



Clay Brick Sector Energy Efficiency Finance Guide

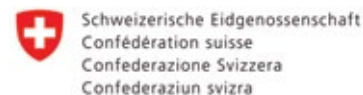
A Guide to Finance Solutions for Energy Efficiency in Clay Brick Manufacturing

This study was undertaken by Clay Brick Association -
representing the brick makers that participated and contributed to the development of
the guidelines, and who should ultimately take ownership of the guidelines.

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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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Executive Summary

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 finance. The objective is to provide brick manufacturers with the confidence and understanding to successfully apply for funding for their energy efficiency projects.

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.

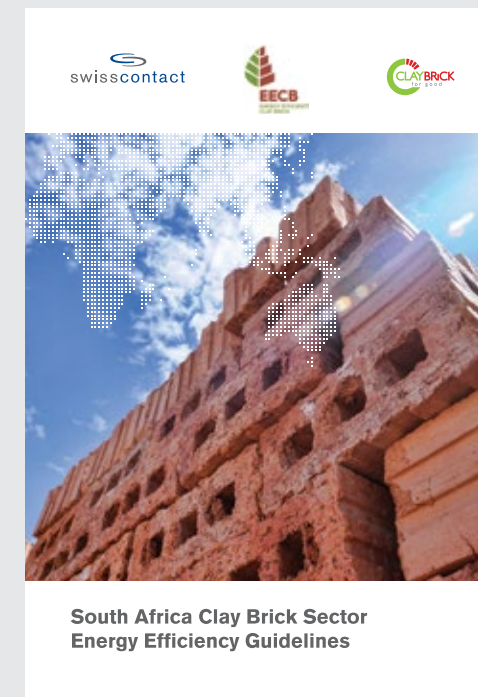
Specifically, this guide aims to help clay brick companies better understand the financial options available to them. It provides specific business case examples and includes information on how to build a business case to substantiate applications for finance to cover or reduce the cost of energy efficiency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

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.

The guideline is available from:
<http://www.claybrick.org>



“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



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



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.

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

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.



How to Use this Guide

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.

In the next section of this guide, the finance options for the top 10 business case examples from the SA Clay Brick Sector Energy Efficiency Guide will be discussed in detail. Each business case example is evaluated against the eligibility criteria for the different finance options available. The objective is to provide some direction regarding which options may be feasible and can be explored in more depth going forward. Whilst the table provides a high level introduction to the funding options, a full treatment of the finance options can be found later in this guide. The finance options have been grouped into their respective categories as follows:

Finance	Asset-Based Finance	This is a method of obtaining a loan for working capital from a financial institution against collateral security of real estate, or equipment or machinery.
	Non-Asset Based Finance	This is a method of obtaining a loan for working capital from a financial institution not against collateral security, sometimes called unsecured lending.
	Corporate Development Funds	Some companies provide grants or loans in order to further develop or 'green' their supply chain.
	Original Equipment Manufactures (OEM)	Original Equipment Manufacturers may offer finance to their customers.
	Energy Services Companies (ESCOs)	Energy Service Companies provide finance through Energy Performance Contracting Arrangements.
Grants	Manufacturing Competitiveness Enhancement Programme (MCEP)	A large scale grant programme designed to promote manufacturing competitiveness and job creation.
	Critical Infrastructure Programme (CIP)	A grant programme to support critical infrastructure supporting manufacturing investment projects.
	Black Industrialist Scheme (BIS)	A grant programme dedicated to growth and global competitiveness of Black owned business.
Tax Incentives	Section 12I Tax Allowance Incentive	Tax deduction allowance designed to support new industrial investments or upgrades and expansions.
	Section 12L Energy Efficiency Incentive	Tax deduction allowance for energy efficiency projects.
Research and Development	Support Programme for Industrial Innovation (SPII)	A grant designed to promote technology development through financial assistance for the development of innovative products and/or processes.
	Section 11D	Tax deduction allowance for expenditure directly for research and development.
Carbon Offsets	Tradeable certificates which can be sold on the market representing a tonne of carbon dioxide equivalent reduced through an emission reduction project.	

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. sewerage 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.

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

Matrix for 10 Business Cases

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

✓

 Easy to access, no qualifying criteria

✓

 Subject to meeting specific criteria

✗

 Not applicable to this project

Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving (kWh/yr)	Ton CO ₂ Saving	Payback (yrs)	Finance				Grants			Tax Deduction		R&D		Carbon Offsets
						Loans	Development Finance	OEM	ESCo	MCEP	CIP	BI	12I	12L	SPII	11D	
Fixed and Clamp	Replace the current clamp kiln with a fixed kiln (e.g. VSBK, tunnel kiln, etc.)	18 000 000	70 000 056	24 700	2.30	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗	✗	✓
Fixed and Clamp	Addition of waste products (e.g. sewerage sludge or paper pulp).	500 000	1 541 679	529	1.1	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✗
Fixed	Controlled and efficient combustion of fuel: installation of PLC & PID controllers for steady rise in temperature.	1 000 000	3 333 336	3 433	0.7	✓	✓	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗
Fixed and Clamp	Use of recent model mobile plant and moving machinery: two old machines replaced by one new machine.	920 000	425 000	438	-	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗
Fixed and Clamp	Increased perforation size of extruded bricks to 10%.	1 000 000	833 340	286	3.3	✓	✓	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗

Matrix for 10 Business Cases

Business Case

✓

 Easy to access, no qualifying criteria

✓

 Subject to meeting specific criteria

✗

 Not applicable to this project

Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving (kWh/yr)	Ton CO ₂ Saving	Payback (Years)												Carbon Offsets
						Loans	Development Finance	OEM	ESCo	MCEP	CIP	BI	12I	12L	SPII	11D	
Fixed	Refurbishment of 91 cars at R57 000 per kiln car.	5 160 000	4 166 670	1 100	3.7	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✗
Fixed	Utilising vented hot clean air at 100°C as preheated combustion air.	500 000	555 556	140	2.5	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗
Fixed and Clamp	Convert air movement fan motors to VSDs or fit separate VSDs.	500 000	69 445	63	-	✓	✓	✓	✓	✓	✗	✗	✗	✓	✗	✗	✗
Fixed and Clamp	Implementing an Energy Management System.	100 000	Dependent on energy savings			✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Fixed and Clamp	2 100 kW compressors after system optimisation.	522 000	566 116	510	0.2	✓	✓	✓	✓	✓	✗	✗	✗	✓	✗	✗	✗

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	Replace current clamp kiln with fixed kiln type (e.G. VSBK, zig-zag, TVA or tunnel kiln etc.)	Difficult	R18 000 000	70 000 056	24 700	2.3

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.).

