead to cleaner production and resource efficiency. In other words, it covers energy efficiency costs.

**Feasibility Studies**
Feasibility studies are likely to lead to bankable business or project plans for projects with a minimum capital value of R30 million. The intention is to see investment in new components, or products or processes not currently manufactured or performed by the applicant, or the creation of new markets. The desire is to see a substantial increase in manufactured products and conformity assessment services not currently available in South Africa.

Benefits for Capital Investment
The grant is worth up to R30 million, and involves cost-sharing of between 30% and 50%. An additional 10% bonus grant of up to R5 million may be awarded for additional job creation or local procurement.

Qualifying costs:
- Machinery and Equipment (including energy efficient equipment)
- Certain building or leasehold improvements
- Forklifts, tools, jigs and dies

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This component covers projects that support the green economy – with green technology upgrades and business development activities and services that will lead to cleaner production and resource efficiency. In other words, it covers energy efficiency costs.

**Feasibility Studies**
Feasibility studies are likely to lead to bankable business or project plans for projects with a minimum capital value of R30 million. The intention is to see investment in new components, or products or processes not currently manufactured or performed by the applicant, or the creation of new markets. The desire is to see a substantial increase in manufactured products and conformity assessment services not currently available in South Africa.

Benefits for Capital Investment
The grant is worth up to R30 million, and involves cost-sharing of between 30% and 50%. An additional 10% bonus grant of up to R5 million may be awarded for additional job creation or local procurement.

Qualifying costs:
- Machinery and Equipment (including energy efficient equipment)
- Certain building or leasehold improvements
- Forklifts, tools, jigs and dies
Benefits for Green Technology and Resource Efficiency

It offers a cost-sharing grant of up to R20 million, covering between 30% - 50% of costs, and is payable at implementation. An additional 10% bonus grant – not exceeding R5 million – may be awarded for additional job creation or local procurement.

Qualifying categories include:
• Cleaner Production
• Waste Management
• Energy Efficiency
• Water Use Efficiency
• Renewable Energy
• Conformity Assessment

Benefits of Feasibility Studies

A cost sharing grant of between 50% and 70% is offered.

The grant is capped on the basis of the applicant’s historical asset cost (HAC). Applicants with a HAC below R5 million qualify for a 50/50 cost-sharing grant.

Applicants should note that turnaround times are long – generally from six to 12 months.

Grants are limited as follows:
• 25% of MVA for applicants with a 100% black shareholding;
• 25% of MVA for applicants with a HAC of at least R5 million but less than R30 million;
• 20% of MVA for applicants with a HAC of at least R30 million but less than R200 million; and
• 10% of MVA for applicants with a HAC of R200 million and above.

The grant is capped on the basis of the applicant’s historical asset cost (HAC). Applicants with a HAC below R5 million qualify for a 50/50 cost-sharing grant.

Applicants should note that turnaround times are long – generally from six to 12 months.

Grants are limited as follows:
• 25% of MVA for applicants with a 100% black shareholding;
• 25% of MVA for applicants with a HAC of at least R5 million but less than R30 million;
• 20% of MVA for applicants with a HAC of at least R30 million but less than R200 million; and
• 10% of MVA for applicants with a HAC of R200 million and above.

Cost to Access

The only cost incurred is for the completion of a Green Report, which is necessary to access the green components of MCEP. This report defines the outcomes of the energy efficiency scheme, and includes projections.

Contact Details

The Department of Trade and Industry
Ms Magdeline Thwala
Director
Email: mthwala@thedti.gov.za
Tel: 012 394 1089

Mr Sithembile Tantsi
Director
Email: tsithembile@thedti.gov.za
Tel: 012 394 1258

Ease of Access:

Coverage Small Medium Large
Company X X X
Project size X X
The Critical Infrastructure Programme (CIP) is designed to lower the cost of an investment by funding bulk infrastructure costs to encourage private investment by companies. Funding takes the form of a cash grant from the Department of Trade and Industry (dti) for infrastructure projects – covering bulk infrastructure. Retail and housing are excluded.

**Benefit**

The grant offers between 10% and 50% of the total infrastructural development costs. The grant is limited to R50 million per project. Infrastructure is defined as:
- Bulk infrastructure which will be accessible to other investors or the general public, such as roads, rail, bridges, electricity transmission lines and telecommunication networks.
- Infrastructure for power co-generation.

**Requirements**

Applicants must apply to the dti three months before infrastructure starts. The applicant must be a SA registered legal entity and at least a level 4 B-BBEE contributor. The project must achieve a minimum score for contribution to industrial policy objectives. The score is calculated on the following elements: B-BBEE compliance, investment in a priority sector, investment value and location of the project.

An application with the required supporting documentation must be submitted to the dti and will go before an adjudication board.

**Cost to Access**

The costs are incurred in preparing the application. The process is well structured, but you will need to complete a detailed application form.

**Contact Details**

The Department of Trade and Industry
Lawrence Muthaphuli
Tel 012 394 1431
E-mail: LMuthaphuli@thedti.gov.za

A typical CIP Project would include the construction of a road to a brick-making facility or a power substation to power a brick-maker. CIP supports investments in solar and wind farms. If at least 60% of the investment is sourced locally, the full investment will qualify for the CIP grant.

**Key considerations for clay brick makers:**

- A large capital investment is required (>R5 million)
- Companies must be B-BBEE compliant and a minimum Level 4 B-BBEE rating is required
- The investment must be infrastructure-related (for example, roads, electrical substations and transmission, or solar PV generation) and support a manufacturing project/facility.

