



## Demonstrating renewable energy and energy efficiency opportunities in the wine industry

The availability of major resources, particularly energy and water, has become a major risk factor leading to the financial vulnerability of wine operations throughout South Africa. The combination of fluctuating fuel prices, environmental concerns, government enforced greenhouse gas and energy legislations, and its associated costs, is straining the wine industry and could impede the future viability of the industry in the country. These trends underscore the need for wine operations to update their energy management plans and strategies, and implement actions that promote energy and water conservation, which would lead to the reduction of production costs and risks, the mitigation of climate change, and the improvement of business sustainability in general.

Two companies, Ökotherm and Wilo, with the financial assistance of DEG – the German Investment and Development Company, are currently at the forefront in the Stellenbosch Wine Region; by demonstrating opportunities for renewable energy at Backsberg Wine Estate, and energy efficiency at Morgenster Wine Estate, respectively.

### BIOMASS-FUELED BOILER AT BACKSBERG

Seeing as there are significant operational demands for heating, the installation of a biomass fuelled boiler from Ökotherm was seen as imperative at Backsberg. With wood chips that are readily available in the region, the installed boiler has the capacity to provide heat for hot water, central heating and warm air systems. Although numerous factors will affect the boiler operation and efficiency, major influences include wood chip size and consistency, moisture content and boiler malfunction due to safety mechanisms.

Trial runs have been conducted with continuous operation under poor conditions – irregular wood chip size, more than 30% moisture, and a feed flow rate of 0.039 kg/s – with a 7500 litre water tank. A typical tank water temperature profile is shown in Figure 1.

The outliers are due to boiler malfunction caused by irregular wood chips being fed into the boiler. This stresses the importance of chips being not only completely dry and regular in size, but also never larger than 15 cm in length – for the particular boiler unit. From these trial

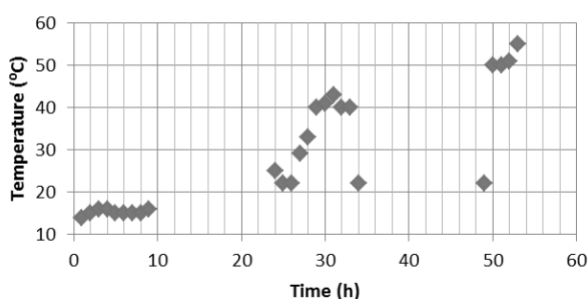


Figure 1: Tank water temperature profile

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runs, the temperature of the tank is still 30°C lower than the required temperature if the boiler should be coupled to an absorption chiller – and operational requirement at Backsberg. In order to heat that amount of water, rough estimates show that 1885 MJ energy is required, translating to 270 kg of wood chips. Thus, investing in preparing the wood chips for the boiler is the key to making this a feasible and successful intervention.

The main benefits of the intervention are the lower consumption of conventional fuels and that the whole process is virtually carbon neutral. Once the chiller is installed, process monitoring of energy balances and fuel costs will be carried out to evaluate the entire system.

### ENERGY-EFFICIENT PUMPS AT MORGENSTER

The topography on which the estate is situated stretches over two terraces, and both medium and high pressure pumping is required. This posed difficulties with irrigation and made the process much more energy intensive. Also, vineyard blocks could not be irrigated selectively. With the implementation of a series of energy efficient pumps from Wilo, the goal was to not only to reduce electricity consumption, but also to reduce water and all the additives which are put into the irrigation water.

Highly efficient, ready for connection water-supply units – with between 2 and 6 vertically arranged glanded stainless steel high-pressure multi-stage centrifugal pumps – were installed in parallel with easy monitoring and control technology. Medium pressure pumps, high pressure pumps, as well as high pressure booster pumps, were installed.

Comparing the power and associat-

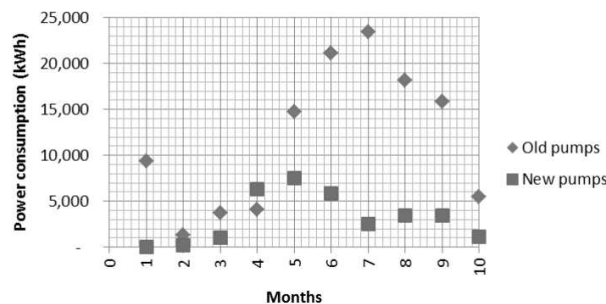


Figure 2: Total power consumption

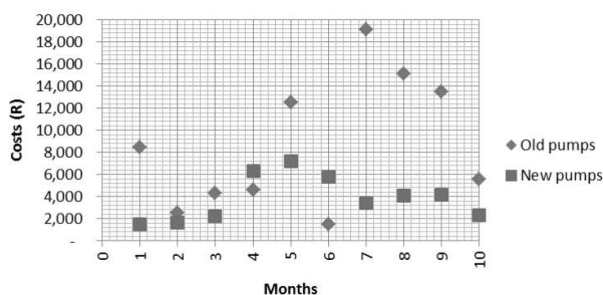


Figure 3: Costs associated with power

ed costs from September 2011 to June 2012 (before installation) and to June 2013 (after installation), the results in Figures 2 and 3 were obtained.

It is clear that there is a major reduction in these two parameters after the pumps were implemented. Overall, a 71% reduction in power consumption and a 39% reduction in power costs were noted. Although water usage is yet to be monitored, a reduction in the amount of water, fertilizer and pesticides is also to be expected.

The objective is to set up a generalized financial scope report and to determine the return on investment – or payback time – in order to apply the technology and system. Once all the relevant parameters such as water usage, fertilizer usage, pesticide usage, pump performance and power consumption are monitored and analysed, the overall feasibility of the system can be determined for any wine farm.

### FURTHER DISSEMINATION OF THE OUTCOMES

DEG – through the Institute for Agroecology – in collaboration with the Centre for Renewable and Sustainable Energy Studies (CRSES) at Stellenbosch University, and with the assistance of TÜV Rheinland, is completing these demonstration studies in April 2014. The next dissemination workshops for the two projects will then be held in May. Further information will be provided in due course, but interested participants are requested to contact Prof Alan Brent, preferably via e-mail.

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# Energy efficiency tax incentives now open for business

National Treasury published section 12L on 8 November 2013 in Government Gazette No. 37019 which puts into operation deductions of energy efficiency savings in terms of the Income Tax Act of 1962.

This long-awaited announcement is welcomed by the Certificated Measurement & Verification Professionals (CMVP) industry that has been advising clients to prepare for the imminent release for a while now.

Minister Pravin Gordhan, Minister of Finance, gave notice that section 12L of the Income Tax Act, 1962 (Act No. 58 of 1962), (Deduction in respect of energy efficiency savings), as inserted by section 27 of the Taxation Laws Amendment Act, 2009 (Act No. 17 of 2009), amended by section 27 of the Taxation Laws Amendment Act, 2010 (Act No. 7 of 2010), and substituted by section 29 of the Taxation Laws Amendment Act, 2012 (Act No. 22 of 2012), came into operation on 1 November 2013.

The 12L allows deductions calculated at 45 cents per kilowatt hour or kilowatt hour equivalent of energy efficiency savings. A person claiming the deduction must obtain a certificate issued by an institution, board or body prescribed by the regulations. Such bodies can be found on the South African National Accreditation System (SANAS) website [www.sanas.co.za](http://www.sanas.co.za).

To claim for energy efficiency savings from National Treasury the Regulation requires that a baseline must be set at the beginning of an assessment year with a reporting period of the energy use at the end of the year of assessment and that such savings calculations meet the full criteria and methodology used to calculate energy efficiency savings. No double dipping is allowed, which means concurrent benefits in respect of the energy efficiency savings may not be received.

To find persons qualified to provide M&V services, the Council for Measurement and Verification of South Africa (CMVPSA) is an independent professional Measurement & Verification (M&V) Body that represents the

South African M&V industry and ensures that the quality of M&V services and service providers are credible, trustworthy and transparent. Their website is [www.cmvpsa.org.za](http://www.cmvpsa.org.za). CMVPSA upholds the highest standards and requirements for M&V in accordance with the Efficiency Valuation Organisation (EVO) International Performance Measurement & Verification Protocol (IPMVP), the internationally recognised protocol for performance M&V which provides a consistent, reliable approach to M&V around the world.

The Association of Energy Engineers (AEE), in cooperation with EVO established the CMVP training programme which is locally presented by the AEE's sole training partner for the Southern African region the Energy Training Foundation (EnTF). EnTF is also an EWSETA training provider and the affiliated training provider of the Southern African Association for Energy Efficiency (SAEE). The CMVP qualification requires attending a 2 day intensive M&V training course, writing and passing the prescribed international examination on the 3rd day, and passing the examination with a minimum of 70% within the required time allowed. Thereafter, a candidate may apply for Certification to the local CMVP Board who will review the candidates' current qualifications and experience in the M&V industry. After positive recommendation by the local board, a recommendation is made to the AEE's international CMVP Board for Certification. AEE keeps tight control of the quality of candidate that receives Certification in that it requires maintaining Certification through continuing education and providing proof thereof for re-Certification every 3 years.

The AEE has been developing the energy engineering field for over 36 years. In total AEE is active in 90 countries with 14 000 CEMs whom are collectively active in every single continent in the world, and just short of 3 000 CMVPs in 28 countries.

The EnTF presents CMVP training throughout the country at various venues. The next scheduled courses will

be in Cape Town in Johannesburg on 14-16 May and 22-24 October 2014, and in Kenya on 23-25 June 2014.

CMVP training carries 3 CPD credits with ECSA. For M&V candidates that need to rewrite examinations in order to become Certified with the AEE, the EnTF will be hosting additional examination days in Pretoria, Potchefstroom, Port Elizabeth and Durban.

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Training provider of the Southern  
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# Encouraging efficient utilisation of energy through the Income Tax Act of 1962 section 12L

This article looks at what can be claimed, what is not claimable, who can issue reports and where to find these persons and companies, what should be on the certificate for SARS, the steps to start the claiming process, where to log your intention to start claiming tax, access to the relevant sourcing documentation, and workshops that are planned to communicate the requirements.

With the long awaited tax allowance for energy efficiency savings promulgated during November 2013 with the effective date notified as 1 November 2013, it is set to provide impetus to the development of the energy efficiency and Measurement and Verification (M&V) industries in South Africa. This article looks at the Regulation dated 9 December 2013 and the requirements it sets for claiming an allowance for energy efficiency savings, as well as what is not claimable, in terms of section 12L of the National Treasury, Income Tax Act No. 58 of 1962.

The Minister of Finance, Pravin Gordhan, in consultation with the Minister of Energy and the Minister of Trade and Industry, published the signed notice of the effective date of the Regulation in Government Gazette Notice no. 855 of 8 November 2013 as 'Regulations in terms of Section 12L of the Income Tax Act, 1962, on the allowance for energy efficiency savings' and declared such to come into operation on 1 November 2013.

On 9 December 2013 the said Regulation 12L was promulgated and stipulates the allowance is for the purpose of determining the taxable income derived by any person from carrying on any trade in respect of any year of assessment ending before 1 January 2020. It stipulates that there must be allowed as a deduction from the income of that person an amount in respect of energy efficiency savings by that person in respect of that year of assessment. It should be noted that 'a person' referred to in this instance is a tax entity and in effect means that the

energy efficiency allowance is not restricted to any industry, sphere of business, or any project and specific energy efficiency initiative – in a nutshell, if you are paying tax you can claim the allowance within the boundaries stipulated in the 12L Regulation. The allowed deduction is calculated at 45c/kWh for verified energy efficiency savings.

The most significant requirement to take cognisance of is that a baseline for the savings should be set by an M&V Professional under the auspices of an M&V Body accredited by SANAS in accordance with SABS/SANS 50 010:2011.