The choice of the kiln is subjective and dependent on many factors such as projected output, the type of product to be produced (e.g. face bricks or plaster bricks) and the availability of skilled staff. Costs for new kilns can vary significantly, but small kiln types can be R1 million and Tunnel Kilns can be up to R30 million or higher.

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.

Business Case Example 1

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✗

Not applicable to this project

Grant or Incentive	Application to Business Case 1: Replace Current Clamp Kiln with a Fixed Kiln	
Loans	A project of this size will undoubtedly need financing of some sort, with this being the most likely source. Financial institutions offer various products for 'green' or energy efficiency projects, and some, such as Nedbank, have previously financed this type of project as asset-based finance. Other loans, such as the Green Energy Efficiency Fund or Evolution One Fund, would also qualify. Refer to the section on finance through financial institutions for more information.	
Corporate Development Funds	This project may qualify for development finance, subject to meeting the criteria required by the institution. Note that these vary according to institution but can include requirements such as being an SMME, or having >50% black/women ownership. Another element to consider is that in order to be eligible, your company should form part of the supply chain of the company whose fund you're applying to.	
ESCos or OEMs	OEM	It is very likely that the installation of a new kiln will require design and commissioning by the original equipment supplier. OEM may therefore offer finance to companies as well as energy performance based contracts and so should be considered for this project.
	ESCO	Due to the project being a process modification, it is unlikely for ESCos to be involved.
Government Grants	MCEP	A large scale grant programme, MCEP could be a good place to start for this kind of project. Note however that MCEP requires a minimum Level 4 B-BBEE status.
	CIP	As this project does not include the installation of critical infrastructure, it does not qualify.
	Black Industrialist	Although the capex in this case is sub R30 million, a kiln installation could rapidly exceed this in other circumstances. If the project investment does become larger than R30 million and the Black Ownership is >51% it may possibly qualify for this programme.
Tax Incentives	S12I	If the project investment is larger than R30 million, it may be possible to qualify.
	S12L	This project results in significant energy savings and so should qualify under section 12L. The potential tax saving from this project is R18 million. For more information on S12L, refer to the detailed slides on S12L.
Research and Development	SPII	This is not a new technology demonstration project, so no research and development is involved.
	S11D	
Carbon Offsets	It would be possible to develop a carbon offset project. Although currently this process is very complex, we have estimated that it would be possible to generate up to R7 million in carbon revenue over 10 years. Refer to the detailed section on carbon offsetting.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	Addition of waste products (e.g. sewerage sludge, paper pulp)	Moderate/Difficult	R500 000	1 541 679	27	1.3

Description

The addition of waste products (e.g. sludge from a sewerage 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 die 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.

If research and development is required, the project may potentially qualify for Research and Development funding.

Business Case Example 2

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✗

Not applicable to this project

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.	
ESCOs or OEMs	OEM	Adding waste material to a kiln may require some kiln modifications which will require the expertise of OES. OES 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	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 it to qualify if it meets the criteria.
	CIP	The capital investment is too low to qualify under this programme.
	BI	
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 slide on S12L for the requirements to qualify.
Research and Development	SPII	It is likely that the project or requires trials and testing and it may be possible to qualify, but requires min Level 4 B-BBEE status. Please refer to the detailed slides on finance through research and development.
	11D	It is likely that the project requires trials and testing and therefore it may possibly qualify for R&D. Please see detailed slides on S11D.
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.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed	Controlled and efficient combustion of fuel	Easy	R1 000 000	3 333 336	1 143	7 months

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 CO₂e 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.

Business Case Example 3

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

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 low pay back 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 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.	
ESCoS or OEMs	OEM	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	MCEP	Under this project, the capital investment may be too low for the MCEP and CIP 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 the criteria.
	CIP	The capital investment is too low to qualify under this programme.
	BI	
Tax Incentives	12I	The capital investment is too low to qualify under this programme.
	12L	The project results in significant energy savings and would qualify under section 12L. The potential tax saving from this project is approximately R800 000, which may be worthwhile pursuing. For more information, please see the detailed slides on S12L.
Research and Development	SPII	The project does not include research and development.
	11D	
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 c.R350 000, which may be too low to outweigh the costs to develop a carbon offset project.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	One new machine replaced two old machines	Moderate	R920 000 *	425 000	438	1.7

Description

Current generation mobile equipment or plant (more specifically forklifts or frontend 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 fulfil the duty of two old generation rough terrain forklifts, each with a lifting capacity of around three tons.

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.
- Frontend loader with a standard 2.3m² 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.

**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.*

Business Case Example 4

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

Grant or Incentive	Application to Business Case 4: Use of Recent Model Mobile Plant	
Loans	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 SMME 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	OEM	It may be possible to finance the equipment from Original Equipment Manufacturers.
	ESCO	It is not likely that an ESCo would facilitate the financing of plant equipment.
Government Grants	MCEP	Under this project, it may be possible to qualify for an MCEP grant. This grants 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.
	CIP	The capital investment is too low to qualify under this programme.
	BI	
Tax Incentives	12I	If the project investment is larger than R30 million it may be possibly to qualify.
	12L	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	SPII	There is no research and development undertaken in this project.
	11D	
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.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	Increase perforation size of extruded bricks from 25% to 40%	Difficult	R1 000 000 *	833 340	286	3.3

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.

There may be significant variability in the capital investment in this type of project as it will depend on the type of extruder equipment purchased as well as the number of extruders.

**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

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

Grant or Incentive	Application to Business Case 5: Increase Perforation Size of Extruded Bricks	
Loans	There is certainly scope for finance in this type of project. Whilst the project payback period is just over three years, the fact that it includes the purchasing of equipment means it may be possible to qualify for asset based finance. 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 SMME 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	OEM	It may be possible for the suppliers of extruders to offer finance, but this would be dependent on the manufacturer.
	ESCO	This project includes the installation of new equipment and it is unlikely for an ESCo to be involved in this type of project.
Government Grants	MCEP	Under this project, it may be possible to qualify for an MCEP grant. This grants requires a minimum Level 4 B-BBEE status. If the project is grouped with numerous other projects it may be possible for it 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.
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 deduction benefit is around R220 000, and therefore may be worthwhile pursuing. Please see the detailed slides on page for the requirements for S12L.
Research and Development	SPII	It is unlikely that the project would require research and development as it includes the purchase of the machines only.
	11D	
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.	