**Coverage**

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Funding through cash grants

Black Industrialist Scheme (BIS)

Introduction
The Black Industrialist Programme aims to unlock the potential within black industrialists that operate in the South African economy. The main objectives of the programme is to accelerate the quantitative and qualitative increase and participation of black industrialists in the national economy, selected manufacturing sectors and value chains, as reflected by their contribution to growth, investment, exports and employment.

Grant Offering
The BIS offers a cost sharing grant ranging from 30% to 50% to approved entities - to a maximum of R50 million. The quantum of the grant will depend on the level of black ownership and management control, the economic benefit of the project and the project value.

Characteristics of Black Industrialist
• High levels of black ownership (>50%);
• Dominant black ownership and management control may be considered for projects that are deemed strategic by the dti
• Exercises control over the business
• Takes potential risk in the business
• Does business within the manufacturing sectors, with particular reference to IPAP focus areas

Mandatory Requirements
• Must be a taxpaying company and provide valid tax clearance certificates
• Must have a valid B-BBEE certificate
• Requires a minimum capital investment of R30 million

Cost to Access
The costs are incurred in preparing the application. The process is well structured, but you will need to complete a detailed application form.

Contact Details
The Department of Trade and Industry
E-mail: bienquiries@thedti.gov.za

A typical project which would qualify for this incentive would include the replacement of a clamp kiln with a fixed kiln where the project costs are above R30 million and the company is owned by a black industrialist.

For example, a Tunnel kiln with a dryer capable of producing 30 million bricks per year is likely to cost R30 million upwards depending on the technology supplier. It is possible for the costs of a tunnel kiln with a dryer and kiln cars to be significantly higher.
Introduction
The power utility Eskom offers energy efficiency incentives under its Integrated Demand Management (IDM) Programme. Funding is through rebates or cash grants for the installation of energy efficient technology. The IDM scheme aims to promote and implement more energy efficient technology, processes and behaviour by all electricity consumers.

NB: Due to finance constraints, a number of Eskom schemes have been put on hold. Eskom is currently processing applications from ESCos for projects resulting in energy savings between 250kW – 1200 kW, but this is subject to limited funding available. Changes will be added in later editions of this guide, if other programmes are restored or replaced. In the meantime, you are advised to keep an eye on the Eskom website for any additional opportunities which may arise.

Benefits
Eskom offered the Demand Response Programme, and funding for projects must be approved before launch.

Demand Response
Companies are paid to reduce their load in order to balance demand and supply. A payment of R1.20/kWh is offered for energy not consumed. The minimum manageable demand which Eskom is seeking is 1 megawatt. It is facing a number of funding challenges and there is an expectation that it may lower this threshold once this is affordable, opening up the possibility for smaller projects to be considered. Eskom focuses on large mining and manufacturing customers who are most likely to be able to meet its requirements for demand reduction. It will deal with municipalities who can control geysers centrally, but no aggregators of smaller loads.

Requirements
Any company wishing to participate must contact Eskom via email for more information. An Eskom representative will conduct a site visit. A legal contract will be signed with Eskom and the company will register as a vendor. Monitoring of reductions in consumption will be conducted to verify savings.

Cost to Access
The company is responsible for all costs incurred in the application process and for financing the capital requirements of the project (energy efficient technology). Eskom will pay for measurement and verification services.

According to Eskom, the programme was very easy to access, and applications were processed in a few weeks.

Did you know?
Eskom provides a number of grants and incentives for energy efficiency through its Integrated Demand Management Programme. A number of Eskom’s incentive programmes are on hold until additional financing can be secured. The developments can be monitored on the Eskom IDM website. Once financing has been secured, it may be possible to access additional funding for energy efficiency projects through the programmes which have been on hold.

A typical project which can apply for Eskom IDM funding includes the power energy saving projects as described in the SA Clay Brick Energy Efficiency Guidelines, subject to the projects being large enough. These projects may include the installation of variable speed drives, maximum demand management, efficiency retrofits of motors, optimisation of compressors etc.

Eskom’s Integrated Demand Management
Funding through cash grants

Key Features of the Performance Contracting Programme
A maximum payment will be agreed upon in a contract between Eskom and the successful applicant.

Payments will only be made for energy savings verified by an independent, accredited Measurement and Verification (M&V) expert.

Components of a project which are too costly or complex to measure and verify in relation to the value of the energy savings will not be included in the contracted savings.

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Email: csonline@eskom.co.za
Website: http://www.eskom.co.za

Ease of Access:

Coverage Small Medium Large
Company X
Project size X
Funding through cash grants

**The Green Fund**

Funding opportunities have been made available through public requests for proposals. Three public calls have already happened with the last one closing on 31 October 2014. In addition, the Fund also actively seeks out and supports initiatives which meet its selection criteria. Please continue to monitor the website for further calls.

**Contact Details**

Green Fund  
The Development Bank of Southern Africa  
Tel: 011 313 5237/3611  
Email: enquiries@sagreenfund.org.za  
Website: www.sagreenfund.org.za

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**Key Considerations for Clay Brick Makers**

- Funding windows under the Green Fund are currently closed.
- National Treasury and The Department of Environmental Affairs are currently revising the fund with an aim to recapitalise the fund. This fund is aimed at recycling the revenue from the proposed Carbon Tax which is expected to be implemented in January 2017.
- Closely monitor the website for further details.