With energy efficiency being an intangible commodity until it is assigned quantification through a protocol as within the M & V process, formalised in the M&V national standard SABS/SANS 50 010:2011, it is important to take cognisance of the definitions stipulated in the Regulation to logically separate what is part of the 12L allowance and what is not:

**'energy efficiency'** means energy efficiency as defined in the standard;

**'energy efficiency savings'** means the difference between the actual amount of energy used in the carrying out of any activity or trade, in a specific period and the amount of energy that would have been used in the carrying out of the same activity or trade during the same period under the same conditions if the energy savings measure was not implemented;

This article should be read in conjunction with the references provided which refer to the applicable standards, regulations and approval documentation.

## 1. BACKGROUND

In 2009, the then Minister of Finance, Trevor Manuel, announced that there would be tax incentives for those that

can demonstrate energy efficiency savings setting the ball in motion to employ the Income Tax Act of 1962 for this purpose.

Such tax incentives have been offered since 2009 using section 12i, the Industrial Policy Project Investment incentive for manufacturing-related projects with a 10% energy demand reduction component. Shortly thereafter, the proposed 12L 'Regulations on the allowance for energy efficiency savings' were released for public comment by 15 November 2011. The effective date of 1 November 2013 for the 12L Regulation was promulgated by the Minister of the Department of Energy (DoE), Minister Pravin Gordhan, in the Government Gazette of 8 November 2013. The 12L Regulation was promulgated on 9 December 2013 in Government Gazette No 37136 and stipulates that there must be allowed as a deduction from the income of a person an amount in respect of energy efficiency savings by that person in respect of a year of assessment.

The Regulation for 12L sets out the process and methodology for determining the quantum of energy efficiency savings, and requirements for claiming the proposed tax allowance, which stipulates a prerequisite that energy savings reports have to be compiled by M&V Professionals performing M&V under the auspices of a SANAS accredited M&V Body and the savings certified by South African National Energy Development Institute (SANEDI) through issuing of a certificate.

To meet the requirements of 12L, government has provided a structure to implement 12L with technical support in the form of South African National Standards (SANS); assurance through the accreditation of energy efficiency M&V Bodies by the South African National Accreditation System (SANAS); and jurisdiction through SANEDI.

The M&V industry have also taken the initiative to set up a Council for Measurement and Verification Professionals of South Africa (CMVPSA) to

ensure that the standard of work performed by M&V Professionals are upheld to provide credibility to the industry and security of workmanship to clients, engage and advise decision-makers on M&V related matters, as well as advise and protect the member M&V Professionals.

## 2. THE REASONING BEHIND 12L

According to the schedule of the Regulation, government recognises that it has become necessary to promote the efficient utilisation of energy to safeguard the continued supply of energy and to combat the adverse effects of greenhouse gas emissions related to fossil fuel based energy use on climate change. Saving energy through its efficient use may in government's opinion also be considered as a potential successful method to guarantee the efficient utilisation of energy in future.

The Regulation also throws some light on what the funds will be used for from the impending Carbon Tax to come into effect in January 2015 by stating that 'the intended purpose of a carbon tax is to mitigate greenhouse gas emissions and also to utilise (recycle) some of the revenue to be generated from such a tax to finance incentives to advance the further efficient utilisation of energy'. If interpreted correctly, there is promise that government will be 'recycling' the carbon tax income towards financing some of the 12L energy efficiency tax allowance.

Before discussing the processes for claiming incentives it would be good to look at the exclusions as, although they look quite minimal, a number of projects will be excluded and it is important to be aware of this before starting any process.

## 3. WHAT IS EXCLUDED FROM THE 12L ALLOWANCE

### 3.1 Renewable sources are excluded

Regulation 6 depicts that a person may not receive the allowance 'in respect of energy generated from renewable sources or co-generation, which means energy from waste and combined heat and power, other than energy generated from waste heat recovery'. The renewable sources excluded are listed as biomass, geothermal, hydro, ocean currents, solar, tidal waves or wind. Waste heat recovery is defined as 'utilising waste heat or underutilised energy generated during an industrial process'. Therefore, only energy gen-

erated using waste heat recovery may be considered.

### 3.2 Captive power plants allowance encourages self-generation on a large scale

Generating energy for your own use is seen as a 'captive power plant' and an allowance can only be claimed should the 'kWh or the equivalent kWh of energy output of the captive power plant' in respect of an assessment year is 'more than 35% of the kWhs or the equivalent kWhs of energy input in respect of that year of assessment'.

The definition in the Regulation stipulates that 'A captive power plant means where generation of energy takes place for the purposes of the use of that energy solely by the person generating that energy'. This is interpreted as the self-generated energy, albeit from whichever source, is not being fed into the grid, but used within the reticulation system of the respective project or plant for which the energy efficiency allowance is being claimed. It is an incentive to up the implementation self-generation in excess of 35% of the requirements of a project or plant.

This can be interpreted as an exception to the rule mentioned in section 3.1, where renewables is excluded from 12L, with the exception that if such renewable energy is generated for own use and if it constitutes in excess of 35% of the kWhs of energy input in the year of claiming, it will be allowed.

### 3.3 Concurrent benefits not allowed

Any grant, allowance or similar benefit which is, or was received, for energy efficiency savings by any 'sphere of government', of any public entity that is listed in Schedule 2 or 3 to the Public Finance Management Act, 1999 (Act No. 1 of 1999) is excluded as per regulation 7.

This means carbon credit offsets and letters of approval for CDM projects received from entities that constitute a 'government sphere' will not be allowed. Schedule 2 and 3 entities also constitutes a number of organisations that support the energy efficiency industry through grants and benefits ranging from the CSIR, which means the NCPD-SA and its IEE Project, Technology Innovation Agency (TIA), Central Energy Fund (CEF), Eskom, Industrial Development Corporation (IDC), Independent Development Trust, Land and Agricultural Develop-

ment Bank of SA, Small Enterprise Development Agency, DBSA, EWSETA and many more.

What is allowed is that a project that has already received a benefit can be ring-fenced and removed from the equation during the M&V process so that the section of the plant or project which has not received any concurrent benefit can become eligible for the allowance. However, projects started before the effective date of 1 November 2013 do not qualify, only projects after this date.

## 4. ENSURING THE VIABILITY OF A 12L ALLOWANCE CLAIM

With all the exclusions and concurrent benefits, the question arises: what constitutes a viable opportunity to pursue the benefit of the energy efficiency tax allowance? A good starting point is to contact an M&V Professional to identify any current initiatives that do not fall within the concurrent benefit category and ensure that your project is large enough to make the M&V process and tax incentive financially viable.

Remember, not only large full-scale electrical projects qualify, projects like lighting only, or the insulation of certain buildings on your premises, a major upgrade of air-conditioning systems, or drives, even reducing diesel or coal use will qualify.

In addition, except for the energy sources excluded in the limitations mentioned, all other energy sources can be claimed, for instance converting to gas from electricity because of its efficiency ensuring an energy saving, or using less fuel in a vehicle fleet due to implementing energy efficiency measures.

A safe rule-of-thumb is if you can save 1 GWh for an assessment year, 12L would most likely be a viable probability for you.

## 5. STAKEHOLDERS IN THE ENERGY EFFICIENCY TAX CLAIMING PROCESS

It is important to become familiar with the stakeholders involved in regulating and controlling the system to ensure accuracy, credibility and transparency, as well as understanding the requirements by each within the tax claiming process.

### Stakeholders at a glance

- SANEDI: Evaluate M&V Professional's energy savings reports and issue tax certificates to organisa-

tions for submission to SARS to claim section 12i and 12L tax incentives - [www.saneditax.org.za](http://www.saneditax.org.za)

- SANAS: Accreditation of M&V Bodies – [www.sanas.co.za](http://www.sanas.co.za)
- SARS and National Treasury: Financial incentive provider using the normal annual tax return process
- CMVPSA: Although this is a voluntary membership-based body, it houses the contact information of screened M&V Professionals and takes on the role of ensuring a capable, credible, transparent and efficient M&V workforce for South Africa – [www.cmvpsa.org.za](http://www.cmvpsa.org.za).

### 6. PROCEDURE FOR CLAIMING THE TAX ALLOWANCE

The Regulation stipulates that organisations wishing to claim an energy efficiency tax allowance according to the 12L Regulation should take the following steps:

1. Register with SANEDI for energy efficiency tax allowance claims at [www.saneditax.org.za](http://www.saneditax.org.za).
2. Appoint an M&V Professional, from a SANAS accredited M&V Body, to compile a report containing a computation of the energy efficiency savings in respect of that person for that year of assessment
3. Submit the M&V Professional's report to SANEDI.
4. SANEDI will furnish you with the approval for continuance.
5. On the successful completion of the energy efficiency savings project and the tax allowance approval process, SANEDI will issue a formal energy savings certificate.
6. Submit the certificate to the South African Revenue Service (SARS) together with the claim for the tax allowance as part of the customary tax returns.

This is the process for each year of assessment for which the allowance is claimed, for each project.

To find an M&V Body visit the SANAS website: [www.sanas.co.za](http://www.sanas.co.za), under the page 'Accredited Facilities' and search for 'Measurement and Verification' under the 'Inspection Body' category.

To find an M&V Professional visit the CMVPSA website: [www.cmvpsa.org.za](http://www.cmvpsa.org.za), search under 'membership' for Provisional Full Members, these are the persons qualified to perform M&V work if they are incorporated under an M&V Body – note not all members are

recognised, only Provisional Full Members, and Full Members.

### 7. ANNUAL CLAIMING CYCLE

The M&V Professional's report contains a computation of energy efficiency savings in respect of the tax entity for the year of assessment and is done in accordance with the SANS standard and the baseline requirements therein. The Regulation requires the baseline to be set for the year in which the allowance is claimed and must be adjusted for every year of further assessment. The methodology used to determine the baseline must be in accordance with the standard and the baseline must be derived from data gathered during the year of assessment, preceding the first year of assessment for which the allowance is claimed.

Green field projects also qualify where the baseline can be constructed from comparable data in a relevant sector, using the SABS/SANS 50010: 2011 standard.

The annual term of assessment is dependent on the claimant's financial year-end, and in the case of green field projects, the time of commissioning of the energy efficiency project.

More than one project can be claimed within a cycle as well, it is not restricted to plant- or company-wide consumption only.

### 8. INDEPENDENCE AND IMPARTIALITY OF M&V REPORTS

To ensure impartiality and independence, accredited M&V Bodies need to manage the risks posed by utilising impartial and independent M&V Professionals. Part of the SANAS accreditation assessment process will include checking for independence and impartiality. These accredited bodies are liable for the results of M&V reports produced by M&V Professionals working under their auspices for a period of 7 years.

M&V Reports are only accepted if done under the auspices of an accredited M&V Body, as per SANAS requirements, by an M&V Professional. Such Inspection Bodies are accredited in terms of section 22 of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act No. 19 of 2006), for the purposes of inspection, measurement, reporting and verification of energy efficiency savings.

True M&V Bodies and their M&V

Professionals are trained and qualified to perform these functions, they are also assessed by SANAS assessors to ensure that they are capable of performing the required reporting tasks in accordance with SANAS and SANS requirements.

### 9. SUB-CONTRACTING M&V WORK BY M&V BODIES

The SANAS Technical Requirements (TR81-03) stipulate that an M&V Body may sub-contract M&V Professionals, or service providers, to perform work on their behalf in instances where the M&V Body is overloaded, have incapacitated staff, unfit equipment and if it is out of the scope of expertise which lies within the M&V Body.

To ensure transparency, the M&V Body has to inform the customer in writing of its intention to subcontract the work in question and the customer must agree to this. One of the requirements if ISO/IEC 17020 is that a register be kept by each accredited M&V Body containing the names of facilities it may select to subcontract to. It is the M&V Body's responsibility to ensure that the subcontractor complies with all the accreditation requirements as it remains accountable for all work done under its auspices. Irrespective of this arrangement, the M&V Professional that signs off on the formal savings report also needs to be an approved SANAS Technical Signatory as part of the accredited M&V Body.