Business Case 6: Reduction of the Thermal Mass of Kiln Car Decks using Lightweight Refractory or Fibre

Business Cases

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed	Refurbishment of 91 cars at R57 000 per kiln car	Moderate	R5 160 000	4 166 670	1 100	3.7

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.

- 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.

The refurbishment of kiln cars may include redesign of kiln car decks in order to incorporate the use of lighter weight materials or some research and development or testing of lightweight insulation materials.

Business Case 6: Reduction of the Thermal Mass of Kiln Car Decks using Lightweight Refractory or Fibre

Business Cases

Business Case Example 6

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

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.	
	As the project is over R1 million, the project may qualify for the Green Energy Efficiency Fund.	
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.	
ESCos or OEMs	OEM	The supplier of the kiln cars may be able to offer some sort of finance
	ESCo	As this is a process modification, it is unlikely for an ESCo to be involved in this type of project.
Government Grants	MCEP	Under this project, it may be possible to 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 for it 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.
Tax Incentives	12I	The capital investment is too low to qualify under this programme.
	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 S12L.
Research and Development	SPII	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 SPII for the requirements for SPII.
	11D	See above, and the detailed slides on 11D.
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.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed	Utilising vented hot clean air at 100°C as preheated combustion air	Moderate	R500 000 *	555 556	140	2.5

Description

All kilns have exhausts and through these, the products of combustion and other emissions are emitted to the atmosphere. These gases are hot and can carry away a large amount of useful heat, in some cases as much as 1MJ/kg. If some of this heat could be cost effectively recovered, it could be used as a virtually free source of heat.

Kilns (tunnel kilns in particular) may also have other sources of waste heat that can be recovered, such as vented hot air from under car or roof cooling systems.

**In this example, specifically referring to Section 6.3.7 in the SA Clay Brick Energy Efficiency Guideline, we have chosen the vented hot clean air example and the total capital investment cost of R500 000.*

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.

Business Case Example 7

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

Grant or Incentive	Application to Business Case 7: Waste Heat Recovery	
Loans	Although the capital investment for this project is not high, the payback period is less than three years and therefore may be able to qualify for 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 SMME 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	OEM	This type of project requires modifications to the process which will require the expertise of OEMs.
	ESCO	As this is a process modification, it is unlikely for an ESCo to be involved in this type of project.
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 it 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, although in heat recovery projects which require more investment, then this may be a source worth considering.
Tax Incentives	12I	The capital investment is too low to qualify under this programme, although in heat recovery projects which require more investment, this may be a source worth considering.
	12L	The project results in energy savings and would qualify under section 12L, but in this example the overall tax benefit from the savings is too low and not worthwhile pursuing to cover the costs to access the incentive.
Research and Development	SPII	The project does not require research and development.
	11D	
Carbon Offsets	It would be possible to develop a carbon offset project, however the benefit from carbon offsets may too low and not worthwhile pursuing to justify the project development costs.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	Convert air movement fan motors to VSDs or fit separate VSDs	Easy	50kW = R140,000 100kW = R300 000 200kW = R600 000	555 556	140	2.5

Description

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.

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%.

**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).*

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

Business Case Example 8

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

Grant or Incentive	Application to Business Case 8: Installation of Variable Speed Drives	
Loans	With low capital investment and a very short payback period, this is quite a low risk project, and therefore it may 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, this 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.	
ESCos or OEMs	OEM	If the VSDs are purchased directly from Original Equipment Manufacturers, they may offer finance to companies as well as energy performance based contracts.
	ESCO	ESCos can be contracted to implement this type of project and can potentially finance the installations through either a finance arrangement, or through Energy Performance Contract Agreements (i.e. share of savings).
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 it to qualify, if it meets the criteria.
	CIP	The project does not include the installation of critical infrastructure.
	BI	The project investment is too low to qualify under this programme.
Tax Incentives	12I	As the project is quite small, it is unlikely to qualify for 12I. It may be that a large scale retrofit of a number of VSDs might push the capital requirement up, and if the project investment is larger than R30 million it may be possibly to qualify.
	12L	Depending on the volume of energy savings (dependent on the size of the retrofit), the project may qualify for S12L. The total energy savings for each project will need to be determined in order to assess whether it will be worthwhile pursuing S12L, as there are costs to access this incentive. Please see detailed section on S12L.
Research and Development	SPII 11D	The project does not include research and development.
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 9: Implementation of an Energy Management System

Business Cases

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/ annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	Implementing an Energy Management System	Easy	R100 000	Dependant on Energy Saving Measures Implemented		

Description

Energy management is an important aspect of manufacturing management. The objective is to deliver the highest value to the business for each unit of heat and power used. In brickmaking, this means manufacturing saleable products with the lowest specific energy consumption (SEC) possible.

For organisations that are used to managing resources such as labour, materials, output levels and quality, managing energy consumption is a simple case of incorporating it as a controllable variable cost into the production performance report.

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.

Business Case 9: Implementation of an Energy Management System

Business Cases

Business Case Example 9

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

Grant or Incentive	Application to Business Case 9: Implementation of an Energy Management System	
Loans	It is unlikely that this type of project will qualify for a loan as it includes the implementation of a management system.	
Corporate Development Funds	It is unlikely that this type of project will qualify for development finance as it includes the implementation of a management system.	
ESCOs or OEMs	OEM	This project does not include the services of original equipment manufacturers.
	ESCO	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	MCEP	This type of project would not qualify for a grant.
	CIP	
	BI	
Tax Incentives	12I	The capital investment is too low to qualify under this programme.
	12L	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	SPII	The project does not include research and development.
	11D	
Carbon Offsets	This type of project would not qualify for carbon offsets directly.	

Project Details						
Kiln Type	Energy Saving Opportunity	Ease of Implementation	Capex (Rand)	Energy Saving (kWh/ annum)	CO ₂ Saving (t/yr)	Payback (Years)
Fixed and Clamp	2 100 kW compressors after system optimisation	Easy	R522 000 *	566 116	510	0.2

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.

Compressors can be powered by electricity or by a diesel engine, of which the most common types used are the reciprocating engine and the screw compressor. Screw compressors tend to be more efficient and better at delivering higher volumes but reciprocating engines are capable of achieving higher pressures and are readily available with diesel power when power is not available on site or portability is important.