The type of projects that can apply depend on the funding window that is open and the eligibility criteria for the funding window. If a funding window is open for energy efficiency—these types of projects would be considered.

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**Did you know?**

The Green Fund offers grants, loans or equity to projects that support the development of a green economy.

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**Cost to Access**

The company is responsible for the cost of preparing an application.

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**Smaller Companies**

- Funding through cash grants

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**The Green Fund**

Clay Brick Sector Energy Efficiency Finance Guide

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**Clay Brick Sector Energy Efficiency Finance Guide**
Funding through cash grants

REEEP is an environmental, non-profit organisation which provides grants to promote clean energy business models in developing countries. It focuses on cutting-edge technology and acts as a funder, an information provider and a connector for up-scaling clean energy business models. A call for proposals is made annually. The 10th funding cycle was in 2014 and was a closed Call for Proposals sponsored by the Government of Austria and the OPEC Fund for International Development. The 11th call was in 2015. If a new funding window is opened, it may be possible to apply.

Benefits
This comes in the form of a non-repayable grant.

Requirements
• Scale-up business models for renewable energy and energy efficient technologies to ensure growth in existing and new market penetration.
• Support decentralised and/or off-grid generation to extend access to energy and its related opportunities.
• Harness the benefits of clean energy in food production and the efficient use of energy in agricultural applications.
• Employ clean energy in providing reliable water supply.
• Support communication, and provide and open up energy data and information to assist with informed decision making and planning, as energy systems change.

Cost to Access
The cost of preparing the proposal is borne by the applicant. Some funding cycles require co-funding by the applicant.

Contact Details
REEEP
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Switchboard: 010 201 4763
Email: Nicole.algio@reeep.org
Website: www.reeep.org

The REEEP provides funding in the form of a grant for renewable energy and energy efficiency. Typical projects include those with added social benefits, which create access to energy for communities.

Ease of Access:

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Various government departments offer some form of tax incentive to cover the costs involved in energy efficiency projects. It is vital for you to study the rules of any tax incentive programme before you start to run up costs.

Programmes have different rules about when a business needs to submit its application. This may be required before you use the asset, or you may need to apply before assets are ordered. As the benefit comes in the form of an additional tax allowance, the incentive will only bring a return if your business is actually incurring income tax.
Funding through tax deductions

Section 12L of the Income Tax Act

Introduction
Section 12L is administered by the South African National Energy Development Institute (SANEDI), which is a state company set up in 2012 to help accelerate green energy projects. It offers tax deductions to all taxpayers for energy efficiency or conservation initiatives. It is applicable to all energy carriers and to both greenfield and brownfield projects. The objective is to encourage South African businesses to use energy more efficiently and to conserve energy. Funding is in the form of a tax deduction based on energy savings (kWh of energy saved).

Benefit
A tax deduction of 95c per kWh of energy saved. It is available for energy saved over the period of 12 consecutive months from any qualifying energy efficiency initiative implemented.

Requirements
A company must identify a qualifying energy efficiency project. An energy baseline must be determined and submitted to SANEDI for approval. Once the project and baseline have been approved, the project can be implemented. In order to claim the tax deduction, the energy savings must be determined over 12 consecutive months. SANEDI will evaluate the energy savings and issue a certificate to the company. The company can then claim the tax deduction for the relevant tax year.

A company can register on a SANEDI website to check if a project qualifies for section 12L: www.sanedi.org.za

Cost to Access
The baseline and energy savings must be measured and determined by a Measurement and Verification Body accredited by the South African National Accreditation System (SANAS). The company will need to pay this entity to complete the requirements to access this incentive.

The incentive is accessed through an online application process. This involves a complicated measurement process. Since this is a new incentive and one that has the full backing of the Department of Energy and Treasury, companies are encouraged to explore this option recognising that, through its uptake, continuous efforts will be made by SANEDI to improve accessibility.

Exclusions
The incentive is not accessible for projects that:

- generate energy from renewable sources, other than waste heat recovery
- generate energy from a captive power plant, unless the kilowatt hours of energy output is more than 35% of the kilowatt hours of energy input in the year of assessment

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SANEDI
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Tel: 010 201 4800
Website: www.sanedi.org.za

Key Considerations for Clay Brick Makers

- In order to qualify for this incentive an energy baseline report must be submitted to SANEDI prior to the implementation of the project.
- This energy baseline must be verified by a SANAS accredited Measurement and Verification Inspection Body.
- The energy baseline must be approved before the project is implemented.
- The energy data to be used to develop the baseline must be high quality data which is accurate.
- After the project is implemented, the energy savings must be verified by a SANAS accredited M&V Inspection Body.

Typical projects that will qualify for Section 12L are those that result in large enough energy savings. In the SA Clay Brick Sector Energy Efficiency Guide, this includes most of the projects listed under the Energy Saving Options. For more information refer to the Annexure.

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Ease of Access:
Section 12I of the Income Tax Act

The 12I Incentive Programme is administered by the Department of Trade and Industry (dti). It supports investment in manufacturing assets, and aims to improve the productivity of SA manufacturing. It takes the form of an additional tax allowance, focused on projects in the manufacturing industry with an investment value of at least R200 million for greenfield projects or R30 million for brownfield projects. So it would not cover very small businesses. Funding is through a tax deduction for the capital invested in new manufacturing assets.

NB: Applications for the S12I Tax Allowance are currently still open. However, the budget allocated to the incentive is running out quickly. It is expected that no new projects will be considered under the S12I. Companies should continue to monitor the website to assess whether any new applications will be permitted.