An M&V Professional in the employ of the customer may not be viewed as an impartial person to sub-contract work to, unless that person is a specialist in the scope of work required for the purposes of issuing an accurate M&V Report. The M&V Body will then be at risk of utilising a sub-contracted service that might be viewed as not being impartial or independent therefore, such a decision would be left to the M&V Body to assess the required needs for impartial and transparent reporting and SANAS finding it acceptable when assessing the M&V body.

### 10. SANEDI'S CLAIMING PROCESS AND CERTIFICATE

Reports submitted to SANEDI must contain satisfactory information which complies with the standard, is an accurate reflection of the energy efficiency savings of the person claiming the allowance in respect of the year of assessment for which the allowance is claimed; and complies with the 12L

Regulations with a baseline and measurements done in line with the standard.

SANEDI issues a certificate containing the information for the assessment year of which the claim is made which must be verified and done in accordance with the standard:

- The baseline at the beginning of the year of assessment in accordance with regulation 5.
- The reporting period energy use at the end of the assessment year.
- The savings in kWhs or equivalent for the claim.
- For captive power plants, the difference between the kWhs equivalent of energy input and the kWhs equivalent of energy output.
- The M&V Body's name, accreditation number and the M&V Professional's details.
- The name and tax number of the person to whom the certificate is issued.
- Date of the certificate, and the relevant certificate number.

SANEDI may investigate or cause, to investigate any energy savings claimed to be satisfied that the saving is a true and accurate reflection of the savings achieved.

To start the process with SANEDI, register your intention to claim online at [www.saneditax.org.za](http://www.saneditax.org.za).

This certificate is the document accepted by National Treasury in respect of. the requirements for claiming a deduction on taxable income in accordance with 12L.

## 11. ENSURING A CONTROLLED M&V INDUSTRY TO PROTECT CUSTOMERS

To ensure that M&V services and service providers are credible, trustworthy and transparent an independent Professional Body was established in the form of the CMVPSA, a chapter of the Southern African Association for Energy Efficiency (SAEE). The CMVPSA exists to protect the interests of all M&V stakeholders and the CMVPSA was established to take on the responsibility of registering, governing M&V Professionals as well as assisting in the supply and development of the technical expertise required to perform acceptable M&V in South Africa. SANAS accredits the M&V Bodies, whereas CMVPSA takes responsibility for the technical competency through registering qualified and suitably

trained M&V Professionals, who perform the M&V for the energy saving reports under the auspices of an Accredited M&V Body.

As the nature of claiming incentives for energy savings depicts that a claim is made for a measured void, or a measure which does not exist anymore, internationally accepted methodologies are applied to ensure accuracy. These methodologies are locally standardised through SANS 50 010:2011, the 'Measurement and verification of energy savings' standard, and is a prerequisite for claiming tax incentives.

CMVPSA considers application for registration from applicants who can prove that they passed the relevant M&V qualifications (e.g. Certified Measurement & Verification Professionals (CMVPs)), have the required experiential background and fulfil the academic requirements as set by the CMVPSA. More details are available from the CMVPSA website [www.cmvpsa.org.za](http://www.cmvpsa.org.za).

## 12. M&V AS A CAREER PATH

It is anticipated that a variation of types of M&V Professionals and Bodies will be essential in future, with a healthy mix of qualification levels and experiential requirements. From Registered Certified M&V Professionals regulated and governed by the CMVPSA or similar bodies to industry specialists for specific technologies, energy sources, and market sectors that could provide the services required to perform M&V. The M&V scope ranges from M&V of specialised projects like building insulation, lighting, pumping, control systems, etc. for a range of technologies in the industrial, residential, commercial and transportation sectors, as well as the array of energy sources like liquid fuel, fossil fuel, renewables, bio-fuel, etc. SANAS provides allowance for Accredited M&V Bodies to sub-contract some specialised services, or additional resources and expertise, to perform M&V obligations, with the condition that the sub-contractor's competence can be verified and demonstrated with the M&V Body taking full accountability. A variety of resources is essential for good M&V which poses further opportunities. These include but are not limited to the development, supply, delivery, installation and maintenance of various types of calibrated measurement equipment, data acquisition/storage/management, training, experiential learning or coaching, assessors, data assurance

auditing, forensic auditing, etc.

It should be noted that a technical qualification may not be a prerequisite in all instances. Knowledge on M&V and energy efficiency in general, on all levels, will become more sought after throughout industry and therefore holds good opportunities for those interested.

The credibility of reported energy savings and claims made are absolutely critical. The skills and knowledge required to ensure that this credibility is built into all processes and activities, opens up a new world of opportunities to many, who have the various levels and types of qualifications. The green economy in itself will only grow, making M&V more important, going forward.

Persons wishing to enter the M&V sector can attend training provided by approved training providers such as the American Association of Energy Engineers (AEE) in conjunction with the Energy Training Foundation (ETF) and the Southern African Association for Energy Efficiency (SAEE).

Registration with CMVPSA is conditional to the successful completion of prescribed courses and examinations. Registration with CMVPSA is also subject to evaluation of practical M&V experience.

## 13. CONCLUSION

With the M&V industry being propelled forward through releasing the tax allowance for energy efficiency savings, it is realised that successful implementation of 12L and growing the M&V industry as a whole to benefit future financial investments into energy efficiency savings, will need thorough communication. To assist with information dissemination the CMVPSA, through its parent body the SAEE, facilitated on behalf of Government and the relevant Government Agencies, a number of workshops that were held in January and February in Pretoria, Durban, Port Elizabeth, Bloemfontein, Kimberley, Polokwane and Potchefstroom to present details, supply information and address any questions.

## Acknowledgements

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## 12L – Some practical issues and concerns: what this could mean to your company

The announcement of 12L caused quite a stir in the industry with Energy Services Companies (ESCOs) and end-users alike who have been awaiting the promulgation of regulation 12L with great anticipation. The relevance of 12L for many of these companies have increased dramatically since the announcement by Eskom in October 2013 that many of the Eskom IDM rebate programmes are on hold until further notice. 12L is seen by many as an alternative to the Eskom rebates in order to help motivate the implementation of energy efficiency projects.

Successful energy efficiency projects reduce energy costs. The return on investment for projects of this nature can be determined with a high degree of accuracy. Incentives like 12L make investments in energy efficiency projects more attractive by improving the financial performance, thereby stimulating the implementation of more energy efficiency projects. The implementation of more energy efficiency projects helps to ensure security of supply, has a major impact on containing cost escalation, reduces environmental emissions and improves business competitiveness in general.

Like with any new incentive there are a couple of concerns, valid questions and finally some misconceptions raised by various parties regarding 12L. Some of the more prominent ones are listed and are subsequently discussed:

1. This process appears to be cumbersome - is it worth the effort?
2. What is the real value of the 12L incentive to my company?
3. Is Measurement & Verification (M&V) not too expensive to make this viable?
4. Is M&V not too complicated and too exclusive for a program of this nature?
5. Will this incentive introduce additional risk?
6. By how much will the 12L applica-

tion process delay implementation?  
7. What should I do if I want to apply?

Let's briefly look at each of these in turn.

**This process appears to be cumbersome – is it worth the effort?**

Registration of a project (or collection of projects) for the 12L incentive is a quick and easy process completed online on the SANEDI website.

Registration of your intent with SANEDI does not place your company under any obligation whatsoever. If the project does not materialize (for whatever reason) or the savings are lower than anticipated, there are no penalties applicable.

Once registered, the bulk of the remaining work will be performed and managed by the M&V body and the rest of the project's execution simply becomes part of 'business as usual' from the company's perspective.

To determine if this (minimal) effort will be worthwhile, see 'What is the real value of the incentive to me?' in this article and decide for yourself.

**What is the real value of the 12L incentive to me?**

The Rand value is dependent on the quantum of energy saved. You will receive a deduction of 45c for each kWh (or kWh equivalent) of energy saved.

Because the company tax rate is 28%, this 45c/kWh results in a net benefit (after tax) of 12.6c/kWh for companies.

- Consider this example:
- Assume you save 1 000 000 kWh per year.
  - Assume your average cost per kWh is 90c/kWh.
  - The value of the saving would be 1 000 000 x R0.9 = R900 000 per year.
  - All else being equal, this saving will impact your bottom-line and will



increase your profit for the year by R900 000.

- You will pay 28% tax on this additional profit:  $0.28 \times R900\ 000 = R252\ 000$ .
- With 12L you can now enjoy a deduction of 45c/kWh.
- $R0.45 \times 1000\ 000 = R450\ 000$ .
- Taxable income is reduced as follows:  $R900\ 000 - R450\ 000 = R450\ 000$ .
- Tax now payable is only  $0.28 \times R450\ 000 = R126\ 000$ .
- The difference between R252 000 and R126 000, consequently yields a net benefit of R126 000 (or 12.6c/kWh) after tax.

To bring this benefit in-line with the more 'standard' way of evaluating the project's value, we need to consider the equivalent benefit before tax.

This can be calculated as follows:

- $R126\ 000$  after tax =  $R126\ 000/0.72 = R175\ 000$  before tax.
- The 12L incentive therefore provides an equivalent net benefit of
- $R17.5c/kWh$  before tax.
- $1000\ 000$  kWh saved  $\times R0.175 = R175\ 000$  (before tax) additional benefit.
- On this 'additional' R175 000 you now pay 28% tax.
- Therefore  $R175\ 000 \times 0.28 = R49\ 000$  which is equivalent to the figure obtained earlier.

A simplified way of looking at 12L is therefore that it provides you with an additional 17.5c/kWh for each kWh saved for the first 12 months of the project's lifetime.

#### **Is M&V not too expensive to make this viable?**

This is perhaps the most common question – the answer is a resounding NO, qualified as follows:

- The 12L incentive is aimed at larger users (typically commercial and industrial consumers). It is not aimed at the residential market or at very small consumers. In the case of very small consumers, the cost of M&V may exceed the value of the incentive. Keep in mind, however, that these small consumers were never the market targeted by 12L in the first place! 12L was always primarily aimed at commercial and industrial customers. Having said that, no tax paying entity is expressly excluded from 12L and it will be interesting to see if somebody will

develop a 12L compliant M&V approach suitable for application to much smaller customers.

- The requirement for M&V according to SANS 50 010 is to ensure the savings that are reported are conservative (i.e. understated rather than overstated). This leaves ample room to tailor the M&V process and therefore, the cost to be appropriate to the value of the project and the corresponding 12L incentive value.

Many (electrical) energy consumers have become accustomed to the Eskom IDM process where Eskom traditionally carried the cost of the M&V.

The perception is therefore, that M&V now places an additional 'burden' on the project – but let's think carefully whether this is really true? Surely ANY project that justifies its existence based on the savings it is expected to generate HAS to have a mechanism in place to measure, monitor and (perhaps more importantly) sustain such savings? The phrase 'you cannot manage what you do not measure' is well known and accepted as a general truism. Installing the measurement equipment to ensure that the expected savings are realised and sustained should therefore not be considered to be an additional 'burden' – it is merely good business, similar to the current practice of employing external auditors to review your company's financial statements, before being published in an Annual Report.

We firmly believe any properly designed energy efficiency project should include the method by which the resulting performance can be tracked and monitored over time. If properly designed, the cost of the measurement infrastructure would be a small fraction of the total project cost, and will almost always be well worth the small additional expense (irrespective of whether 'formalized' M&V is required or not).

#### **Is M&V not too complicated and exclusive for a program of this nature?**

There is a perception that M&V is somehow complicated and can only be performed by an exclusive group of people. Nothing could be further from the truth!