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 Contact 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).*

Business Case Example 10

✓

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 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.	
ESCos or OEMs	OEM	If the VSDs are purchased directly from Original Equipment Manufactures, they may offer finance to companies as well as energy performance based contracts.
	ESCO	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.
	CIP	This project does not include the installation of critical infrastructure.
	BI	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	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 pursuing.
Research and Development	SPII 11D	The project does not include research and development.
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 Option	Included Sectors	Excluded Sectors	Company Size	Project Size
Funding through Loans				
Green Energy Efficiency Fund	All	None	Medium and Large	Medium and Large
Sasfin	All	None	Small and Medium	Small and Medium
Mercantile Bank		Activities which harm the environment are considered immoral such as tobacco and casinos	All	All
Investec	All	None	Medium and Large	All
Nedbank	All	None	All	All
Absa/Barclays Bank	All	None	All	All
First National Bank	All	None	All	All
Standard Bank	All	None	All	All
Funding through Corporate Development Funds				
Anglo American Green Fund	All	None	Small and Medium	Small and Medium
Evolution One Fund	All	None	Small and Medium	Large
SCF Capital Solutions	All	None	All	All
Massmart Supplier Development Fund	All	None	Small and Medium	Small and Medium
Funding through Energy Service Companies or Original Equipment Manufacturers				
ESCos	All	None	Medium and Large	Medium and Large
OEM	All	None	Medium and Large	Medium and Large

List of Available Funding

Funding Option	Included Sectors	Excluded Sectors	Company Size	Project Size
Funding through Cash Grants				
Manufacturing Competitiveness Enhancement Programme (MCEP)	Manufacturers, engineering companies and conformity assessment companies	Higher hurdles for other industries such as paper and pulp, petroleum refineries, nuclear fuel, basic chemicals, basic precious and non ferrous metals	All	Medium and Large
Critical Infrastructure Programme (CIP)	Manufacturing and Mining	Retail and Housing	Large	Large
Black Industrialist Scheme	Manufacturing		Medium & Large	Medium & Large
Eskom Integrated Demand Management (IDM)	All	None	Medium & Large	Medium & Large
Renewable Energy and Energy Efficiency Partnership (REEEP)	Varies depending on funding window	This focuses on cutting edge technology	Medium & Large	Medium & Large
The Green Fund	Varies depending on funding window	Varies depending on funding window	Large	Large
Funding through Tax Deductions				
12L of Income Tax Act (Section 12L)	Most companies	Energy generated from renewable sources and cogeneration other than waste heat recovery - minimum size for captive power plants	Large	Large
12I of Income Tax Act (Section 12I)	Manufacturers	Alcohol, tobacco, arms and ammunition, biofuels, if it impacts food security	Large	Large
Funding through Research and Development				
Support Programme for Industrial Innovation (SPII)	Manufacturing or related industrial fields and software	Military projects and projects limited due to licensed technology	Medium and Large	All
11D of the Income Tax Act	All Industries	Oil & gas exploration, financial instruments and products	Medium & Large	Medium & Large
FUNDING THROUGH CARBON CREDITS				
Carbon Credits	Most Industries	Industries which don't have a methodology	Large	Large

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.

Be sure to ask your commercial bank about the Green Products on offer for Energy Efficiency Projects

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.

Benefit

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.

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: callcentre@idc.co.za
Telephone : 011 269 3000
Website: www.idc.co.za/development-funds/geef

Coverage	Small	Medium	Large
Company		X	X
Project size		X	X

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

Ease of Access:



Sasfin

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

This credit line was complimented by the Climate Change Investment Programme in Africa (CIPA), an advisory program of the International Finance Corporation (IFC), financed by the Swiss State Secretariat for Economic Affairs (SECO).

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; chillers; compressors; pumps; IT equipment, including servers, desktops, laptops, printers, scanners; water heating, including heat pumps, solar and gas; manufacturing equipment; and finally, materials handling equipment.

Contact Details

Candice Pretorius
Regional Manager
Capital and Specialised Equipment Finance
Tel: 011 809 7681, Tel: 011 809 7500,
candice.pretorius@sasfin.com

Ease of Access:



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.

Contact Details

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

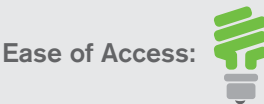


Mercantile Bank

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

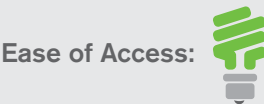


Investec

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

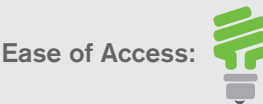


Absa

Absa is one of South Africa's top four banks. Together with the AFD, 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

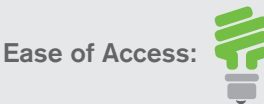


Standard Bank

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: rentia.vantonder@standardbank.co.za
Switchboard: 086 123 000 / 0860 123 108

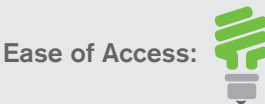


FNB

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 1-5 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



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.

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

Coverage	Small	Medium	Large
Company	X	X	
Project size	X	X	

Ease of Access:



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	Small	Medium	Large
Company	X	X	
Project size	X	X	

Ease of Access:



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

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.

Requirements

- Projects should ideally be focused on environmental sustainability within the Anglo American value chain
- Projects must be at bankability stage
- Projects should contribute to transformation, job creation and community involvement
- Projects must support the objectives of black economic empowerment

Contact Details

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

Coverage	Small	Medium	Large
Company	X	X	
Project size	X	X	



Coverage	Small	Medium	Large
Company		X	X
Project size		X	X

Contact Details

Ground Floor, 82 Maude Street Sandton, Gauteng 2149, South Africa.
Contact: Christopher Clarke
Tel: 082 496 0522
Email: chris@inspiredevolution.co.za



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.

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

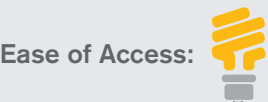
For clay brick makers, a number of original equipment suppliers exists, for example:

- 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

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

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.

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



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.

EPCs are almost always provided by ESCOs, or energy service companies, also known as 'Contract Energy Management Companies' or 'Energy Management Companies'. ESCOs are companies which provide a range of energy services, ranging from simple identification, to supply, installation, and operation of assets.

In some cases, ESCOs may even supply energy (e.g. providing heat and electricity through a CHP engine).