Requirements

An application with the required supporting documentation must be submitted to the dti. The application must be approved before the company contracts for or acquires any assets. Annual progress reports must be submitted to the adjudication committee within 12 months of the financial year. Energy efficiency is a mandatory and point-scoring criteria for this incentive.

Energy Efficiency Requirements

A greenfield project must use modern, viable, energy efficient equipment and processes, when compared to current practices. A brownfield project must achieve a minimum of 10% energy savings from the baseline.

Benefit

The incentive is a tax benefit of between 35% and 100% of costs incurred on new or expansion projects. The level of benefit is determined by a scoring system, with points for:

- Innovative processes
- Improved energy efficiency with an emphasis on cleaner production technology
- General business linkages
- Acquiring goods from SMMEs
- Direct employment creation
- Skills development
- Location in an Industrial Development Zone (IDZ) for greenfield projects only

The additional tax allowance is limited to the following:

- R900 million on new, or greenfield, projects
- R550 million on expansion, or brownfield projects

Cost to Access

The cost to access the incentive is the amount incurred in preparing the application. The rules are complicated, and this generally means that you would need professional assistance in preparing an application for the incentive.

Contact Details

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Andre Potgieter
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Tel: 012 394 1427

Contact Details

SANEDI
Contact: Barry Bredenkamp
Email: barryb@sanedi.org.za
Tel: 010 201 4800
Website: www.sanedi.org.za

Key Considerations for Clay Brick Makers

- This incentive requires a minimum of R30 million capital investment for brownfield projects and R50 million for greenfield projects.
- Projects should be energy efficient.
- Points are awarded for skills development and employment creation.

A typical project that could qualify for the Section 12I incentive will include:

The replacement of a clamp kiln with a fixed kiln where the project costs are above R30 million and the company is owned by a black industrialist. For example, a tunnel kiln with a dryer capable of producing 909 million bricks per year is likely to cost R50 million upwards depending on the technology supplier. It is possible for the costs of a tunnel kiln with a dryer and kiln cars to be significantly higher.
Section 12B of the Income Tax Act

Section 12B of the Income Tax Act is an accelerated depreciation allowance predominately aimed at accelerating the development of smaller solar PV energy projects.

As from 1 January 2016, Section 12B of the Income Tax Act No. 58 of 1962 was amended from a three year (50% - 30% - 20%) accelerated depreciation allowance on renewable energy to an even quicker allowance of one year (100%).

Therefore it allows for the deduction equal to 100% basis in respect of plant and machinery brought into use in a year of assessment for the first time, which is used in a manufacturing process or a process of a similar nature. This applicable to renewable energy sources, and specifically to photovoltaic solar power installation of less than 1 MWh.

Whilst included in this guide for completeness, and to raise awareness, this incentive is not necessarily applicable to the clay brick manufacturing process, and has thus not been used in other parts of the guide.

Funding through Research and Development Incentives - Introduction

For this guide, we have separated out the research and development tax and grant incentives from the rest of the finance available.

This is because of the limited number of potential users of these incentives for energy efficiency projects.

As the name implies, this incentive is available to businesses that need to undertake research and development.

Some companies need to undertake research and development to develop new products and processes so they can become energy efficient.

Therefore we have included this section for businesses that wish to be at the leading edge in pursuing a green agenda.
Support Programme for Industrial Innovation (SPII)

The Support Programme for Industrial Innovation (SPII) grant is a cash incentive to promote technology development and commercialisation in South Africa. SPII is administered by the Department of Trade and Industry.

It provides financial assistance for the development of commercially viable, innovative products and processes and facilitates commercialisation of such technologies. Excluded sectors are military projects and projects which are limited due to licensed technology.

Benefits
The SPII programme has a choice of three schemes:

- The Product Process Development (PPD) Scheme targeted at SMMEs offers a maximum grant of up to R2 million. The B-BBEE shareholding will determine what share of costs are covered, offering between 50% and 85% of costs.
- The Matching Scheme offers companies a tax-free, non-repayable grant of between 50% and 75% of costs, depending on the B-BBEE shareholding of the company, of up to R5 million.

Requirements
An application form with supporting documentation is submitted to the dti, which will appoint a specialist to assess the project. A site visit may be required by the specialist. The application is then referred to the SPII Evaluation Panel for approval. The project is assessed on the completion of targets, and payment will be made once each target has been reached.

Cost to Access
The only costs incurred are the costs of preparing the application. Applications must include due diligence and a detailed contract.

Section 11D of the Income Tax Act

The research and development (R&D) tax incentive is run by the Department of Science and Technology. It promotes scientific and technological advancement through innovation. This helps companies to be more competitive in local and global markets. R&D is defined as the development of new products, processes, services, materials or software or the improvement of existing products, processes, services, materials or software. Funding is in the form of a tax deduction for costs incurred in research and development. Excluded sectors are oil and gas exploration, financial instruments and products.

Benefits
The incentive is a tax deduction of 150% of qualifying R&D costs incurred in South Africa. The benefit is equivalent to a net 14% (extra 50% over normal 100% tax deduction X 28% tax rate) tax saving on eligible R&D expenditure.

Requirements
A company must apply for support before the R&D costs are incurred. It needs to submit a pre-approval application form to the Department of Science and Technology (DST), which manages the Scheme. Once the request has been approved, the company will need to submit an annual progress report to the DST. Eligible R&D expenditure is then claimed in the company’s tax return.