If nothing else, the 12L incentive has managed to de-mystify and 'open' the M&V playing field more than anything else has done in the last 10 years. One of the key reasons for the devel-

opment of SANS 50 010 was the pending implementation of 12L.

SANS 50 010 is now a National Standard that anybody can access and use. The review process of this Standard (open to public participation) is expected to commence during 2014. This review process is open to input from all affected parties and stakeholders.

Because this is a tax incentive, credibility of the figures presented is of paramount importance. The regulation stipulates that only SANAS accredited M&V bodies are allowed to compile savings reports which can be submitted to SANEDI. There are very good (and obvious) reasons for this requirement – but under no circumstances can this requirement be considered to be fostering 'exclusivity'!

Why not you ask? Is this not exactly what is happening here by protecting an 'exclusive little club'? Once again the answer is a resounding NO.

Let's consider the facts for a moment. ALL the requirements (as well as guidance) for becoming a SANAS accredited M&V body are open to the public and available from SANAS – any business (even a 'one-man-show') can apply and, provided they meet the requirements, become accredited by SANAS.

The SANAS requirements are by no means prohibitively difficult to meet; this is underpinned by the fact that the requirements are based on the widely accepted international standard (ISO 17020). The requirements are there to ensure that a credible process is followed and to confirm that the people who quantify the savings have at least a rudimentary understanding of the systems they are tasked to verify. In order to make the process even more inclusive, M&V bodies can apply for a limited scope of accreditation – somebody who understands only lighting systems, for example, could become accredited for performing M&V on lighting systems only.

We believe the SANAS M&V accreditation process (driven largely by 12L) has managed to unlock the M&V market to broad participation by many players. The growth of this market will be driven by the adoption of 12L, possibly other incentives or future regulations as well as a growing need for independent third-party verification of energy performance (even if not regulated – for example, for performance contracting or shared-saving purposes).

**Will this incentive introduce additional risk?**

Most people would agree that SARS is certainly not a party anybody likes to take chances with. Since tax legislation provides for punitive measures against tax malpractices, people and companies are asking (or quietly wondering) if making use of the 12L regulation will expose their company to increased risk?

In our opinion this is not the case – provided of course there is no deliberate attempt to deceive or to intentionally falsify and inflate saving figures. Without such deliberate intent it is difficult to see how making use of this incentive could expose a company to increased risk.

Instead (maybe counter-intuitively), we believe making use of the 12L process will significantly reduce risk to the companies involved.

To explain our point of view let's take a typical project workflow:

- As a company you may consider implementing a project that will save energy. The 12L incentive will increase the financial viability of the project, so you decide to include this incentive in your business case for the project to be approved.
- If (and only if) the project gets corporate approval, you proceed with the 12L process as well as with project implementation.
- Since you want to apply for 12L, you are now required to appoint an independent, SANAS accredited M&V body to perform the M&V work. Note, the appointment of the M&V body is no different to the appointment of any other service provider – you agree on the rates and cost, these costs are not fixed but can be negotiated with the various M&V bodies you consider appointing. You can require the M&V body to comply with your BBEE requirements, insurance requirements, health & safety requirement, etc. This is just like appointing any other service provider. A list of accredited M&V bodies is available from the SANAS website.
- You register your intent to apply for 12L on the SANEDI website. The appointed M&V body may assist you in this process.
- The normal commercial process takes its course and after a period of time you (or your contractors) complete the installation and the

project starts to realise the savings it is supposed to. Or does it?

- As an absolute minimum, the M&V body appointed will provide you with a saving report at the end of a consecutive 12-month period following the commissioning of the project(s) in question. They (the M&V body) are responsible for issuing this report and could be held liable (by your company and others like SANAS, SANEDI and possibly even SARS) for any blatant inaccuracies or omissions in this report.
- Such an M&V report will answer (independently & objectively) the question posed above namely '...the project starts to realise the savings it is supposed to. Or does it?' In other words, you will get an objective view of the value and savings delivered by the project(s) in question.
- Rather than to increase your risk, we believe this reduces your risk moving forward. The information provided by the M&V process will help you to decide on the nature and feasibility of future projects you may plan to implement. 'To measure is to know' and now, you will know the value delivered by the project(s) in question.
- At this point, after the contents of the M&V report is known to you, you still have the option to decide whether or not you want to submit the 12L tax claim.
- Unless deliberate steps have been taken to intentionally deceive and mislead the M&V body, the results they provide in the report would be conservative. The M&V body is required to provide a statement to this effect under a specified section that has to form part of the report according to SANS 50010.
- Should you decide to proceed, the saving certificate (issued by SANEDI) will be handed in with your next annual tax return.
- SARS now (as with any tax matter) have the final say as to whether they will allow the deduction or not. Provided that there are no abnormal circumstances, SARS is expected to allow the deduction and

your company will get the benefit of the rebate.

Looking at this process, it is hard to see how any significant risk is created? Conversely, it is easy to see how this process can help to manage the risk of not knowing to what extent your energy projects are performing as expected.

**By how much will a 12L application delay the process?**

It is important to understand that applying for 12L per se is not expected to add any additional time to project timelines – the 12L process is designed to run parallel to the 'normal' project implementation cycle.

Additional time as a result of 12L should ONLY be required in cases where a credible baseline cannot be established and where the M&V body requires more data (and therefore time) in order to establish such a baseline. In such cases, the much more pertinent question that begs answering should be 'If we do not have a credible baseline against which to evaluate the future savings, what business do we have implementing this project in the first place?'

A 'good' project WILL have credible information available that was used to develop the business case in the first place. In such cases, there should be no delays caused by 12L or by the M&V process.

**What should I do if I want to take the next steps?**

- Visit the SANEDI website and look for information on 12L.
- Estimate the annual saving your project is expected to realise.
- Use the figure of 17.5c/kWh to calculate the additional benefit as a result of 12L.
- If this figure is significant enough for you to justify appointing an M&V body to help you through the rest of the process, go ahead and appoint somebody.
- Sit back and enjoy an additional 17.5c/kWh for each kWh saved during the first 12 months of your new energy efficiency improvement project's life cycle.



## CONCLUSIONS

The 12L tax incentive is a welcome (now more than ever) support mechanism implemented by government to encourage the adoption of energy efficiency projects. At the time when 12L was designed, the Eskom IDM rebate program was in full swing. 12L was never designed to replace or supplement the Eskom IDM process – in fact concurrent benefits (like claiming both 12L as well as an Eskom rebate is expressly prohibited). At the time, 12L was designed to cater for projects (especially non-electricity projects) that fell outside the IDM realm.

With the uncertainty regarding the future of the Eskom IDM process, there is a chance (although this is pure speculation on our part) that Treasury may re-visit the 12L rates at some future date with a possible view of increasing the rebate, increasing the period over which the rebate may be claimed or possibly both.

We think this is a possibility since we believe government is committed to making 12L a success and that they would be willing to adapt the system as needed in future to ensure this success. Why do we think so? Because 12L poses a win-win-win to all parties involved, government gets more taxes due to increased profitability, the customer gets the additional financial benefit, emissions are reduced which benefits the environment and the economy is stimulated due to more projects and increased competitiveness of industry in general.

One final question remains, if you have a pending energy efficiency project, why on earth would you decide to throw away an additional benefit of 17.5c/kWh for each kWh saved? For all but a few really small consumers, 12L seems like an obvious incentive to apply for.

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# Long-awaited 12L roadshow comes to Cape Town

**M**arch 2014 saw the much anticipated SARS 12L roadshow presented at Eskom in Brackenfell and included presentations by DoE, SANEDI, SARS & SABS with well over 250 people in attendance from ESCO's, Eskom, local M&V bodies and the private sector.

Despite much having been already written on 12L in principle, there were still many questions about details of the programme that needed addressing, so the roadshow was welcomed. This article aims to bring clarity to some practical aspects of the programme which may not initially have been very clear.

## STRUCTURED APPROACH

Although first mentioned in 2009, it was only in December 2013 that the 12L Tax Incentive for Energy Efficiency savings was finally gazetted. On many minds must have been the question, "What's been the hold-up?" According to the DoE, one of the reasons was the process of checking that this legislation would be practically implementable. By the end of the day, it was clear that time has been well spent designing the administrative processes and procedures to make participation in the programme as simple as possible while minimising program risk. The DoE also said it has been essential to design the program as an aligned component of a larger integrated strategy for meeting EE goals through mandatory & voluntary actions. The incentives will be paid from the fiscus and the law has a sunset clause of 01 January 2020.

DoE was emphatic that 12L was not intended to replace the Eskom IDM energy saving rebates but was introduced as a means of meeting the national energy efficiency targets with the expressed objectives of addressing energy security, global competitiveness, unemployment and attempting to 'decouple growth in energy consumption from growth in GDP'. The National EE Strategy was reviewed in 2011 with public participation and was submitted to parliament for approval. The DoE

wanted this to be approved before the dissolution of the current cabinet, however, the cabinet agenda has not been able to accommodate it. This certainly leads one to ask what priority the EE goals are being given.

## ONLINE PROCESS

The implementation of the 12L programme has been assigned to SANEDI. The online application system developed for the purpose is cloud-based and the intention is for each application to be an entirely paperless process. ESCO's were informed that the system is open for business and projects can be registered at <https://saneditax.org.za>. Recommended browsers are Firefox, Chrome & Safari, but use of Internet Explorer is discouraged.

One key aspect of 12L which differs from the Eskom IDM programme is that energy savings are applicable to all fuel types, not just electricity. This will call for particularly robust M&V when fuel-switching is involved. All energy savings, however, will be quoted as kWh equivalents. It was also emphasised that savings (or losses!) due to interactive effects which only become apparent after implementation will not be eligible. This once again calls for a very thorough scoping and baseline stage from an M&V perspective.

## INCLUSIONS, EXCLUSIONS AND THE LAW

Projects that qualify for the programme include 'classical EE' projects (including waste heat recovery), energy conservation projects (including operational & behavioural changes) as well as Greenfield projects. In the case of Greenfield projects, the baseline would need to be constructed from 'comparable' data in terms of facility type, size, output, location and any other factors deemed relevant.

A very notable exclusion of projects which qualify for 12L is that of renewables and this certainly elicited much discussion as the wording of the act seems open to interpretation. The

gazetted definitions of 'Co-Generation' and 'Combined Heat & Power' include co-products, by-products, waste products and residual products from industrial processes. However, § 6(2) then specifically excludes renewable fuels for co-generation which is somewhat contradictory. There is another further restriction on 'Captive Power Plants' unless the onsite energy generated and used by such plants account for more than 35% of the total energy use within the facility during the 12 month assessment period. The discussions around these issues only highlighted that this law is yet to be tested in court. The DoE responded by saying that renewables are being introduced through REIPPPP, but that they are 'open' to evaluate business proposals for renewable captive power plants for 12L and then went on to invite such applications. Regardless of these questions, it is certainly clear that the act is aimed at reducing demand rather than increasing supply.

The frank presentation by a SARS legal representative revealed just how new and untested this legislation is and even challenged SANEDI's interpretation of 'A Person' as written in the Act. They cautioned that there will be tightening and learning as all stakeholders become accustomed with the processes and the interpretation of the law as it is written. For those 'Persons' wanting to make a claim for 2014, they should use the general field on their tax return called 'Other' but assurance was given that the 2015 returns will be modified and made ready for 12L claims.

Two positive technicalities from SARS were mentioned. Firstly, the depreciation of the capital investments in projects can be claimed as normal as well as the 45c/kWh incentive. Secondly, the M&V costs can be included in the EE project costs as this is expenditure used for the production of income.