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

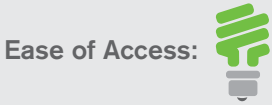
The measures installed under performance contracts may be financed either by the business itself, or more often as a loan from a financial institution (bank) or by the performance contractor itself.

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.

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.



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

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 limited to R8 million for manufacturing enterprises and to R1 million for conformity assessments.

Maximum and Minimum Grant

Despite the amounts detailed in the individual components, there is a cap for applicants. The maximum grant payable by the MCEP is calculated as a percentage of the applicant's average manufacturing value add (MVA) over the prior two years. The minimum grant is R1 million.

The MVA is equivalent to gross profit, and is calculated by taking sales or turnover, and then deducting the sales value of imported goods, the sales value of other bought in finished goods, and material input costs used in the manufacturing (salaries or wages for service enterprises).

The grant is capped on the basis of the applicant's historical asset cost (HAC). Applicants with a historical asset cost (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.

Requirements

The programme is administered by the dti. One application is allowed in each two year period, and applicants must have a level-4 B-BBEE contributor status.

An application with the required supporting documentation must be submitted to the dti 60 days before the start of activities. An adjudication board will consider the application. The first claim must be submitted to the dti within six months of the start of production or of activities for which support was requested.

The MCEP is accessible to SA registered manufacturers, engineering services that support manufacturing, and to conformity assessment bodies that service the manufacturing sector.

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
Te: 012 394 1258

The MCEP offers a cost-sharing grant for capital investment and investment in green technology and resource efficiency improvement.

Project that would typically qualify for MCEP includes energy efficiency projects with a capital investment higher than R500 000. This may include for example the equipment to increase the perforation size of bricks, installation of a heat exchanger for heat recovery, installation of variable speed drives on motors.

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	Small	Medium	Large
Company			X
Project size			X



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.

The BIS offers support on a cost-sharing basis towards:

- Capital Investment costs
- Feasibility studies towards a bankable business plan (max of 3% of projected investment project cost)
- Post-investment support (max of R500 000);
- Business development services (max of R2 million)

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

- Makes long-term commitment to the business and is a medium-to long-term investor

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.



Coverage	Small	Medium	Large
Company			X
Project size			X



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.

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.

Contact Details

Tel: 086 003 7566
Email: csonline@eskom.co.za
Website: <http://www.eskom.co.za>

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.

Coverage	Small	Medium	Large
Company			X
Project size			X



South Africa’s Department of Environmental Affairs (DEA) initiated the Green Fund (the Fund) in 2012. The Development Bank of Southern Africa, which is a state owned development finance institution mainly focusing on large infrastructure projects, manages the Fund on behalf of the DEA. Excluded and included sectors vary, depending on the funding window. It provides catalytic finance for investment to support South Africa’s transition to a green economy. Funding takes the form of grants, loans or equity.

The fund aims to promote the development of the green economy by:

- Promoting innovative and high-impact green programmes and projects
- Reinforcing climate and sustainable development policy objectives through green interventions
- Building an evidence base for the expansion of the green economy

- Attracting additional resources to support South Africa’s green economy development.

Benefit

Funding for initiatives which promote a green economy.

Requirements

The Fund has three funding areas which reflect national policy priorities and focus on sectors with high potential. The focus areas and eligibility criteria differ for each.

- Green Cities and Towns: focus areas include the greening of municipal infrastructure, sustainable built environment and integrated planning for climate-resilient cities.
- Low Carbon Economy: including cleaner production, energy efficiency, renewable energy and alternative fuels.

- Environmental and Natural Resource Management: focusing on investment in ecosystem services, land use management and rural adaptation models.

Did you know?

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

Funding opportunities have been made available through public requests for proposals. Two public calls have already happened. The website should be monitored for any future calls. In addition, the Fund also actively seeks out and supports initiatives which meet its selection criteria.

Cost to Access

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

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

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.

Coverage	Small	Medium	Large
Company			X
Project size			X



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.

NB: The application process can be a challenge, as you will be competing for support against other applicants, which reduces the chances of success.

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.

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

Coverage	Small	Medium	Large
Company		X	X
Project size		X	X

Ease of Access:



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.



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.saneditax.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

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

- 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.

Coverage	Small	Medium	Large
Company		X	X
Project size		X	X



Ease of Access:

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.

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

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 end. 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.

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

Department of Trade and Industry
Andre Potgieter
Email: Andre@thedti.gov.za
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 brownfields 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 R30 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.



Coverage	Small	Medium	Large
Company			X
Project size			X



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.



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.



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

Contact Details

Sathiya Arumugasamy / Moshiane Maseko
Tel: 012 394 5953 / 1811
Email: spiienquiries@thedti.gov.za

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.

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



Ease of Access:

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.

Benefit

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.

Contact Details

The Department of Science and Technology
Dimakato Mokone
E-mail: dimakatso.mokone@dst.gov.za
Email: tax@dst.gov.za
Tel: 012 843 6300

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.

Coverage	Small	Medium	Large
Company		X	X
Project size		X	X



Ease of Access:

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 and renewable energy through carbon credits, which can be traded on the carbon markets. Funding is based on greenhouse gas emission reductions achieved after the project has been implemented and is operational. The credits can be sold before they are issued, or forward sold, to fund the capital requirements of the project.

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.

SA participates in the **compliance market** through the Clean Development Mechanism (CDM) which was established to allow developing countries to implement emission reduction projects.

These projects can be funded through the sale of carbon credits to developed

countries. Developed countries that are subject to legislation limiting their greenhouse gas emissions, can purchase carbon credits as a means of meeting their legal obligations. The CDM is administered by the United Nations Framework Convention on Climate Change (UNFCCC).

The carbon price was around 0.40 Euro cents per credit when this was written. This meant that one carbon credit was worth about R7 - depending on the project type, when it was sold, and the buyer. One carbon credit is equivalent to reducing electricity consumption by approximately 1MWh.

The Department of Environmental Affairs will be publishing regulations for carbon offsets in the near future, and these will provide more clarity on how companies can use offsets in order to reduce their carbon tax liability.

Requirements

In the development of a carbon project, those running eligible projects must follow the following process:

First assess if the project qualifies and if there is a methodology available which will allow for the development of the project. This incentive is applicable to large companies and very large projects.