Cost to Access
The only cost to access this incentive is the cost incurred in completing the application. The application form is relatively simple, but the criteria to secure the incentive are complex, and there is a slow turnaround time. This means it is advisable to use a consultant.

Ease of Access: Coverage Small Medium Large

Company X X

Project size X X X

A typical project that will qualify for SPII includes the improvement of raw material mixes or replacement of raw materials with waste. This includes research and development with trials and testing.

A typical project that will qualify for Section 11D includes the improvement of raw material mixes or replacement of raw materials with waste. This includes research and development with trials and testing.

Contact Details
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Contact Details
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Dimakato Mokone
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Email: tax@dst.gov.za
Tel: 012 843 6300

Ease of Access: Coverage Small Medium Large

Company X X

Project size X X

Clay Brick Sector Energy Efficiency Finance Guide
The proposed Carbon Tax, anticipated to come into effect in January 2017, is expected to enhance the demand for carbon offsets and incentivise investment in GHG emission reduction projects. South African companies will be able to reduce their carbon tax liability by 5% - 10% through the carbon offsets allowance.

What are Carbon Offsets? They are financial instruments which take the form of tradable permits or certificates - which allow a country or organisation to emit one ton of carbon dioxide. Many institutions fund energy efficiency projects in order to purchase carbon credits to offset their emissions and thereby reduce their carbon tax liability. The Department of Environmental Affairs is responsible for the renewal of permits. The issuing of permits is complex and it is the main reason why projects are rejected.

Funding through carbon offsets

There are two carbon markets for trading carbon credit - the compliance market and the voluntary market. The compliance market has, however, shown very high levels of volatility and therefore the voluntary market is currently a more viable option in South Africa.

The voluntary market is less regulated than the compliance market. There are a number of different voluntary standards and schemes. It is a willing seller-buyer arrangement. Currently in South Africa, Nedbank offers the largest portion of voluntary credits available in Africa and the price is dependent on the additional social benefits of the project which can be up to R200 per credit.

A carbon credit project must:

1. Reduce emissions below a baseline.
2. Result in real, permanent and measurable reductions in emissions.
3. Be ‘additionality’. The project is additional to what would have happened without the carbon credits.

The costs of accessing carbon credits projects include:

- Paying the auditor to assess the project type, when it was sold, and the buyer.
- Purchasing and installing monitoring equipment
- Paying the auditor to assess the project on an annual basis, to verify the number of carbon credits
- Costs for this exercise can easily be in excess of R1 million, given the complexity of the carbon offset projects. The benefit needs to be weighed up against the costs incurred.

Both Nedbank and Standard Bank have specialised teams which deal with carbon credits. A typical project that will qualify for carbon is a large carbon emission reduction project like the replacement of a clamp kiln with a fixed kiln.
How to build a Business Case

Your written proposal needs to make it easy for people to see at a glance what you want from them and why; but it will also need to give sufficient detail to satisfy the needs of the diligent critics among them.

Brevity, Clarity, Certainty
A written proposal must have, on the first page, the complete story in simple terms. Details are not relevant here - they can follow in the body of the document. You must make it easy for the reviewer to absorb your message quickly and read on.

The body of the proposal must be written in a clear and logical style. If the project is technical in nature it will be helpful to include a layman's explanation of the technology in question before going on to say how you propose applying it.

The financial case for your proposal rests on the balance between projected costs and savings. Clearly, the argument will only be as sound as the evidence on which it is based.

How to Build your Case:
• Know the residual life of affected assets
• Evaluate the project cost
• Evaluate the requirements of other projects
• Calculate the cost and energy savings
• Estimate the project life
• Identify sources of funding

• Work out a project timetable
• Calculate the internal rate of return and the net present value
• Carry out risk analyses
• Consult other interested parties
• Find any available precedents, case studies or technology references
• Identify non-financial benefits

“Ask yourself: what does the bank want to hear that I want to tell them?”

How to build a Business Case

It is essential to prepare thoroughly by collecting the most reliable data and evidence you can obtain.

Avoid using emotive terms, and be wary of adverse comparisons with your competitors. Another more subtle aspect to the language barrier is that some ordinary words you use (such as ‘target’, for instance) will mean different things to different people. Use more concrete and specific terms if possible. Include relevant visual material like plans and photographs, which will make the document more attractive and easier to follow. It may be that some of the people you are trying to influence are not even familiar with the site you are talking about, and having a picture of it will help to make your proposal more concrete in their minds.

Verify your Numbers

Verify estimated cost and energy savings using an appropriate degree of diligence. In many cases it is possible to estimate the effects of a proposed change with reasonable certainty. This is particularly true where an effective monitoring and targeting scheme is in use or where a sufficiently detailed energy audit has been conducted.

Obtain Forward Estimates

Bearing in mind that savings are usually estimated in energy terms, you will need to obtain forward estimates of prices in order to express the estimates in financial terms. These are frequently available from sources such as Eskom, the Department of Energy, or energy market intelligence service provider.

Typical pitfalls:

• Using unexplained jargon or ambiguous terms.
• Failing to address any issues of relevance.
• Failing to identify and deal with risks factors.
• Not using the appropriate financial appraisal method.

Quoting Simple Payback

When quoting the payback period, it is more powerful to say “this project will repay its cost every two years”, rather than to say “this project will pay back its cost in two years. The former wording stresses the continuity of future savings and sounds like a positive choice. The latter wording suggests that the benefit is short-lived.