### M&V PRESENTS OPPORTUNITIES

The 12L legislation stipulates that the M&V may only be carried out by SANAS accredited M&V bodies. A valid concern raised by delegates was whether there is sufficient M&V capacity to cope with the expected claims. Part of the purpose of the workshop was to actually stress that this gap in the provision of M&V services represents a significant opportunity. The presentation by SANAS quickly dispelled the myth that M&V is reserved for academics at universities and is

accessible to anybody, provided that they meet the requirements of the ISO 17020 standard pertaining to M&V, and the entire step-by-step process of accreditation was presented. M&V work can present opportunities at many different levels from tasks such as counting lights to determining the efficiency changes in complex industrial processes. Obviously there are costs involved with becoming accredited and some delegates asked whether there would ultimately be enough work to make it a viable business opportunity. Another opening also exists in the consultancy sphere of the process of accreditation itself. These opportunities are seen by the DoE as all contributing to the goal of creating employment.

Unlike with IDM projects, ESCO's and companies are at liberty to award M&V work to service providers of their choice but are also liable for the costs of the M&V which must be factored into project costs. In this regard, the costs of metering and data requirement stipulated by M&V companies should never be overlooked. Some delegates expressed racketeering as a concern but were reassured by SANAS that only competitive practices would be allowed.

On a positive note, it is expected that the M&V costs for 12L may be less than those required for IDM-funded projects. The reason for this is that according to SANEDI, they will require a single figure of energy saved for each assessment period (should the period fall over more than one tax year). Thus, there is no need for Time-of-Use reporting as 1 kWh saved at midnight on a weekend will be worth the same 45c incentive as 1 kWh saved during a weekday evening peak. Also, the reporting requirements for 12L are not quite as stringent as for IDM, thus some reports could be combined, allowing for costs to be reduced.

### CONCLUSION

Certainly the greatest sentiment expressed by those in attendance was that the actual realisable benefits of the programme are too conservative. Firstly, the after-tax benefit of 12.6c/kWh vs the initial apparent value of 45c/kWh and secondly, the length of time for which the benefit is claimable (12 months). For those designing the programme, the announced value of a 45c/kWh incentive may have seemed very clear, unaware that Joe Public might not know the subtle but signifi-

cant difference between a tax incentive and a tax rebate. The actual value of 45c was derived from roughly half of the lowest tariff bid from one of the rounds of REIPPPP.

The DoE certainly gave the assurance that both of these aspects are subject to review by National Treasury such that the goals of the programme are met. Perhaps this will ultimately be determined by the level of participation.

A personal impression was that on the whole the roadshow was very professional, well organised, well rounded and certainly worth attending. However, one was left with the impression that many businesses were not convinced and are left asking, "Do we wait and try to force the government to increase the benefit or take the plunge and risk being the guinea pigs of a legally untested programme?" We will wait with anticipation to see the response.

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that has been charged by NEMA, with the responsibility of granting environmental authorisations. As this power line is linked to a proposed electricity generation project and thereby considered to be of national importance, the National Department of Environmental Affairs (DEA) is the competent authority and the Western Cape Department of Environmental Affairs and Development Planning (Western Cape DEA&DP) will act as a commenting authority.

An application for authorisation has been submitted to DEA for the proposed power line. The power line has been registered and allocated the following EIA Reference number: 14/12/16/3/3/1/996. Moyeng Energy (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd, as the independent environmental consultant, to undertake the required Basic Assessment process and assess all the potential environmental impacts associated with the proposed project, and propose appropriate mitigation and management measures in an Environmental Management Programme (EMPr).

As part of these environmental studies, I&APs will be actively involved through the public involvement process also being undertaken by Savannah Environmental. By registering on the project database, one will receive all information relating to the project and will be provided with an opportunity to provide comment and input into the Basic Assessment Process. Comments can be made as written submission via fax, post or e-mail to the Process Facilitator.

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## World's top solar thermal experts lecture at the University of Pretoria

The world's top solar thermal experts offered a specialist workshop on 'Solar Heat for Industrial Applications' at the University of Pretoria on 3 and 4 February 2014.

The attendance of 40 is exclusively limited to persons who have attended previous SOLTRAIN courses, or have experience with large solar water systems in Lesotho, Mozambique, Namibia, South Africa and Zimbabwe.

The positive reaction of the expert attendees was overwhelming. 'The best SOLTRAIN course ever'.

This Train-the-Trainer workshop is part of the unique Southern African Training and Demonstration Initiative (SOLTRAIN), sponsored by the Austrian Development Agency (ADA). The Pretoria University workshop is coordinated by the Sustainable Energy Society of Southern Africa (SESSA). 'Train-the-Trainer' entails that the recipients of this specialist training are committed to disseminate the knowledge they received.

'South Africa and the SADC region urgently need this expertise', says Prof Dieter Holm, regional SOLTRAIN coordinator, 'and this is a cost-effective way of creating decent long-term jobs'. Proj-

ect leader, Werner Weiss, concurs: 'Southern Africa has twice Austria's sunshine'.

The University of Pretoria is South Africa's and SADC's leader in the use of solar water heating in their student residences. The University is also building a thermal demonstration unit for practical experiments by students. The Pretoria campus falls within the SOLTRAIN Solar Thermal Flagship District, where various installations can be visited by technical tourists and political decision-makers.

Southern Africa boasts 59% of the world's best winter sunshine area, but does not rank among the global solar thermal leaders. 'Not yet', says Prof Holm, 'but, given enabling legislation and leadership by example in government buildings, we would create a sustainable and competitive solar water heating industry in the region. A strong local solar water heating industry will earn forex, reduce our chronic regional electricity problem, reduce pollution and contribute to achieving our environmental commitments'.

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SOLTRAIN 2 workshop in action, 4 February 2014 (photo: D Holm)



SOLTRAIN 2 - a lighter moment (photo: D Holm)

# Singulus Technologies and PTiP launch CIGS photovoltaic pilot production facility in South Africa

## PROFILE AND BACKGROUND

**S**ingulus Technologies develops innovative technologies for efficient production processes, which only make use of resources conservatively. New production technology combined with sustainable processes and the use of novel materials can decouple the use of resources from economic growth in the long-term. Singulus Technologies' innovative power and competitiveness are strengthened by these new technologic developments.

With its Optical Disc segment Singulus Technologies is the market leader for CD, DVD and Blu-ray Disc production equipment. As the only engineering company worldwide Singulus Technologies today already provides the machine technology for three-layer Blu-ray Discs with a storage volume of about 100 GB.

In the Solar division Singulus Technologies is a recognized supplier for new machines concepts and production processes for crystalline and thin-film solar cells, which increase the efficiency of solar cells and reduce their production costs. Singulus Technologies establishes itself as a development partner and machine supplier for technologies enabling a sustainable energy provision on the basis of renewable energies.

In the Semiconductor segment Singulus Technologies focuses its activities on the vacuum coating of wafers with ultra-thin layers for the production of MRAM memory, thin-film write/read heads and other semiconductor applications.

Singulus Technologies continues to expand its know-how in vacuum coating, the automation and process technology as well as the integration of manufacturing lines in order to develop new work areas. To strengthen the existing business activities Singulus

Technologies is currently reviewing concrete acquisition opportunities.

New application areas for vacuum deposition technology are the focus of the further development.

## THE LAUNCH OF THE PHOTO-VOLTAIC PILOT PRODUCTION FACILITY IN STELLENBOSCH

On 3rd February, in the presence of numerous honorary guests from Germany and South Africa including high-ranking politicians, business and technical partners, Photovoltaic Technology Intellectual Property (Pty) Limited (PTiP) launched the successful commissioning of its pilot production line for the manufacturing of CIGS thin-film solar modules. Singulus Technologies (SINGULUS) supplied the engineering technology and support for the key production processes.

PTiP, a spin-off from the University of Johannesburg (UJ), has already been working on the development of CIGS solar modules for the past 20 years. The demonstration plant in the Techno Park near Stellenbosch was established on the back of the critical success demonstrated in the UJ research laboratories. This facility will serve as a state-of-the-art research and development facility for commercial-scale and market ready 1200 mm x 600 mm CIGS modules. The commercial development of the PTiP process is in the limelight of the South African government. The Industrial Development Corporation (IDC) is a strategic shareholder and financially supports of the expansion by PTiP in Techno Park. PTiP received additional financial support from the 'Technology Innovation Agency' (TIA), an initiative of Department of Science and Technology. With the new CIGS line, the development of modules can be improved with particular regard to the efficiency and the special demands of the African market.

The project also attained particular interest in the course of the German-South African Science Initiative.

Prof Vivian Alberts, CEO of PTiP, comments: 'The commissioning and official opening of this CIGS pilot facility in South Africa confirms the goals of the South African government to support and promote alternative and renewable energies, based on locally developed IP and skills. It is an important step for a successful energy policy in our country. 'Prof Alberts adds: 'The immediate goal is to set-up a commercially viable production plant for CIGS thin-film modules in South Africa in order to supply products with high local content to existing and future PV projects in South Africa. The European Investment Bank already announced its support for the establishment of a PTiP production plant and the mass production of PV modules. With the core production equipment and support from our partner, SINGULUS, we are able to industrially and efficiently implement our developed process. '

SINGULUS has been working with the scientists from the University of Johannesburg for the past 3 years and in the course of the cooperation already delivered the first laboratory systems in 2011. Dr.-Ing. Stefan Rinck, CEO of the Singulus Technologies AG, remarks: 'With the vacuum coating, the selenization as well as two work steps in the wet-chemical area, in total we supplied four key process steps for a CIGS line. With our partner PTiP, we intend to continue to successfully implement the additional expansion stages as well. '

## INFORMATION CIGS THIN-FILM SOLAR TECHNOLOGY

Solar cells and modules can be categorized in terms of the specific production processes and used materials, for example, crystalline silicon solar cells and CIGS thin-film modules.

The CIGS thin-film solar technology utilizes large glass substrates as the basic substrate material, on which a very thin photo-active layer with a thickness of approx. 1.5 to 2.5 µm is applied. This absorber layer consists of a compound semiconductor including the elements copper, gallium and indium with selenium and sulphur in a so-called chalcopyrite structure.

In contrast to monocrystalline or polycrystalline solar cells, thin-film modules only marginally lose performance amid low light or very high temperatures. This results in the fact that thin-film solar cells produce electricity earlier in the morning hours and later in the evening hours. Furthermore, thin-film solar modules can be used as a design feature for the front or the roof of buildings due to its homogenous surface and better visual appearance.

Singulus Technologies focuses on the market of CIGS solar cells with photoactive layers made of compound semiconductors. These thin-film cells have achieved laboratory efficiency levels of around 20% so far. The efficiency of modules is in a range from 13% to 15%, depending on the module size.

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## Rand Merchant Bank shows support for onshore wind

**R**and Merchant Bank, one of South Africa's leading banks has confirmed their sponsorship of a wind energy summit in Cape Town this year.

In a rapidly growing market and with more than three competitive bidding rounds already underway, onshore wind in South Africa has never been so enticing to the global industry.

Confidence in this market has yet again been stressed by Rand Merchant Bank [RMB] who has confirmed their 'gold sponsorship' of the Wind Energy Summit South Africa (9-10 April, Cape Town). During this industry meeting, RMB will share their experience of successful financing during the round one development at the Hopefield wind farm.

Sharing key insight into the project, RMB will cover bankability considerations for South African wind projects, with specific reference to the Hopefield wind farm in addition to lessons learned by financiers from rounds one and two of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

Victoria Auckland, Project's Director of the summit organiser, Wind Energy Update said, 'We are delighted to announce Rand Merchant Bank as official Gold Sponsors of Wind Energy Summit South Africa. Their fantastic insight into the market in particular and the bankability of projects will be very well received and has generated a lot of excitement amongst our attendees.'

The summit brings together the key decision makers of South African wind, including the National Treasury and the Department of Environmental Affairs, NERSA, Eskom, Nedbank Capital, Gestamp Wind, Siemens and Suzlon.