A carbon credit project must:

- Result in real, permanent and measurable reductions in emissions.
- Reduce emissions below a baseline. The methodology typically guides the company in terms of what the baseline should be. Setting the baseline can be complex.
- Only be viable with the revenue from the carbon credits. This is termed 'additionality'. The project is additional in that it would not have happened without the carbon credits.

The demonstration of additionality is complex, and it is the main reason why projects are rejected.

The costs of accessing carbon credits projects include:

- Completion of the application form
- Paying the auditor to assess the application form
- 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.

Contact Details

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

Standard Bank: Rentia van Tonder, CIB
Email: rentia.vantonder@standardbank.co.za
Switchboard: 011 721 9000

To find out more about the CDM:

www.cdm.unfccc.int/

To find out more about the VCS:

www.v-c-s.org/

To find out more about how South Africa participates in the carbon markets:

www.energy.gov.za

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

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.

Brick manufacturers have typically found it difficult to access finance for the implementation of new energy saving technologies, partially as a result of perceived riskiness. This is compounded by the fact that your project might be unfamiliar territory, somewhat technical, and may be relatively small in scale. The advice which follows should help you to build a successful business case.

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?”

A more detailed guide to the development of a business case is available from the Private Sector Energy Efficiency Programme website: http://www.psee.org.za/downloads/publications/Making_the_business_case.pdf

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

Just as Important as What you Present is How you Present it

Structuring the written proposal well is important. You should present a concise, clear proposal culminating in a single request. It should be supported by an appropriate analysis of the costs, benefits, risks and implementation timetable.

Watch your Language

Inconsiderate use of jargon, acronyms and specialist technical terminology is one of the main reasons for proposals being rejected. So, when framing your written proposal, be careful to define or explain any specialist technical terms that you use. Better still, avoid using them if they are not essential to the argument.

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 ('asset' or '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.

Typical pitfalls:

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

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.

Your business case must also identify potential risks and how you plan to contain them.

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.

Identify Possible Risks

Energy saving projects entail a high level of perceived risk. Your business case must identify and discuss all the possible risks to show that they have been considered and are containable or controllable.

Technical 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.

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.

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



✓ Easy to access, no qualifying criteria

✓ Subject to meeting specific criteria

✗ Not applicable to this project

Nr	Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving KWh/yr	Ton CO ₂ Saving	Payback (yrs)	Loans	Development Finance	OEM	ESCo	MCEP	CIP	BI	12I	12L	SPII	11D	Carbon Offsets
1. Improving Combustion Efficiency																		
1	Clamp	Ensure that fuel is evenly distributed within the firebox as well as the skinkel layers. Use firing channels to ensure efficient combustion for lighting and controlling airflow into the clamp once firing is underway.	10 000	916 674	314	0,1	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
2	Fixed and Clamp	Use best quality coal available locally with consistent calorific value and particle size within firing system.	10 000	1 333 344	457	0,1	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
3	Fixed	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.	50 000	1 750 014	600	0,2	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
4	Fixed	Optimise pulse time, droplet size in oil burners - optimisation of oil burners. Fuel oil saving.	1 000 000	2 083 350	582	1,4	✓	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗
5	Fixed	Carry out daily checks on kiln burners to ensure complete combustion at point of entry.		500 004	171	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
6	Fixed	Measurement of kiln oxygen profile and use it to adjust the burner air, kiln draft and rapid cooling.	200 000	500 004	140	1	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗

✓ Easy to access, no qualifying criteria

✓ Subject to meeting specific criteria

✗ Not applicable to this project

Nr	Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving KWh/yr	Ton CO ₂ Saving	Payback (yrs)	Finance				Grants			Tax Ded		R&D		Carbon Offsets
							Loans	Development Finance	OEM	ESCo	MCEP	CIP	BI	12I	12L	SPII	11D	
2. Improved Heating Efficiency																		
7	Fixed	Addition of internal fuel (carbon) to minimise the amount of external firing of solid fuel required.	20 000	833 340	286	-	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
8	Fixed	Maintaining a steady rise in temperature through the clean and efficient combustion of fuel. Controlled continuous firing of kiln is preferable to over-fuelling. For example, install PLCs and PID controllers on firing equipment.	250 000	3 333 360	1 143	1	✓	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗
9	Fixed and Clamp	Optimising of setting pattern such that all combustion air can reach all fuel an hot gases can reach bricks.	20 000	1 166 676	400	0,10	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
10	Fixed	Ensure burner dilution air is maintained to a minimum on dryer burners. Use recirculation air instead.	-	500 004	140	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
11	Fixed	Check exhaust fan speed reduces with kiln thermal input, i.e. exhaust fan modulates in accordance with fuel input and closes down during push - if it doesn't close, it means cold air is being pulled into the kiln wasting heat.	-	500 004	450	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

✓

Easy to access, no qualifying criteria

✓

Subject to meeting specific criteria

✕

Not applicable to this project

Nr	Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving KWh/yr	Ton CO ₂ Saving	Payback (yrs)	Finance				Grants			Tax Ded		R&D		Carbon Offsets
							Loans	Development Finance	OEM	ESCO	MCEP	CIP	BI	12I	12L	SPII	11D	
2. Improved Heating Efficiency <i>(continued)</i>																		
12	Fixed and Clamp	Increasing perforation size of extruded bricks consistent with local standards to reduce firing energy requirements and improve air flow. Best practice example is increase from 25% - 40%.	1 000 000	833 340	286	3,3	✓	✓	✓	✕	✓	✕	✕	✕	✓	✕	✕	✕
13	Fixed	Ensure that good seals exist in the preheat section on TVA/Hoffman type kilns and is as air tight as possible. Best practice example assumes 10% of exhaust is from cold air, through the preheat exchange by 20°C.	-	333 336	114	-	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
14	Fixed	Increase recirculation rates in the dryers where possible.	25 000	279 169	251	-	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
15	Fixed	Use of high velocity recirculation (e.g. cones) in the dryer to improve heat distribution in chamber dryers.	250 000	208 335	58	3	✓	✓	✓	✓	✕	✕	✕	✕	✕	✕	✕	✕
3. Reducing Ingress Air Levels																		
16		Reduce exhaust fan speed by 10% to reduce heat loss through exhaust.	-	978 897	209	-	✕	✕	✕	✕	✕	✕	✕	✕	✓	✕	✕	✕
17		Reduce Kiln airflow levels by switching off contravec fans and reducing input of low pressure contravec fans where brick exit temp is already low.	-	1 224 732	502	-	✕	✕	✕	✕	✕	✕	✕	✕	✓	✕	✕	✕