Identify Additional Benefits

Energy saving projects will often yield additional benefits, some of which could even have significant financial value in their own right. It is worthwhile considering whether there are likely to be any such benefits complementing the financial returns expected from the projects you are promoting.

Avoid using emotive terms, and be wary of adverse comparisons with your competitors. Another more subtle aspect to the language barrier is that some ordinary words you use (such as ‘target’, for instance) will mean different things to different people. Use more concrete and specific terms if possible. Include relevant visual material like plans and photographs, which will make the document more attractive and easier to follow. It may be that some of the people you are trying to influence are not even familiar with the site you are talking about, and having a picture of it will help to make your proposal more concrete in their minds.

Technological Risk

Put simply, will your project yield the savings that you claim? This is where specific product endorsements from the same type of user are indispensable.

Cost Risk

The possibility that the capital cost or ongoing running costs end up higher than you have budgeted for. You need to ensure that estimates and quotations are reliable.

Operational Risk

This is the risk that the project could compromise output. For instance, it may require shutdown of facilities or processes. Questions to ask then include:

• What would happen if work overran?
• Might the work clash with other shutdown projects?
• Are the necessary personnel going to be available?

Market Risks

Consider what energy prices might do relative to other costs. What about interest rates?

Reducing energy usage means lower carbon emissions. That’s great news for the environment.

By John Fisher

Clay Brick Sector Energy Efficiency Finance Guide

Clay Brick Sector Energy Efficiency Finance Guide
Next Steps

Start with the following easy low and no-cost options to help save money and improve the energy performance of your site.

Step 1: Understand your Energy use through Energy Audits

Look at your site and identify the major areas of energy consumption. Check the condition and operation of equipment and monitor the power consumption over one week to obtain a base figure against which energy improvements can be measured.

Step 2: Identify Opportunities using the Clay Brick Sector Guide

Compile an energy checklist. Walk around your site and complete the checklist at different times of day (including after hours) to identify where energy savings can be made.

Step 3: Prioritise your Actions using the Finance Guide

Draw up an action plan detailing a schedule of improvements that need to be made and when, along with who will be responsible for them. Improvements can be measured.

Step 4: Seek Specialist Help

It may be possible to implement some energy saving measures in-house, while others may require specialist help. Discuss the more complex or expensive options with a qualified technician.

Step 5: Make the Changes and Measure the Savings

Implement your energy saving actions and measure against original consumption figures. This will assist future management decisions regarding your energy priorities.

Step 6: Continue Managing Energy Efficiency

Enforce policies, systems and procedures to ensure your centre operates efficiently and that savings are maintained in the future.

Appendix

Evaluation of Energy Saving Options based on the SA Clay Brick Sector Energy Efficiency Guidelines
### Energy Saving Options

#### 1. Improving Combustion Efficiency

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving KWh/yr</th>
<th>Payback (yrs)</th>
<th>Carbon Offsets Loans Development Finance OEM ESCo MCEP CIP BI 12I 12L SPII 11D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clamp</td>
<td>Ensure that fuel is evenly distributed within the firebox as well as the firebrick layers. Use firing channels to ensure efficient combustion for lighting and controlling airflow into the clamp once firing is underway.</td>
<td>10 000</td>
<td>314</td>
<td>0.1</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>Fixed and Clamp</td>
<td>Use best-quality coal available locally with consistent calorific value and particle size within firing system.</td>
<td>10 000</td>
<td>487</td>
<td>0.1</td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>Fixed</td>
<td>Add fuel to the kiln only when it will quickly combust, when the red heat can be seen or the temperature is above 800°C.</td>
<td>30 000</td>
<td>630</td>
<td>0.2</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>Fixed</td>
<td>Optimise pulse time, droplet size in oil burners - optimisation of oil burners. Fuel oil saving.</td>
<td>3 000</td>
<td>583</td>
<td>1.4</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>Fixed</td>
<td>Carry out daily checks on kiln burners to ensure complete combustion at point of entry.</td>
<td>2 000</td>
<td>171</td>
<td>0.3</td>
<td>x</td>
</tr>
<tr>
<td>6</td>
<td>Fixed</td>
<td>Measurement of kiln oxygen profile and use it to adjust the burner air, kiln draft and rapid cooling.</td>
<td>200 000</td>
<td>140</td>
<td>1</td>
<td>x</td>
</tr>
</tbody>
</table>

#### 2. Improved Heating Efficiency

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving KWh/yr</th>
<th>Payback (yrs)</th>
<th>Carbon Offsets Loans Development Finance OEM ESCo MCEP CIP BI 12I 12L SPII 11D</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Fixed</td>
<td>Addition of internal fuel (biogas) to minimise the amount of external firing of solid fuel required.</td>
<td>20 000</td>
<td>320</td>
<td>0.5</td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td>Fixed</td>
<td>Maintaining a steady rise in temperature through the clean and efficient combustion of fuel. Controlled continuous firing of fuel is preferable to over-firing. For example, install PLC's and PID controllers on firing equipment.</td>
<td>250 000</td>
<td>3 450</td>
<td>1.4</td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>Fixed and Clamp</td>
<td>Optimising of setting pattern such that all combustion air can reach all air ports can result in burning</td>
<td>20 000</td>
<td>1 016</td>
<td>0.1</td>
<td>x</td>
</tr>
<tr>
<td>10</td>
<td>Fixed</td>
<td>Ensure burner dilution air is maintained to a minimum to ignite burners. Use recirculation air instead.</td>
<td>-</td>
<td>500</td>
<td>0.4</td>
<td>x</td>
</tr>
<tr>
<td>11</td>
<td>Fixed</td>
<td>Check exhaust air speed relates with kiln thermal inputs. Ensure fan operates in accordance with fuel input and turns down during push - if it doesn't close, it means air is being sucked into the kiln heating.</td>
<td>-</td>
<td>500</td>
<td>0.4</td>
<td>x</td>
</tr>
</tbody>
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## Energy Saving Options