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**WIND  
ENERGY**  
update

## Rural electrification in South Africa with platinum-based fuel cells using methanol fuel

### THE OPPORTUNITY

**L**ike many emerging economies, South Africa (SA) faces the challenge of providing universal access to reliable, high quality, carbon-efficient energy. A recent report prepared on behalf of Anglo American Platinum Ltd. (Amplats) has identified the significant potential of fuel cell (FC) applications to meet this challenge. Fuel cell applications could also make a significant contribution towards economic development and the creation of skilled employment opportunities in South Africa.

FC technology is rapidly evolving and offers efficiency, versatility, and scalability benefits that make FCs powerful solutions for off-grid energy generation. South Africa has more than 3.2m households without electricity. Of these, approximately 1.3m households are in rural communities. Despite the SA government's resolute plans for expanding power capacity and transmission lines, large areas in the Eastern Cape, Limpopo and KwaZulu-Natal will still be off-grid in the foreseeable future. It is estimated that for at least 30% of these households, FCs can provide more cost-effective and less carbon intense electricity than grid connection and have significant cost advantages over other off-grid solutions such as solar, PV, or diesel generators.

Further benefits of FC technology include the scalability and modularity of



the technology. This means a solution can be right sized for communities and power output can be increased as the community grows. FC mini-grids offer the prospect of rural communities being able to develop cottage industries and lift themselves out of poverty.

In addition to the potential for low-carbon rural electrification, the development of a domestic FC industry could provide significant benefits to SA's emerging economy:

- Job creation from FC deployment (installation, maintenance, re-fuelling);
- Industrial capacity building in a high tech manufacturing industry;
- Job creation in knowledge-based industries along the entire FC value chain; and
- Unlocking new export markets in the rapidly growing clean tech sector.

**THE PROJECT**

Amplats and Ballard are currently implementing a project for the development, commercialisation and market introduction of a home generator FC product in South Africa. The product is designed for use in non-electrified communities in rural South Africa. The product specification is a 2.5kW fuel cell system fuelled by methanol. The final system allows running units in parallel to scale the power output to the community needs, and includes batteries for energy storage. The project plan segments the implementation into the four phases shown in Figure 1.

Unlike PV or wind, fuel cells can produce power whenever the demand exists and can produce sufficient power for refrigeration and some cooking, a limitation that is often seen in PV installations. Fuel cells offer a more efficient, less polluting and lower cost fuel option than supplying rural communities with power from diesel generators.

Initial feasibility studies confirm that the methanol fuel cells are more economically attractive than expanding power line for communities that are greater than ~15 km away from grid. In challenging terrain and low density communities the fuel cell solution is

most attractive. Plans are based on the premise that rural communities receive free basic electricity allocation. FC mini-grid technology enables the government of South Africa to meet its objectives of universal access to power at a lower cost.

During Phase 1, which was completed in 2012, technology and market feasibility studies were conducted with positive results. The market study has estimated the market for the proposed specification of fuel cells in rural electrification in South Africa alone at between US\$220m and US\$480m, with the potential to scale the solution into countries like Angola and Republic of Congo, among others.

Phase 2, the current program phase, focuses on the development of a prototype system and an initial field trial. The prototype system being developed by Ballard Power Systems will contain a newly developed fuel cell stack, methanol fuel processor and system specifically targeting the market requirements of rural electrification. A demonstration of FC mini-grid technology in a rural South African community is to start in Q1 2014 led by Amplats and Ballard.

Phase 3 covers the establishing of manufacturing capacity in South Africa, with large parts of the value chain located in South Africa, including the assembly of the system, the manufacturing of a significant share of its components as well as installation, servicing and fuelling logistics. An initial phase of market penetration would seek a rollout of 200-300 systems to villages to showcase the technology.

Phase 4 foresees commercialisation of the supply chain and a rollout of tens of thousands of units across rural SA and later other countries facing the same challenges of electrification of rural villages.

**PROJECT PARTNERS**

Anglo American Platinum Limited is the world's leading primary producer of platinum group metals producing around 40% of the world's newly mined platinum and employing over 51 000 people in South Africa.

Ballard Power Systems Inc. is a global leader in the design and manufacture of clean energy, zero-emission proton exchange membrane fuel cells, supplying the world's largest fuel cell bus fleet and an expanding global customer base.

**NOTES**

1. The Carbon Trust, *Accelerating a Fuel Cell Future for South Africa: A report prepared for Anglo American by Carbon Trust Advisory*, 2011
2. Roland Berger Strategy Consultants, *Fuel cell – an attractive value proposition for electrifying rural South Africa*, 2012

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Figure 1: Timeline for AAPL/Ballard "Rural Electrification in South Africa" Project

# Lahmeyer consults in various phases of power projects in the SADC region

## BACKGROUND

As an independent company of consulting engineers, Lahmeyer International offers a wide range of planning and consultancy services. The main fields of activity are complex infrastructure projects in the Energy, Hydropower and Water Resources Sectors, Water Supply and Sanitation as well as in Building and Transportation. Positioned as an international market leader in the engineering consulting business, the Lahmeyer Group employs more than 1 500 people from over 30 specialist fields worldwide. Among the clients of Lahmeyer are governments, authorities, energy suppliers, industrial enterprises, investors as well as international financing institutions. Lahmeyer has executed projects in 165 countries all around the globe.

Lahmeyer International can record a series of new projects from Southern African countries. The consulting engineering company currently provides advisory services for the construction and operation of several power plant projects in the SADC region.

The Southern Africa Development Community (SADC) is an inter-governmental organisation headquartered in Gaborone, Botswana. The main goal of SADC is the socio-economic cooperation and integration as well as political and security cooperation among 15 southern African states.

## REHABILITATION WORKS FOR COAL-FIRED POWER PLANT IN BOTSWANA

On behalf of the Botswana Power Corporation (BPC) Lahmeyer International is providing Owner's Engineering services for the Morupule Power Station with an installed capacity of 132 MW (4 x 33 MW units). The plant serves as one of the few power stations that supplies base load to the electrical grid. Thus, it plays a pivotal role in the power supply sector of the country. The core

of Lahmeyer's activities lies in the planning and supervision of a rehabilitation measure in order to extend the power station's lifespan by more than 15 years and to increase the availability rate of the plant, which was commissioned in 1986, on a significant and sustainable basis.

## OPERATIONS AND MAINTENANCE STRATEGY FOR CCGT POWER PLANT IN NAMIBIA

In Namibia, Lahmeyer acts as Independent Advisor for the Namibia Power Corporation (Pty) Ltd. (NamPower) for preparation and implementation of Operations and Maintenance (O&M) for the Kudu 800 MW Combined Cycle Gas Turbine Power Plant. In addition to the day-to-day O&M duties, the Lahmeyer experts prepare the frame of future cooperation with the original equipment manufacturer during the long-term service agreement phase, and set up the documents for a training programme for the Namibian O&M team. Moreover, Lahmeyer will support NamPower during handover of O&M

duties from the contractor to NamPower.

## CONVERSION TO NATURAL GAS OPERATION FOR A POWER PLANT IN MOZAMBIQUE

Lahmeyer is also supporting a power plant in Maputo, Mozambique. The plant is owned and operated by Electricidade de Moçambique, E.P. (EDM). For cost reasons, two of the three gas turbines which are installed in the power plant shall be converted to burn natural gas instead of Diesel. In 2015, they will be connected to a newly constructed gas pipeline. Lahmeyer International and its local partner - Tecnica Engenheiros Consultores LDA were contracted as an independent Consultant to convert units no. 2 and no. 3 for this project. The specialists are responsible for assessment of the current status and preparation of the technical tender documents. They provide supervisory services during the EPC phase and finally management of handover of the plant to the operating personnel.



*In Zimbabwe, Lahmeyer investigates, among others, the thermal power plant Bulawayo.*

## MODERNISATION OF THERMAL POWER PLANTS IN ZIMBABWE

In Zimbabwe, Lahmeyer is performing a study in order to investigate the current status of the thermal power plants Harare-II (60 MW) and Bulawayo (120 MW). By using modern technology, the Zimbabwe Power Company will make the operation of the old plants more viable. NamPower assists the company during this process. Lahmeyer verifies the existing feasibility study and recommends improvement measures. Furthermore, the Lahmeyer experts review the assessed EPC bids for Harare-II and evaluate the proposed refurbishment measures and their effects on the plant, both in technical and financial terms. Finally, Lahmeyer will prepare recommendations for further proceedings steps.



*Lahmeyer provides advisory services for the conversion of a power plant in Maputo in Mozambique*

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# Malagasy Navy engages Drum Cussac to support anti-piracy operations

GLOBAL RISK MANAGEMENT CONSULTANCY DELIVERS FIRST PROJECT IN MADAGASCAR

Leading global business risk specialists Drum Cussac have been selected to deliver anti-piracy training for the Malagasy Navy at their naval base in Diego Suarez, to assist in providing a secure environment for Madagascar's offshore operations. This is the first time that a private company has been permitted to partner with the Malagasy Navy to help enhance its anti-piracy capabilities.

A team of Drum Cussac's highly skilled and experienced risk management consultants worked closely with thirty Malagasy Naval personnel to enhance the Navy's anti-piracy capability when operating in an offshore environment.

Although reported cases of offshore security incidents in East Africa have fallen recently, the rapid development of Madagascar's offshore oil and gas industry has led to a growing need for more robust security in the region.

UK-headquartered Drum Cussac provides risk mitigation and security solutions for the oil and gas, energy, maritime and logistics sectors. The company is well-placed to work with the Malagasy Navy based on the strength of its experience in helping organisations address the multiple challenges faced when operating in complex regions where threats from piracy and criminality exist on a daily basis.

'Our training helps build credible and professional security teams that are capable of conducting anti-piracy and security duties generally,' said Andrew Nicholson, Director Offshore at Drum Cussac. 'The training will assist the Malagasy Navy in providing a secure environment for the region's offshore oil and gas sector. We have worked closely with the Malagasy authorities, agencies and regulators over a 12-month period and we hope to continue this relationship by delivering further projects in the region.'

General de Brigade Rabeharindranto, Director of Defence for the Malagasy Military, added: 'This was pragmatic training delivered by Drum Cussac and has given our men additional knowledge and skills to conduct anti-piracy operations.'

Drum Cussac has a proven track-record of working alongside the oil and gas industry and foreign governments in Africa, the Middle East and Asia Pacific, to create local capabilities that establish an environment in which companies can operate safely. The company has built a deep understanding of the need for proportionate security and risk mitigation measures to secure its customers' people, assets, reputation and profitability. It currently supports African operations in Nigeria, Tanzania, Kenya, Madagascar and the Mozambique Channel.

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## Storage will make CSP projects more financeable in South Africa

Concentrated Solar Power (CSP) has been positively affected by the decision of the South African Department of Energy (DoE) to increase the tariff uplift for producing power during the peaking hours of the day, as they will get paid 2.7 times the agreed tariff rate.

It can become an incentive to the CSP producers in the country to build plants that have at least six hours of storage. Plants with more storage have greater capacity to determine when they want to produce the power, which in turn, gives the power generator greater flexibility and influence over how much revenue it will be able to earn.

"All of these factors have contributed to a reduction in the risks for CSP, which in turn, will make these deals more bankable", said Alastair Campbell, Managing Director at Vantage GreenX and former Head of Power Finance at Standard Bank in the latest CSP Today Quarterly Update.

"The tariff uplift in the peak hours is forcing the CSP developers to structure their deals more like peaking projects than mid merit projects which, when compared against the cost of generating power from gas or distillate peaking alternatives in South Africa, starts to make a lot more economic sense. Over its lifetime, CSP with storage is probably the cheapest peaking alternative in this country, which in turn, will make these projects eminently more financeable", added Alastair Campbell.