✓

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Nr	Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving KWh/yr	Ton CO ₂ Saving	Payback (yrs)	Finance				Grants			Tax Ded		R&D		Carbon Offsets	
							Loans	Development Finance	OEM	ESCO	MCEP	CIP	BI	12I	12L	SPII	11D		
3. Reducing Ingress Air Levels <i>(continued)</i>																			
18	Fixed	Reduce excess combustion air by reducing supply pressure or closing damper positions on individual burners.	250 000	1 489 734	416	0,7	✓	✓	✕	✕	✕	✕	✕	✕	✕	✓	✕	✕	✕
19	Fixed	Improve cooling zone balance by reducing the flow through the exit contraveac and the injection cooling by 10% to reduce egress of hot air from the cooling zone into the firing zone. Use PID controller of air movement fans to maintain a constant pressure in the cooling zone and any heat recovery offtake.	125 000	746 950	209	0,4	✓	✕	✓	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
4. Reducing Temperature of Bricks Leaving Continuous Kiln																			
20	Fixed	Ensuring bricks leaving the kiln are cooled to below 100°C and heat is recovered into the kiln or dryer.	250 000	1 833 348	512	0,4	✓	✓	✓	✓	✕	✕	✕	✕	✕	✓	✕	✕	✕
5. Reducing Heat Loss Through Kiln Structure																			
21	Fixed	Insulation of hot air pipework & duc2rk. In general maintain hot air duc2rk insulation levels to a min of 50mm for temperatures below 200°C and 100mm at higher temps.	20 000	200 002	56	0,4	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
22	Clamp	Scoving (Smearing) the outside walls of a clamp kiln with clay. This is good practice, but not often employed where the scale of clamp kilns gets quite large.	50 000	1 833 348	629	0,2	✕	✕	✕	✕	✕	✕	✕	✕	✕	✓	✕	✕	✕

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Nr	Kiln Type	Energy Saving Opportunity	CAPEX (ZAR)	Energy Saving KWh/yr	Ton CO ₂ Saving	Payback (yrs)	Finance				Grants			Tax Ded		R&D		Carbon Offsets
							Loans	Development Finance	OEM	ESCo	MCEP	CIP	BI	12I	12L	SPII	11D	
5. Reducing Heat Loss Through Kiln Structure <i>(continued)</i>																		
23	Fixed	Ensuring all kiln walls and roofs are maintained, well insulated and in good condition.	50 000	666 672	229	0,7	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
24	Fixed	Minimising the time the exhaust damper is left open during new brick setting in VSBK.	-	222 224	76	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
25	Fixed	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.	500 000	333 336	114	-	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
26	Fixed	Reduce air flow into and out of the roof cooling space where it exits to reduce heat loss from the kiln.	250 000	1 915 849	657	0,6	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
6. Heat Recovery																		
27	Fixed	Using heat exchanger in the exhaust to pre-heat HFO to eliminate the electrical heating system.	90 000	65 556	59	1,9	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
28	Fixed	Install an exhaust heat exchanger to preheat combustion air for tunnel kiln or dryers.	3 750 000	3 250 304	909	3	✓	✓	✗	✗	✓	✓	✗	✗	✓	✗	✗	✓
29	Fixed	Use of hot air from the kiln cooling system as preheated combustion air. For example roof space and kiln car cooling.	625 000	4 118 366	1151	0,4	✓	✓	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗

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							Loans	Development Finance	OEM	ESCO	MCEP	CIP	BI	12I	12L	SPII	11D	
7. Upgrading Kiln Technology																		
30	Fixed and Clamp	Replace current clamp kiln with a fixed kiln (type).	18 000 000	70 000 560	24 009	2,3	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗	✗	✓
8. Energy Management and Measurement																		
31	Fixed and Clamp	Improving metering on fuel consumption.	380 000	625 000	214	1,5	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
32	Fixed	Process Optimisation: Operate at higher throughputs at the kiln and higher operational equipment effectiveness.	-	8 655 069	2 969	-	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓
33	Fixed and Clamp	Use of recent model forklifts and optimisation of product movement. Business case on two old machines replaced by one new machine.	920 000	425 003	114	1,7	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
9. Reducing Moisture Content of Dried Bricks Entering Kiln																		
34	Fixed and Clamp	Ensure Bricks are fully dried (<2% moisture content) prior to entering the kiln.	-	1 111 120	381	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗
10. Reducing Temperature of Kiln Cars Leaving Continuous Kilns																		
35	Fixed	Maintaining kiln car seals in optimum condition through planned or condition based maintenance.	200 000	500 004	140	1	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

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							Loans	Development Finance	OEM	ESCO	MCEP	CIP	BI	12I	12L	SPII	11D	
10. Reducing Temperature of Kiln Cars Leaving Continuous Kilns <i>(continued)</i>																		
36	Fixed	Reduce the thermal mass of kiln car decks using lightweight refractory or fibre.	3 825 000	4 166 700	1165	2,7	✓	✓	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗
11. Reducing Waste Levels by Improving the Consistency of Raw Materials																		
37	Fixed and Clamp	Improvement of raw material mixes by incorporating small quantities of imported materials. Test mixes first in the laboratory prior to incorporation.	500 000	1 541 679	529	1,1	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓	✗
38	Fixed and Clamp	Improvement of souring practice after mining through stockpiling practices.	600 000	791 673	272	2,3	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
39	Fixed and Clamp	Consistent particle size distribution through sieve analysis.	250 000	604 172	207	1,6	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
40	Fixed and Clamp	Ensure a consistent moisture content through proper stockpiling. Measuring moisture levels twice daily with penetrometer.	200 000	604 172	207	1,3	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
41	Fixed and Clamp	Scalping of undersize material mix using screens to avoid material unnecessarily going though prep plant.	300 000	95 834	86	5,5	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
42	Fixed and Clamp	Using body additives to improve quality.	50 000	642 505	220	1,1	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
43	Fixed and Clamp	Using body additives to reduce firing temperature.	150 000	833 340	286	3,8	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