### 2. Improved Heating Efficiency (continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving KWh/yr</th>
<th>Ton CO2 Saving</th>
<th>Payback (yrs)</th>
<th>Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Fixed</td>
<td>1. Improved Heating Efficiency</td>
<td>1 000 000</td>
<td>833 340</td>
<td>285</td>
<td>x</td>
<td>3.3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>333 335</td>
<td>114</td>
<td>x</td>
<td>x</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>13</td>
<td>Fixed</td>
<td>2. Improved Heating Efficiency</td>
<td>25 000</td>
<td>276 159</td>
<td>251</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>250 000</td>
<td>328 335</td>
<td>58</td>
<td>3</td>
<td>✓</td>
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### 3. Reducing Ingress Air Levels

<table>
<thead>
<tr>
<th>No.</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving KWh/yr</th>
<th>Ton CO2 Saving</th>
<th>Payback (yrs)</th>
<th>Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Fixed</td>
<td>3. Reducing Ingress Air Levels</td>
<td>1 017 697</td>
<td>259</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1 214 732</td>
<td>502</td>
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</table>

### 4. Reducing Temperature of Bricks Leaving Continuous Kiln

<table>
<thead>
<tr>
<th>No.</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving KWh/yr</th>
<th>Ton CO2 Saving</th>
<th>Payback (yrs)</th>
<th>Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Fixed</td>
<td>4. Reducing Temperature of Bricks Leaving Continuous Kiln</td>
<td>260 000</td>
<td>1 833 348</td>
<td>512</td>
<td>0,4</td>
<td>✓</td>
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</table>

### 5. Reducing Heat Loss Through Kiln Structure

<table>
<thead>
<tr>
<th>No.</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR)</th>
<th>Energy Saving KWh/yr</th>
<th>Ton CO2 Saving</th>
<th>Payback (yrs)</th>
<th>Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Fixed</td>
<td>5. Reducing Heat Loss Through Kiln Structure</td>
<td>1 000 000</td>
<td>1 489 734</td>
<td>415</td>
<td>0,7</td>
<td>x</td>
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</table>
### 5. Reducing Heat Loss Through Kiln Structure (continued)

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR) Energy Saving</th>
<th>Payback (Yrs)</th>
<th>Finance Grants</th>
<th>Tax Ded</th>
<th>R&amp;D</th>
<th>Carbon Offsets</th>
<th>Loans</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Fixed</td>
<td>Ensuring all kiln walls and roofs are maintained, well insulated and in good condition.</td>
<td>50 000 500 000 5 000</td>
<td>666 672 229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>24</td>
<td>Fixed</td>
<td>Minimising the time the exhaust damper is left open saving exhaust gases setting in VSBK.</td>
<td>250 000 250 000</td>
<td>1 915 849 857</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>25</td>
<td>Fixed</td>
<td>Fitting exit doors to reduce unwanted additional air on older kilns. Ensure all doors are well sealed and door control management during pushing is effective.</td>
<td>500 000 500 000</td>
<td>3 333 333 333</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>26</td>
<td>Fixed</td>
<td>Reduce air flow into and out of the roof cooling space where it exits to reduce heat loss from the kiln.</td>
<td>250 000 250 000</td>
<td>1 915 849 857</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
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### 6. Heat Recovery

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR) Energy Saving</th>
<th>Payback (Yrs)</th>
<th>Finance Grants</th>
<th>Tax Ded</th>
<th>R&amp;D</th>
<th>Carbon Offsets</th>
<th>Loans</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Fixed</td>
<td>Using heat exchanger in the exhaust to pre-heat HFO to eliminate the electrical heating system.</td>
<td>30 000 30 000</td>
<td>5 350 535 035</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>28</td>
<td>Fixed</td>
<td>Install an exhaust heat exchanger to avoid combustion or for furnace by doors.</td>
<td>2 750 000 2 750 000</td>
<td>5 350 535 035</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>29</td>
<td>Fixed</td>
<td>Use of hot air from the kiln cooling system as preheated combustion air for example roof space and kiln car cooling.</td>
<td>425 000 425 000</td>
<td>1 118 380 380</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
</tbody>
</table>

### 7. Upgrading Kiln Technology

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR) Energy Saving</th>
<th>Payback (Yrs)</th>
<th>Finance Grants</th>
<th>Tax Ded</th>
<th>R&amp;D</th>
<th>Carbon Offsets</th>
<th>Loans</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Fixed</td>
<td>Replace current clamp kiln with a new fixed clamp kiln.</td>
<td>18 000 000 18 000 000</td>
<td>1 915 849 857</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>31</td>
<td>Fixed</td>
<td>Improving metering on fuel consumption.</td>
<td>300 000 300 000</td>
<td>67 000 670 670</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>32</td>
<td>Fixed</td>
<td>Process Optimisation: Operate at higher throughputs at the kiln and higher operational equipment efficiencies.</td>
<td>- - 930 000 930 000</td>
<td>5 350 535 035</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td>33</td>
<td>Fixed</td>
<td>Use of new model forklifts and optimisation of product movement. Business case on two old machines replaced by one new machine.</td>
<td>500 000 500 000</td>
<td>1 915 849 857</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
</tbody>
</table>