Vantage GreenX will be joined at CSP Today South Africa 2014 (8th – 9th April, Cape Town) by leading financial institutions such as Investec, Standard Bank or DBSA who are all active in South Africa's renewable energy program (REIPPPP) to guarantee your project is bankable in future bidding rounds.

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## Africa moves to increase power infrastructure

Africa's power demands are soaring beyond the capacity of an ageing infrastructure to cope, but multiple programmes are being put in place to address the challenges. This is according to Dr Willie de Beer, Chairman of the DistributeCH Africa Advisory Board.

Pretoria based energy expert, Dr de Beer was speaking at DistributeCH International/Utility Products in San Antonio, Texas, where nearly 10,000 delegates from 67 countries gathered to discuss global power trends and challenges in January.

He said that Africa's total power demand in 2010 was 590 TWh, projected to grow to 3100 TWh by 2040 on the back of an ever-increasing demand for energy. 'The population of Africa is projected to reach 1.9 billion by 2050 and customer expectations are on the increase,' he said. Dr de Beer said that while there were pockets of power excellence and high levels of stability across the continent, the need for investment and upgrades was clear.

However, South Africa and the continent as a whole, was taking steps to address the challenges.

Dr de Beer noted that Africa is part of the Smart Grid infrastructure investment by 45 emerging market countries – including Brazil, Russia, India, China and South Africa – which over the next decade will reach \$274.9 billion, outpacing investment by developed countries. In addition, Africa and South Africa's investment is particularly focused on reducing electricity theft, improving reliability and incorporating renewable energy into electricity grids, and Africa is a key focus for the US, benefiting from President Barack Obama's grant package worth \$7 billion in government funding plus an additional \$9 billion in private sector commitments.

Dr de Beer told delegates: 'Eskom, South Africa's national electricity company and DistributeCH Africa's Host Utility & Networking Sponsor, plans to spend over \$150 billion on power infrastructure over the 2010-2030 timeframe, including \$11 billion on transmission-sector reliability alone and pilot projects over the next 10 years.'

Africa's plans to address power challenges and meet the future demands of an increasingly industrialised continent which would come under in-depth discussion at POWER-GEN Africa and DistributeCH Africa in Cape Town in March.

These events, co-located for the first time at the Cape Town International Convention Centre from 17 - 19 March 2014, attracted around 3000 industry experts and power industry professionals from across Africa and abroad.

The event, presented by PenWell Events, featured the best of the international POWER-GEN and DistributeCH events, combined with an in-depth focus on Africa's unique challenges and opportunities. The world's leading power engineering vendors present solutions designed to address Africa's unique power challenges.

Dr de Beer notes: 'Facilitating economic development, smart grids and the role of emerging technology are just some of the solutions the inaugural DistributeCH AFRICA event would present to help Africa to achieve successful strategies for long-term, sustainable solutions.'

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# African energy leaders see global climate framework uncertainty, high energy prices, and commodity prices as top critical issues

**A**frican energy leaders see global climate framework uncertainty, high energy prices, and commodity prices as the critical issues driving Africa's energy agenda this year, according to the 2014 World Energy Issues Monitor, released by World Energy Council (WEC).

The African views are in contrast with the global view, where high energy price volatility has for the first time replaced climate framework as the top critical uncertainty.

Bonang Mohale, WEC Vice-Chair Africa, commented at the report launch at the Africa Energy Indaba:

'Our African survey finds that, in contrast with the global findings, climate framework has become an even more critical issue. Africa is dramatically vulnerable to climate change, and Africans are becoming more aware that climate change is an urgent and real issue rather than something that only countries with large emissions should worry about.'

In Africa, electricity supply remains a critical concern, with growing demand, lack of required investment, and increasing power shortages across the continent. Renewable energy remains a high-priority issue.

As a change from last year's findings, African national governments and regional institutions are taking actions in energy efficiency and regional inter-connection, while investment cooperation with China and India is viewed with increasing importance.

The report captures the views of over 800 energy leaders including ministers, chief executives and the heads of the WEC's national members committees covering 84 countries.

In its global findings, climate framework uncertainty is now perceived by energy leaders to have less impact than in the previous three years of the study. Meanwhile, carbon capture, utilisation and storage (CCUS) continues



to be viewed as a technology having limited impact.

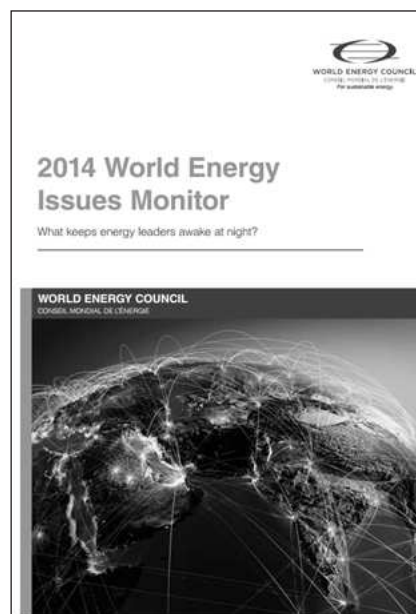
Energy leaders are also increasingly concerned about the sector's ability to access the capital markets for funds towards energy infrastructure, when set against a continued recessionary backdrop.

Christoph Frei, WEC Secretary General, said:

'The fact that both climate framework and CCUS are perceived to be issues of less impact is bad news not only in terms of emissions mitigation, but also for the development of robust and resilient energy infrastructure. Our energy systems are in a state of massive expansion and transition, and the

signals we see today provide clear evidence of the urgent need for more robust, coherent, long-term frameworks for planning our future investment.'

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## Fasken Martineau advised on African Renewable Deal of the Year 2013

**F**asken Martineau, a leading international business law and litigation firm, announced that the 50 MW CSP Power Generation Facility in Bokpoort, Northern Cape has been recognized as the "African Renewable Deal of the Year 2013" by Project Finance International, published by Thomson Reuters, which tracks project finance activity across all sectors on a global basis. The Bokpoort CSP financing project took top spot over more than 30 renewables that also closed in 2013 from across the African continent.

The project was procured pursuant to the Renewable Energy Independent Power Producer Procurement Programme initiated by the Department of Energy. This was a greenfield project, developed on a BOO (build, own and operate) basis located in the Northern Cape province of South Africa with a net generation capacity of 50 MW with nine hours of thermal energy storage. Once completed it will be a CSP power plant with the longest amount of thermal storage in the world.

Fasken Martineau advised the lenders, Investec Bank Limited, ABSA Bank Limited and Old Mutual Specialist Finance, in respect of financing of the project with a team that included Blaize Vance, Ashen Jugoo, Michael van Vuren, John Janks, David Manny, Jamie MacDonald, Tamsyn Zulch and Katy-Lynne Brannigan.



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## Carbon footprinting: A practical calculation guide focusing on measuring, monitoring, reporting and verification

**C**arbon footprinting entails calculating the total greenhouse gas (GHG) emissions of an economic activity; as a proxy of the activity's impact on the environment. It is commonly accepted that GHGs increase the rate of climate change, with (potentially) severe implications for weather patterns and the future of all economic sectors; and in particular agriculture.

There are many reputable sources of information freely available relating to climate change and the carbon footprinting of economic activities. The question can be asked why is there the need for this carbon footprinting book? The answer is simple. The sources that do exist are not easy to understand and are mainly geared towards people that are already experts in carbon footprinting. This carbon footprinting book is different. It takes the reader by the hand and explains in a step-by-step manner the nuances of carbon calculations by using day-to-day examples like the use of electricity. It also incorporates and explores the nuances that are faced in the South African GHG reporting context in a conversational style.

International negotiations for a long term future in which GHG production is severely restricted is progressing at a snail's pace. This book then provides the reader the necessary background to follow the basics of the international negotiations and how it relates to us as South Africans, and to South African companies; for example, potential restrictions on trade.

Domestically, the South African National Treasury is also proposing the phasing in of a carbon tax – now in 2016. This book explores how South African companies could do their tax compliance by calculating their own carbon footprint.

With an increased understanding of carbon footprinting companies and members of society will be:

- Better placed to reduce opera-

tional expenditures associated with the use of electricity, petrol, diesel, electricity and refrigerant gasses, to name but a few;

- Better geared for the looming domestic and international financial penalties that will be associated with GHG pollution;
- Make informed operational choices; and
- Think strategically about developing products and services for an increasingly complex world with environmental limitations.

The book can be broken down as follows:

- The first section explains international conventions and local applications of carbon footprinting in a conversational "how to" manner.
- The second section consists of a selection of case studies. The reader is exposed to real carbon footprints and GHG information of predominantly South African companies. Certain structured discussions and questions are posed while other open ended questions are debated in structured learner interactions.

The book is a collaborative effort of Stellenbosch University and the Sustainability Institute, and Nedbank, and was formally launched at the Nedbank Group's head office in Sandton on the 4th of February 2014. It is freely available from: [www.nedbankgroup.co.za/pdfs/Carbon\\_Footprinting\\_Guide.pdf](http://www.nedbankgroup.co.za/pdfs/Carbon_Footprinting_Guide.pdf).

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## OBJECTIVE OF THE WORKSHOP AND GREEN CAPE STUDY

Green Cape is doing a 5 month feasibility study on biofuel production in the Western Cape. The main objective of this workshop was to help Green Cape and partnership (City of Cape Town and the Western Cape Provincial Government) to elicit what the stakeholders in the Western Cape would like to be included in this study.

The objectives of the Green Cape study are as follows:

- Understanding the current status of biofuel production in the country
- Investigate the amount of biofuels that will be needed to support the green transport fleet in the province
- Investigate the potential of bioethanol as an alternative fuel for fleet/transport in the Western Cape.

There were a few presentations from

- The SCANIA CEO
- Buks Venter, Managing Director of Taurus Distillations cc,
- The Department of Bioprocess Engineering, Stellenbosch University
- Western Cape Ethanol (A group of co-ops that came together to revive the economy of rural areas in the Western Cape).

According to SCANIA, technology that is needed for bioethanol use is not a problem for the heavy fleet industry. For heavy fleet, engine capacity and compression sections are the two areas where changes can be made. Since bioethanol has low energy content, the tank must be bigger than a conventional tank. A huge motivation from this presentation was that all buses in the city of Stockholm in Sweden use bioethanol. A sample bus that they brought to the workshop is shown in Figure 1.

According to Taurus Distillation, 2 million litres of bioethanol can be produced from fruit juice waste, potato waste and wine industry waste. Currently Taurus produces 122 596 L of fuel ethanol from 1 512 000 litres of waste juice.

According to the University of Stellenbosch's Department of Bioprocess Engineering, all the paper producing companies in South Africa can produce bioethanol at a small scale since,

# Western Bioethanol Workshop

most produce paper sludge between 15-50 tonnes, making them all economically viable even if each was producing bioethanol on their own.

Both the University of Stellenbosch and Western Cape Ethanol have not produced any ethanol so far. Western Cape Ethanol has done the feasibility study that was support by PetroSA and they have a business model which PetroSA has agreed to fund.

Western Cape Ethanol proposes to produce their ethanol from wheat and rye.

- The concern for land issues for growing that much wheat was raised.
- IDC pointed out that the government or IDC cannot not fund any bioethanol production with feedstock from plants since those plants will use land preserved for biodiversity purposes.
- Grain SA suggested that Green Cape must make a case and explain that grains must be supported to produce bioethanol since the Western Cape produces surplus grain. Grain SA suggested that the study should suggest to National government to stop dictating to the province on how they use their sur-

plus grain produce.

- Grain SA was of the view that the food security issue that is always picked by government as a threat, if maize and other grains are used for biofuel production, is not well supported by research.
- Grain SA is of the view that allowing grains to be used for biofuels will open new markets for farmers.

As for the University of Stellenbosch, they are still testing the different business model cases for the paper sludge in the province. The first model is where all the paper producing companies will sell their paper sludge to the ethanol producer at a centralised location. Secondly, each plant can produce its own ethanol with the option of having a mobile facility that will go to these sites to produce ethanol.