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12. Low Carbon Alternative Fuels and Materials																			
44	Fixed and Clamp	Addition of waste products (e.g. sewerage sludge, paper pulp) that improve workability/extrudability of the column.	500 000	28 889	10	0,3	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✓	✓	✗
45	Fixed and Clamp	Co-firing kilns with syngas, biogas or pyrolysis	2 000 000	-	-	8,3	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
46	Fixed and Clamp	Open up brick body and reduce fired mass through the addition of light-weight waste materials and biomass.	500 000	-	-	0,3	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
13. Power																			
47	Fixed and Clamp	Convert air movement fan motors to VSDs or fit separate VSDs.	522 000	566 116	510	0,2	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
48	Fixed and Clamp	Maximum Demand Management through implementation of real time measurement and monitoring system to control max demand charges.	15 000	-	-	0,2	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
49	Fixed and Clamp	Automated & phased switch off of plant when production ceases.	200 000	166 668	150	0,3	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
50	Fixed and Clamp	Motor efficiency retrofits on less efficiency motors.	256 000	20 556	19	3	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
51	Fixed and Clamp	Replacing oversized motors with correct specification.	-	94 723	85	-	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

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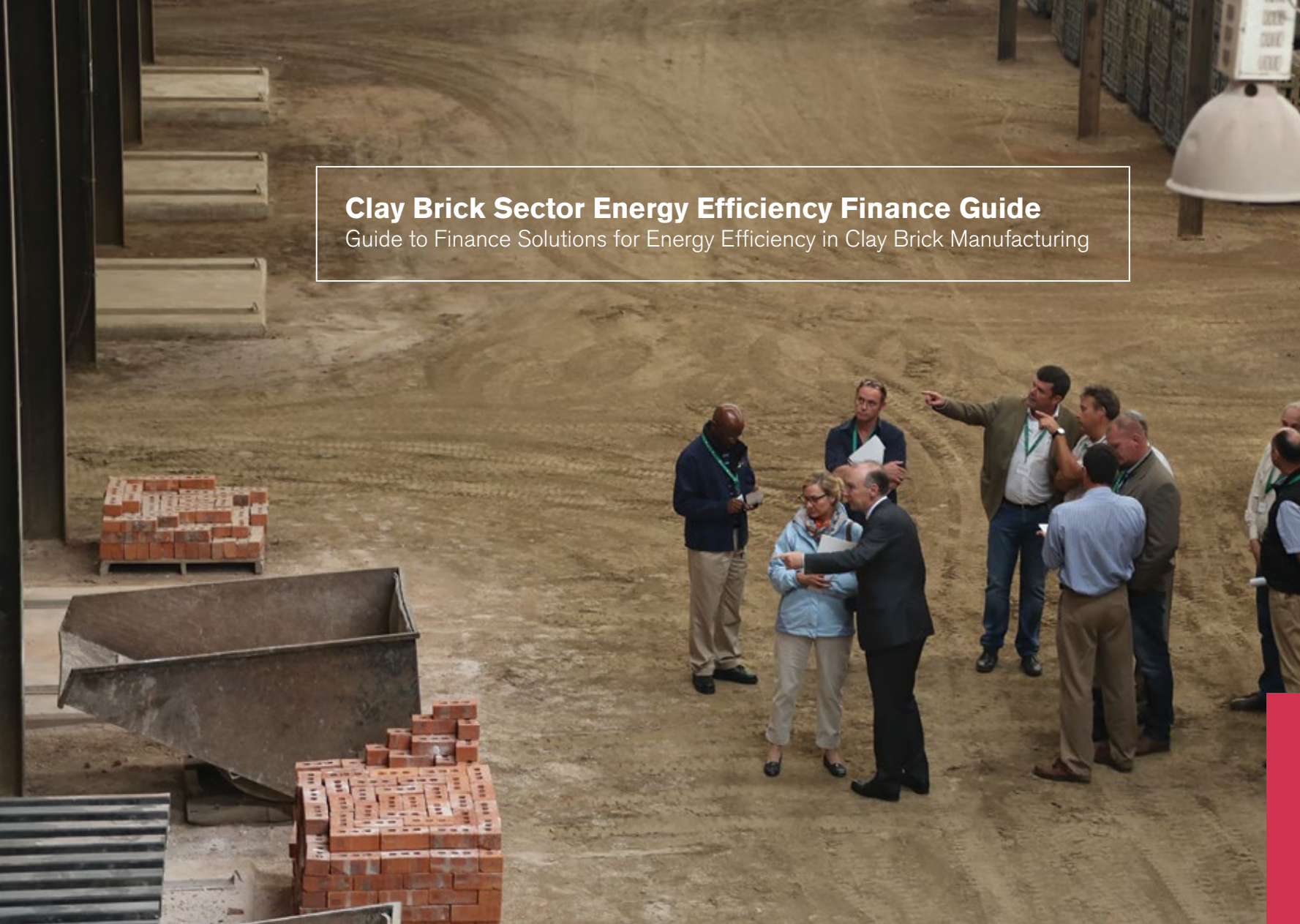
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13. Power <i>(continued)</i>																		
52	Fixed and Clamp	Replace existing standard solid V-drive belts with cogged V belts.	60 000	26 111	24	0,6	✖	✖	✔	✔	✖	✖	✖	✖	✖	✖	✖	✖
53	Fixed and Clamp	Optimising compressed air efficiency.	-	69 445	63	-	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖	✖
54	Fixed and Clamp	Voltage control on crushing plant.	165 000	69 445	63	0,6	✖	✖	✔	✔	✖	✖	✖	✖	✖	✖	✖	✖
55	Fixed and Clamp	Rationalise transformers.	30 000	30 834	28	0,2	✖	✖	✔	✖	✖	✖	✖	✖	✖	✖	✖	✖
56	Fixed and Clamp	Upgrading existing lighting with energy efficient units and controls.	52 000	34 723	31	0,4	✖	✖	✔	✔	✖	✖	✖	✖	✖	✖	✖	✖
57	Fixed and Clamp	Making use of clear roof sheeting (daylight harvesting).	4 000	1 944	2	0,4	✖	✖	✔	✖	✖	✖	✖	✖	✖	✖	✖	✖
58	Fixed and Clamp	HVAC control opitmisation.	14 000	4 444	4	0,7	✖	✖	✔	✔	✖	✖	✖	✖	✖	✖	✖	✖
59	Fixed and Clamp	Domestic hot water optimisation.	60 000	33 889	31	0,4	✖	✖	✔	✔	✖	✖	✖	✖	✖	✖	✖	✖

Clay Brick Sector Energy Efficiency Finance Guide

Guide to Finance Solutions for Energy Efficiency in Clay Brick Manufacturing





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