### 8. Reducing Moisture Content of Dried Bricks Entering Kiln

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR) Energy Saving</th>
<th>Payback (Yrs)</th>
<th>Finance Grants</th>
<th>Tax Ded</th>
<th>R&amp;D</th>
<th>Carbon Offsets</th>
<th>Loans</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Fixed</td>
<td>Ensure Bricks are fully dried (&lt;2% moisture content) prior to entering the kiln.</td>
<td>- 500 000 500 000</td>
<td>5 350 535 035</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
</tbody>
</table>

### 9. Reducing Temperature of Kiln Cars Leaving Continuous Kilns

<table>
<thead>
<tr>
<th>Nr</th>
<th>Kiln Type</th>
<th>Energy Saving Opportunity</th>
<th>CAPEX (ZAR) Energy Saving</th>
<th>Payback (Yrs)</th>
<th>Finance Grants</th>
<th>Tax Ded</th>
<th>R&amp;D</th>
<th>Carbon Offsets</th>
<th>Loans</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>Fixed</td>
<td>Maintaining kiln car exit in optimum condition through planned or condition based maintenance.</td>
<td>200 000 200 000</td>
<td>1 111 111 111</td>
<td>66 666 666 666</td>
<td>50 000 500 000 5 000</td>
<td>229 229</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
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</tbody>
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### Energy Saving Options

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</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Fixed and Clamp</td>
<td>Improve the internal and external efficiency when using lightweight refractory material, sodium silicate and fly ash from the laboratory prior to incorporation.</td>
<td>900 000</td>
<td>7 541</td>
<td>376</td>
<td>529</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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</tr>
<tr>
<td>37</td>
<td>Fixed and Clamp</td>
<td>Improve the internal and external efficiency when using lightweight refractory material.</td>
<td>600 000</td>
<td>13 167</td>
<td>872</td>
<td>272</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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</tr>
<tr>
<td>38</td>
<td>Fixed and Clamp</td>
<td>Reduce the thermal mass of kiln cars leaving Continuous Kilns.</td>
<td>250 000</td>
<td>634</td>
<td>172</td>
<td>207</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<td></td>
</tr>
<tr>
<td>39</td>
<td>Fixed and Clamp</td>
<td>Use a consistent moisture content through proper stockpiling.</td>
<td>250 000</td>
<td>634</td>
<td>172</td>
<td>207</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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</tr>
<tr>
<td>40</td>
<td>Fixed and Clamp</td>
<td>Use a consistent moisture content through proper stockpiling.</td>
<td>500 000</td>
<td>634</td>
<td>172</td>
<td>207</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<td>49</td>
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**16. Reducing Temperature of Kiln Cars Leaving Continuous Kilns (continued)**

- **No. Kiln**: 12
- **Type of Energy Saving Opportunity**: Low Carbon Alternative Fuels and Materials
- **Energy Saving Opportunity Details**: Addition of waste products (e.g. sewage sludge, paper pulp) that improve workability/extrudability of the column.
- **CAPEX (ZAR)**: 500 000
- **Energy Saving KWh/yr**: 28 889
- **CO2 Saving Ton**: 10
- **Payback Period (yrs)**: 0.3
- **Finance**: Yes
- **Grants**: Yes
- **Tax Ded**: No
- **R&D**: Yes
- **Carbon Offsets**: No
- **Loans**: Yes
- **Development Finance**: Yes
- **OEM**: No
- **ESCo**: Yes
- **MCEP**: No
- **CIP**: No
- **BI**: No
- **12I**: No
- **12L**: No
- **SPII**: No
- **11D**: No

**17. Power**

- **No. Kiln**: 47
- **Type of Energy Saving Opportunity**: Maximum Demand Management through implementation of real time measurement and monitoring system to control to near demand charges.
- **CAPEX (ZAR)**: 15 000
- **Energy Saving KWh/yr**: -
- **CO2 Saving Ton**: -
- **Payback Period (yrs)**: 0.3
- **Finance**: Yes
- **Grants**: Yes
- **Tax Ded**: No
- **R&D**: Yes
- **Carbon Offsets**: No
- **Loans**: Yes
- **Development Finance**: Yes
- **OEM**: No
- **ESCo**: Yes
- **MCEP**: No
- **CIP**: No
- **BI**: No
- **12I**: No
- **12L**: No
- **SPII**: No
- **11D**: No

**18. Power**

- **No. Kiln**: 48
- **Type of Energy Saving Opportunity**: Substrate & phased switch off of plant when production ceases.
- **CAPEX (ZAR)**: 200 000
- **Energy Saving KWh/yr**: 185 698
- **CO2 Saving Ton**: 150
- **Payback Period (yrs)**: 1.3
- **Finance**: Yes
- **Grants**: Yes
- **Tax Ded**: No
- **R&D**: Yes
- **Carbon Offsets**: No
- **Loans**: Yes
- **Development Finance**: Yes
- **OEM**: No
- **ESCo**: Yes
- **MCEP**: No
- **CIP**: No
- **BI**: No
- **12I**: No
- **12L**: No
- **SPII**: No
- **11D**: No
### Energy Saving Options

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