All the presenters including the Saldhana group (a group that proposes import/export of bioethanol) and SAPIA were very clear that Biofuel policy and the implementation direction is still not clear.

- The blending regulation and pricing strategy are not out yet
- Pricing strategy has delayed because the Department of Energy is considering sorghum as the only feedstock, but the sugar industry has halted the process questioning why they are left out
- SAPIA was of the view that implementing biofuels into the existing fossil fuel based market is very complex and not easy to do. SAPIA raised fundamental questions such as what if biofuels are to contribute to the Road Accident Fund, will they be economic to compete with conventional fuels (will there be any return on investment)?

The various stakeholders agreed that the Green Cape study should:

1. Question IDC on their choice of supporting biogas for greener transport instead of bioethanol, yet studies have shown that bioethanol is cheaper than biogas in terms of infrastructure costs.
2. Is market share of 2% for biofuels enough in the transport sector? The Green Cape Study will uncover this.

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Figure 1: A SCANIA green bus running on bioethanol

# ACSA workshops towards conforming with ISO50 001 with EnTF

The Energy Training Foundation (EnTF) presented its Energy Management System Implementation (EnMSI) training and workshop with members of the Airports Company of South Africa's (ACSA) technical and engineering member team who have all undertaken roles and responsibilities to reduce ACSA's energy consumption through a properly implemented energy management system.

ACSA has already embarked on a number of energy efficiency projects at

the various airports under the auspices of Chief Engineer, Dupie du Plessis, who is based at ACSA in Port Elizabeth. Extensive lighting upgrades to LED technology at most runways of the regional airports, as well as other lighting system improvements have already delivered at least 15% of energy savings. 'We are now focussing on ensuring the sustainability of energy saving initiatives which have already been done, as well as any further energy efficiency projects, by following a properly

implemented energy management system in accordance with ISO50 001', said du Plessis.

The workshop session over 3 days is based on the SABS/ISO50 001 Energy Management System standard. It takes the format of the EnTF's Energy Management System Implementation (EnMSI) training course together with a consulting service delivering not only an understanding of the ISO standard and its requirements, but is coupled with a delivery module which leaves a skeleton roadmap that includes:

- What needs to be done on the site to achieve optimal energy management
- Where energy can be saved
- Estimates of what energy savings could be expected
- Savings options that warrant further investigation for more accurate energy saving targets
- Training needs of staff and up skilling
- What tasks can be done in-house and what would be better outsourced
- Short, medium and long-term investment considerations
- Which technologies and retrofits need to be considered
- Which incentives and rebates can be pursued
- What is required to ensure continuous energy saving

The in-class bill verification process highlighted the importance of understanding tariffs and giving attention to billing received from utilities to ensure energy savings are measured correctly. A downward trend in billing received does not necessarily mean an energy saving if there has been a tariff change downward, the same would apply with upward tariff adjustments where it would not necessarily mean increased



*At the Port Elizabeth International Airport in January 2014, ACSA Energy Management System Implementation workshop and training with the Energy Training Foundation (EnTF):*

*From left to right (back): Dupie du Plessis (ACSA PE), Riaan Lombard (ACSA George), Yolanda de Lange (EnTF), Lance Coghlan (ACSA Upington), Roland Timm (ACSA Kimberley), Calvin Gilfillan (ACSA PE), Bradford Kruger (ACSA George)*

*From left to right (front): Simphiwe Mbonambi (ACSA PE), Dr Braam Dalgleish (EnTF lecturer), Patrick Nkeane (ACSA Bloemfontein), Samkelo Luyenge (ACSA East London), Sikhona Mkhwanazi (ACSA Bloemfontein), Siyanda Nxazonke (ACSA East London), Tshele Monareng (ACSA Bloemfontein)*



energy demand. Du Plessis said, 'These comparisons have prompted us to list bill verification as an opportunity to perform better energy management.' He continues, 'We have had many ideas of energy improvements that can be made, but the site visit with the EnTF team highlighted even greater opportunities to not only save energy but improve the performance of the equipment we utilise'.

Populating the energy review information, together with the available ACSA energy data, into a plan in line with the standard has given the ACSA team a clearer picture of the energy savings possibilities and how to establish the processes and means to work towards sustainable energy efficiency improvements.

Such on-site training workshops that facilitate the development of an energy policy, action plan and a roadmap to follow allows interaction between team members responsible for the success of any energy efficiency initiatives. It breeds an equal understanding amongst team members on the energy management road ahead, and what is required to achieve the targets set by the team members themselves.

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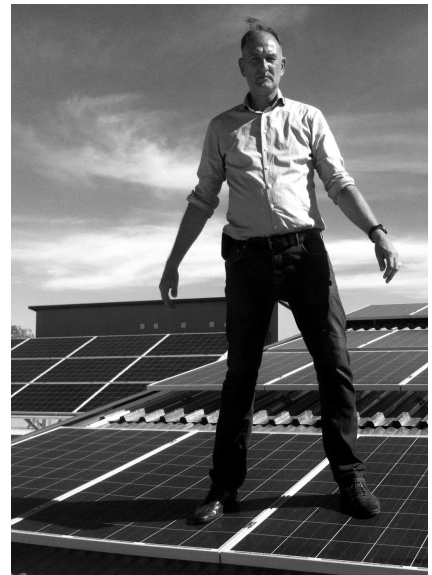


## Introduction to solar PV training

**S**UNCYbernetics will be hosting its solar PV introductory training course at the Solar Training Centre of SA, North West University, Potchefstroom, on Thursday, 26 June 2014, from 10h00 to 16h00 at a cost of R1 500-per person.

The course is for beginners and those that want to explore the possibilities of PV technology in South Africa. Topics covered include technical considerations like fuse choices, overvoltage and EMF-protection, monitoring, metering, cabling do's and don't's, electrical circuits as well as troubleshooting PV-plants, module types, project planning, installation, inverters, etc. In addition, delegates have the benefit of visiting an installation which demonstrates the theory discussed.

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*E-mail: [info@suncy.com](mailto:info@suncy.com)*  
*Website: [www.suncy.com](http://www.suncy.com)*



*Peter Schrum, Director of SUNCYbernetics, demonstrates the strength of the PV modules installed at the NWU campus in Potchefstroom*



## South African biomass energy: little heeded but much needed

**AN IIED PAPER HAS BEEN PUBLISHED ON SOUTH AFRICAN BIOMASS ENERGY**

**S**outh Africa badly needs more energy. Heavy reliance on large-scale coal and a centralised grid is no solution, especially given agreed Long Term Mitigation Scenarios. The largest renewable energy source is biomass energy but mostly in the form of wood fuel for cooking and heating.

Two modern attempts to develop South Africa's biomass energy potential — the Howick wood pellet plant, and the Tstikamma biomass plant — failed. But only just, and this was mostly due to local market conditions and stand-offs in agreeing purchase agreements with Eskom (the public energy provider), not insuperable technological difficulties. More coherent incentives for domestic biomass energy market development within South Africa are needed, both for more efficient wood pellet stoves and also for biomass electricity, if South African citizens, and particularly its poorer communities, are to have secure access to energy.

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*Website: <http://pubs.iied.org/17165IIED.html> (paper download)*



## Short courses in renewable and sustainable energy studies

**D**evelop and enhance your knowledge in renewable and sustainable energy in support of accelerated and shared economic growth in South Africa while earning CPD points.

Stellenbosch University will present a number of short courses in renewable and sustainable energy studies to enhance the capacity in the country to implement projects in this area. These courses form part of the taught master programmes but each module's week of contact is also registered with ECSA so that participants from industry can typically earn 4.0 CPD points in category 1.

*The dates for 2014 are as follows:*

	<i>Course date</i>	<i>Final registration date</i>
Renewable Energy Policy	19-24 May 2014	5 May 2014
Introduction to Solar Energy	9-14 June 2014	23 May 2014
Thermal Energy Systems	23-28 June 2014	6 June 2014
Photovoltaic System Design	23-28 June 2014	6 June 2014
Renewable Energy Finance	14-19 July 2014	30 June 2014
Bioenergy	11-16 August 2014	28 July 2014
Wind & Hydro Energy	1-6 September 2014	15 August 2014
Hydro & Ocean Power	1-6 September 2014	15 August 2014

All the courses will be presented in English by specialists in their field and will include group-work and interaction with other professionals. The venue is the Sustainability Institute based at Lynedoch, near Stellenbosch. Accommodation is available at Lynedoch or in Stellenbosch.

Further details, brochures and registration procedures are available on request.

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# Energy events 2014

## JUNE 2014

### 1 – 31 August

**YOUNG SCIENTISTS SUMMER PROGRAM**, Laxenburg, Austria  
 Websites: [www.iiasa.ac.at/yssy](http://www.iiasa.ac.at/yssy) and [www.iiasa.ac.at/postdoc](http://www.iiasa.ac.at/postdoc)

### 4 – 6

#### UNESCO CHAIR IN TECHNOLOGIES FOR DEVELOPMENT: WHAT IS ESSENTIAL?

Lausanne, Switzerland

Website:

<http://cooperation.epfl.ch/2014Tech4Dev/Sessions>

### 16 – 20

#### THE GREEN POWER MINI-MBA

London, United Kingdom

Website: [www.greenpowerconferences.com](http://www.greenpowerconferences.com)

### 18 – 19

#### POWER & ELECTRICITY WORLD PHILIPPINES 2014

SMX Convention Centre, Manila, Philippines

Contact: Lewis Moh, Business Development Manager

Tel: +65 6322 2743

E-mail: [lewis.moh@terrapin.com](mailto:lewis.moh@terrapin.com)

### 30 – 4 July

#### WIND POWER FINANCE SCHOOL

Johannesburg, South Africa

Website: [www.greenpowerconferences.com](http://www.greenpowerconferences.com)

## JULY 2014

### 21 – 23

#### DEVELOPING & DELIVERING GEOTHERMAL POWER PROJECTS

Nairobi, Kenya

Website: [www.greenpowerconferences.com](http://www.greenpowerconferences.com)

### 21 – 25

#### THE FUTURE ENERGY MIX MODELLING SCHOOL

London, United Kingdom

Website: [www.greenpowerconferences.com](http://www.greenpowerconferences.com)

### 22- 23

#### UNDERSTANDING GRIDS, SMART GRIDS & MICROGRIDS

Johannesburg, South Africa

Website: [www.greenpowerconferences.com](http://www.greenpowerconferences.com)

## OCTOBER 2014

### 9 – 11

#### SECOND ANNUAL AFRICA'S PUBLIC OFFICIALS ENERGY AND ENVIRONMENT WORKSHOP

St Georges Hotel and Tshwane University of Technology, Tshwane (Pretoria), South Africa

Contact: Machelane Sinthumule, Events Co-ordinator, Corporate Affairs & Marketing, Tshwane University of Technology

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E-mail: [Sinthumule@tut.ac.za](mailto:Sinthumule@tut.ac.za)

### 19 – 22

#### PLANNING AFRICA 2014

International Convention Centre, Durban, KwaZulu-Natal, South Africa

Contact: Helene Uys, The Conference Company

Tel: 031 303 9852

E-mail: [Helene@confoco.co.za](mailto:Helene@confoco.co.za)

Website: [www.sapi.org.za](http://www.sapi.org.za)

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# Energy Management News

The newsletter is published quarterly by the Energy Research Centre (ERC) of the University of Cape Town. (ERC is an amalgamation in 2004 of two organisations at the University: the former Energy Research Institute and the Energy and Development Research Centre.)

Energy Management News is available free of charge. The articles do not necessarily reflect the views of the editor or of the ERC.

Enquiries, comments, articles, and information on energy events are welcome, and should be sent to:

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